

To  
**The Inspector General of Forest / Scientist C,**  
 Integrated Regional Office (IRO),  
 Ministry of Environment, Forest and Climate Change,  
 Aranya Bhawan, A Wing, Room No. 409,  
 Near CH 3 Circle, Sector - 10A,  
 Gandhinagar - 382007.  
 E-mail: [eccomplianace-gui@gov.in](mailto:eccomplianace-gui@gov.in), [rowz.bpl-mef@nic.in](mailto:rowz.bpl-mef@nic.in)

एकीकृत क्षेत्रीय कार्यालय, गाँधीनगर  
 Integrated Regional Office, Gandhinagar  
 पर्यावरण, वन एवं जल संसाधन विभाग,  
 Ministry of Environment, Forest & Climate Change  
 भारत सरकार / Govt. of India  
 कक्ष क्र. 407 व 409, ए. विंग, अरुणा भवन,  
 Room No.407 & 409, A Wing, Aranya Bhawan  
 गाँधीनगर (गुजरात) / Gandhinagar (Gujarat)

Date: 27.11.2021

02/12/21

**Sub** : Half yearly Compliance report of Environment Clearance of "Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kachchh by M/s. Adani Ports & SEZ Limited"

**Ref** : Environment clearance granted to M/s Adani Ports & SEZ Ltd. vide letter dated 21<sup>st</sup> July, 2004 bearing no. J-16011/30/2003-IA-III.

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of April-2021 to September-2021 is being submitted through soft copy (e-mail communication & CD).

Kindly consider above submission and acknowledge.

Thank you,

Yours Faithfully,

For, M/s Adani Ports and Special Economic Zone Limited

  
**Shalin Shah**  
 Head - Environment & Sustainability

Encl: As above

**Copy to:**

- 1) The Additional Secretary, MoEF&CC, Regional Office (WZ), E-5, Kendriya, Paryavaran Bhawan, Arera Colony, Link Road No. - 3, Bhopal - 462016.
- 2) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003.
- 3) The Zonal Officer, Regional Office, CPCB - Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara - 390023.
- 4) The Member Secretary, GPCB - Head Office, Paryavaran Bhawan, Sector 10 A, Gandhi Nagar - 382010.
- 5) The Director, Forests & Environment Department, Block - 14, 8<sup>th</sup> floor, Sachivalaya, Gandhi Nagar - 382010.
- 6) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham - 370201.

Adani Ports and Special Economic Zone Ltd  
 Adani House,  
 PO Box No. 1  
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 Gujarat, India  
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[info@adani.com](mailto:info@adani.com)  
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Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad - 382421, Gujarat, India

## Chiragsing Rajput

---

**From:** Chiragsing Rajput  
**Sent:** Tuesday, November 30, 2021 7:02 PM  
**To:** ecompliance-guj@gov.in; rowz.bpl-mef@nic.in  
**Cc:** ec-rdw.cpcb@gov.in; 'ro-gpcb-kute@gujarat.gov.in'; ms-gpcb@gujarat.gov.in; 'mefcc.ia3@gmail.com'; 'monitoring-ec@nic.in'; direnv@gujarat.gov.in; Snehal Jariwala  
**Subject:** Half Yearly EC Compliance Report Submission - APSEZ, Mundra - SPM & Pipeline for COT (Apr'21 to Sep'21)  
**Attachments:** 3. EC Compliance Repor\_SPM & Pipeline for COT\_Apr'21 to Sep'21.pdf



Ports and  
Logistics

APSEZL/EnvCell/2021-22/081

To

**The Inspector General of Forest / Scientist C,**  
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**Sub** : Half yearly Compliance report of Environment Clearance of "Single Point Moor Terminal (COT) and connecting pipes at Mundra Port, District Kachchh by M/ Limited"

**Ref** : Environment clearance granted to M/s Adani Ports & SEZ Ltd. vide letter d bearing no. J-16011/30/2003-IA-III.

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**Shalin Shah**

**Head – Environment & Sustainability**

**Encl: As above**

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- 2) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Park Bagh Road, New Delhi-110003.
- 3) The Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMM

Thanks & Regards,  
Chiragsing Rajput  
Environment Cell | Adani Ports & Special Economic Zone Ltd.  
Mob +91 9687678443 | Ext. 59523 | [chiragsing.rajput@adani.com](mailto:chiragsing.rajput@adani.com) | [www.adani.com](http://www.adani.com)  
Adani Corporate House, 8<sup>th</sup> Floor, East Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.



Growth  
with  
Goodness

Our Values: Courage | Trust | Commitment



/AdaniOnline



To

**The Inspector General of Forest / Scientist C,**  
Integrated Regional Office (IRO),  
Ministry of Environment, Forest and Climate Change,  
Aranya Bhawan, A Wing, Room No. 409,  
Near CH 3 Circle, Sector – 10A,  
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Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

# Environmental Clearance Compliance Report of



SPM, Crude Oil Terminal and  
Connecting Pipes

at  
Mundra Port,  
Dist. Kutch, Gujarat  
of

Adani Ports and SEZ Limited

Period:  
April-2021 to September-2021

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

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**EC & CRZ  
Clearance  
Compliance  
Report**

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

- Chronology of company name change from **M/s. Gujarat Adani Port Limited** to **M/s. Adani Ports and Special Economic Zone Ltd.** was submitted along with last half yearly EC Compliance report for the period Oct'20 to Mar'21.



	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

**Half yearly Compliance report of Environment and CRZ Clearance of “Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kutch issued by MoEF vide letter no. J-16011/30/2003-IA.III dated 21st July 2004.**

Sr. No.	Conditions	Compliance Status as on 30-09-2021
<b>A. Specific Condition</b>		
1.	Mangrove afforestation in 25 ha of area, suitably identified in consultation with State Forest Department. The GAPL shall bear the cost of the said land as well as the cost of the plantation of mangroves and its sustenance and implant within 6 months from the date of clearance of this letter. Further, it shall be ensured that mangroves in the vicinity of the salt works are not affected due to the project.	<p>Complied.</p> <p>25 hectare of mangrove plantation with a cost of 10 Lakh is already completed near railway yard in consultation with Dr. Maity, Mangrove consultant of India.</p> <p>There are no salt works within the project area.</p> <p>It may be noted that to enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 2890 ha. Area across the coast of Gujarat. Total expenditure for the same till date is INR 832 lakh.</p> <p>Details on Mangroves afforestation &amp; Green belt development carried out by APSEZ till date is annexed as <b>Annexure – 1</b>.</p> <p>Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to extend multi-species mangrove plantation. Please refer attached <b>Annexure – 2</b> for CSR activity report carried out by Adani Foundation.</p>
2.	In addition to the mangrove plantation, GAPL should also take up massive green belt developments in 30 acres of land in and around the project in consultation with the Forest Department. Detailed plan indicating the area identified	<p>Complied.</p> <p>During the course of development of the project, green belt was developed in 6.18 Hectares of land. Total 7607 trees were planted with the density of 1230 trees per hectare within port premises at a cost of Rs. 25.00 Lakh.</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	for the mangrove plantation as indicated at (i) above and for green belt development along with the financial outlay shall be provided to this ministry within 6 months from the date of receipt of this letter.	<p>This plantation was done in consultation with Gujarat Ecological Commission (as they are one of the authorized agencies of Dept. of Forest &amp; Env. Dept., Govt. of Gujarat).</p> <p>In addition to this, various activities on green belt development and mangrove plantation are being carried out on regular basis by horticulture department. Total expenditures of the horticulture dept. for the financial year of 2021-22 (Till Sep'21) have been INR 605 lakhs.</p> <p>It may be noted that, APSEZ has developed 486.19 ha. area as greenbelt with plantation of more than 9.4 Lacs saplings within the APSEZ area. Details on mangroves afforestation &amp; Green belt development carried out by APSEZ till date is annexed as <b>Annexure – 1</b>.</p>
3.	No dredging activity shall be carried out.	<p>Complied.</p> <p>Construction activities are completed &amp; project is in operation stage. SPM is approximately 8.6 km inside the open sea from the shore where 30 m of draft is naturally available. Hence no dredging is required.</p>
4.	No ground water should be tapped at the project site / within CRZ area.	<p>Complied.</p> <p>No ground water is tapped at the project site. Entire water requirement is fulfilled through APSEZ Desal Water and GWIL.</p>
5.	Adequate facilities as listed in National Oil spill Disaster Contingency Plan for the Mundra Port which includes firefighting equipment of 1200 cum/hr. spray capacity with 2 monitor fitted with the dolphin 2, 3, 4 and 5 oil spill dispersant foam liquid etc. should be maintained and put into operation immediately in case of oil spills.	<p>Complied.</p> <p>Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared.</p> <p>Oil spill contingency response plan is being updated on regular basis and the same was last updated on 01.10.2020 is in place and implemented. Details were submitted along with last half yearly compliance report for the period Oct'20 to Mar'21. And there is no further change.</p>

**Status of the conditions stipulated in Environment Clearance under CRZ notification**

Sr. No.	Conditions	Compliance Status as on 30-09-2021																						
		<p>For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. Oil Spill Contingency Response Plan (OSCRP) prepared by APSEZ is in accordance with the NOSDCP.</p> <p>Regional Level Pollution Response exercise “<b>SWACHCHH SAMUDRA-NW 2019</b>” was carried out by Indian Coast Guard on 18<sup>th</sup> Dec, 2019. All participants from various Oil Handling Agencies and Stakeholders (ICG, GMB Port, DPT Vadinar, IOCL, RIL, NAYARA Energy, BORL, ESBTL Salaya, APSEZL, HMEL, GSFC, PCB, Forest Dept., Customs, Fisheries &amp; DPT Kandla) were participated in this exercise.</p> <p>Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZ already has facilities for combating a Tier-1 spill. Shoreline Resources available with APSEZ, for deployment during shoreline cleanup/emergent situation:</p> <table><tr><th>Item</th><th>Quantity</th></tr><tr><td>Oil Spill Dispersants</td><td>5000 ltr.</td></tr><tr><td>Absorbent pads</td><td>2000 Nos.</td></tr><tr><td>Portable dispersant storage tank: 1000 ltr. Capacity</td><td>1 no.</td></tr><tr><td>Portable pumps</td><td>2 nos.</td></tr><tr><td>Oil Containment Boom-Length 2000 metres, Height -1500 mm, Draft-900mm, Free Board-600mm</td><td>2000 m</td></tr><tr><td>Skimmer-KOMARA 15 Duplex Skimmer System with floating IMP 6 Pump.</td><td>4 Nos.</td></tr><tr><td>12.5T Flexible Floating Storage Tank (PUA).</td><td>3 Nos.</td></tr><tr><td>Lamor Minimax 12 m³ skimmer</td><td>2 sets</td></tr><tr><td>Lamor Side Collector system (Recovery Capacity 123 m³/ hr)</td><td>2 Nos.</td></tr><tr><td>Canadyne Fence Boom (Reel model 7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter</td><td>1 No.</td></tr></table>	Item	Quantity	Oil Spill Dispersants	5000 ltr.	Absorbent pads	2000 Nos.	Portable dispersant storage tank: 1000 ltr. Capacity	1 no.	Portable pumps	2 nos.	Oil Containment Boom-Length 2000 metres, Height -1500 mm, Draft-900mm, Free Board-600mm	2000 m	Skimmer-KOMARA 15 Duplex Skimmer System with floating IMP 6 Pump.	4 Nos.	12.5T Flexible Floating Storage Tank (PUA).	3 Nos.	Lamor Minimax 12 m³ skimmer	2 sets	Lamor Side Collector system (Recovery Capacity 123 m³/ hr)	2 Nos.	Canadyne Fence Boom (Reel model 7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter	1 No.
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	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021	
		Floating Tank	25 m <sup>3</sup>
		<ul style="list-style-type: none"> <li>• 10 Tugs are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required.</li> <li>• 9 Tugs are fitted with a fire curtain and remote controlled fire monitors.</li> <li>• Dolphin 11 has firefighting system of 1200 m<sup>3</sup>/hr. along with 20 ton lifting "A" frame and diving support facility.</li> <li>• The equipment are being kept in working condition. Routine inspection, maintenance and testing is performed as per the stipulated requirements.</li> <li>• Detail of resource available at APSEZL is provided in annexure 3 of Oil Spill Contingency Plan.</li> </ul>	
6.	The duration of construction phase of the project should be kept to a maximum of 8 months to avoid impact on marine environment and birds as suggested by NIO.	<p>Already complied. Not applicable at present.</p> <p>Construction activity is already completed and the project is in operation.</p>	
7.	It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project.	<p>Not Applicable</p> <p>Location of SPM is unmanned (approximately 8.6 km inside the open sea from the shore) hence; there is no displacement of people, houses or fishing activity as a result of the project.</p>	
8.	The project proponents must make necessary arrangements for disposal of solid wastes and for the treatment of effluents / liquid wastes. It must be ensured that the effluents / liquid wastes are not discharged into the seawater.	<p>Complied.</p> <p>Used oil / Spent oil generated is being sold to registered recyclers time to time.</p> <p>No other type of hazardous waste as well as no effluent or liquid waste are generated from operation of SPM or discharged into the sea water.</p> <p>The non-hazardous solid waste generated from on-shore SPM operational activity is being handled and managed as per 5R concept for environmentally sound management.</p> <p>In order to analyzed marine water quality, marine sampling is being carried out at a location nearby SPM by NABL and MoEF&amp;CC accredited agency namely</p>	

**Status of the conditions stipulated in Environment Clearance under CRZ notification**

Sr. No.	Conditions	Compliance Status as on 30-09-2021																																														
		<p>M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Apr'21 to Sep'21 is mentioned below.</p> <p><b>Total Sampling Locations: 09 Nos.</b></p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr><tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr><tr><td>pH</td><td>--</td><td>8.47</td><td>8.02</td><td>8.48</td><td>7.95</td></tr><tr><td>TSS</td><td>mg/L</td><td>135</td><td>88</td><td>133</td><td>80</td></tr><tr><td>BOD (3 Days @27 °C)</td><td>mg/L</td><td>5.0</td><td>2.26</td><td>ND*</td><td>ND*</td></tr><tr><td>DO</td><td>mg/L</td><td>6.4</td><td>5.8</td><td>6.0</td><td>5.7</td></tr><tr><td>Salinity</td><td>ppt</td><td>37.4</td><td>34.86</td><td>37.7</td><td>35.2</td></tr><tr><td>TDS</td><td>mg/L</td><td>38842</td><td>35964</td><td>39117</td><td>36276</td></tr></table> <p>*ND = Not Detectable</p> <p>Please refer <b>Annexure – 3</b> for detailed analysis reports. Approx. INR 9.56 Lakh is spent for all environmental monitoring activities during the compliance period i.e. Apr'21 to Sep'21 for overall APSEZ, Mundra.</p>	Parameter	Unit	Surface		Bottom		Max	Min	Max	Min	pH	--	8.47	8.02	8.48	7.95	TSS	mg/L	135	88	133	80	BOD (3 Days @27 °C)	mg/L	5.0	2.26	ND*	ND*	DO	mg/L	6.4	5.8	6.0	5.7	Salinity	ppt	37.4	34.86	37.7	35.2	TDS	mg/L	38842	35964	39117	36276
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TDS	mg/L	38842	35964	39117	36276																																											
9.	The camps of labor shall be kept outside the Coastal Regulation Zone area. Proper arrangements for cooking fuel shall be made for the labor during construction phase so as to ensure that mangroves are not cut / destroyed for this purpose.	<p>Complied. Not applicable at present.</p> <p>Construction activities are completed and project is in operational phase.</p>																																														
10.	Regular drills should be conducted to check the effectiveness of the on-site Disaster Management Plan. The recommendations made in the Environmental Management Plan and Disaster Management Plan, as contained in the Environmental Impact Assessment and Risk analysis reports of the project, shall be effectively implemented.	<p>Complied.</p> <p>Disaster Management plan is in place and implemented. Updated DMP was submitted to the MoEF &amp; CC along with half yearly compliance report for the period from Apr – 2016 to Sep – 2016 and there is no further change.</p> <p>On Site Emergency Response Plan and Crisis Management Plan is in place and implemented. The updated Onsite emergency plan is attached as <b>Annexure – 4</b>.</p>																																														



	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021				
		<p>Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. The Oil spill contingency response plan updated on 01.10.2020 is in place and implemented. Please refer Compliance of Specific Condition No. 5 for further details.</p> <p>Mock drills are conducted regularly by APSEZ. Last Oil Spill Mock drill was conducted on 24.03.2020. Details were submitted along with last half yearly compliance report for the period Oct'20 to Mar'21. No OSR mock drill was conducted between Apr-Sep 2021 due to strong SW wind.</p> <p>All the recommendations given in the report of NIO and Tata AIG Risk Management Services are implemented. Few examples are provided below.</p> <p><b>Few Marine EIA recommendations:</b></p> <table><tr><td>Temporary colonies of workforce should be located sufficiently away from the HTL with proper sanitation. Adequate arrangement of fuel supply to the workers should be made to discourage them from using mangroves for firewood.</td><td>Construction activity is already completed.  Most of the construction labours were residing in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. were provided by APSEZL.</td></tr><tr><td>As a step towards improvement in marine environment quality, mangrove afforestation of intertidal mudflats should</td><td>25 hectare of mangrove plantation with a cost of 10 Lakh is already completed near railway yard in consultation with Dr. Maity, Mangrove consultant of India. Details on mangroves afforestation &amp; Green belt development carried out by APSEZ till date is annexed as</td></tr></table>	Temporary colonies of workforce should be located sufficiently away from the HTL with proper sanitation. Adequate arrangement of fuel supply to the workers should be made to discourage them from using mangroves for firewood.	Construction activity is already completed.  Most of the construction labours were residing in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. were provided by APSEZL.	As a step towards improvement in marine environment quality, mangrove afforestation of intertidal mudflats should	25 hectare of mangrove plantation with a cost of 10 Lakh is already completed near railway yard in consultation with Dr. Maity, Mangrove consultant of India. Details on mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as
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**Status of the conditions stipulated in Environment Clearance under CRZ notification**

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		be encouraged through adequate institutional support.	Annexure – 1.
		The prevailing traffic control management of deep-sea ships navigating through the gulf needs thorough review and introduction of state of the art VTS should be considered.	<p>APSEZ is practicing well defined traffic control procedure.</p> <p>A VTS service for Gulf of Kutch is provided by the VTS Gulf of Kutch, operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India.</p> <p>Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77.</p> <p>Arrival and departure information before arrival and departure respectively in Gulf of Kutch is provided to VTMS information cell through agent or by directly sending mail to <a href="mailto:vtsmanagergulfofkutch@yahoo.com">vtsmanagergulfofkutch@yahoo.com</a> and <a href="mailto:vtsgok@yahoo.com">vtsgok@yahoo.com</a></p> <p>Mundra port has subscribed and taking VTMS feed from Kandla from link <a href="http://www.vts.gov.in">www.vts.gov.in</a>.</p>
		<b>Few Tata AIG Risk Assessment Recommendations:</b>	
		There should be facilities of boom, skimmer, dispersant, diving suits, firefighting equipment and excellent communication facilities.	10 Dolphin tugs fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required; out of them 9 Dolphin Tugs are fitted with a fire curtain and remote-controlled fire monitors.
	In the event of oil spillage the oil slick normally will be carried away by water current and wind. It is very difficult to identify oil slick patches by	Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill	





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		boats/vessels, hence it is suggested that GAPL may take help from coast guard/Navy for aerial surveillance in order to identify and monitor oil slick movement.	contingency plan updated & approved by coast guard, which was submitted during last half yearly compliance report.
11.	The entire stretch of the pipelines shall be buried underground except at the booster pumping station, which will be properly fenced and the station would be manned round the clock. The buried lines will be protected with anticorrosive coal tar based coating. The coating will be tested by high voltage detector in accordance with prescribed standards.	<p>Complied.</p> <p>Entire SPM pipeline is buried underground. Total pipeline length is 15.4 km including 8.6 km inside the open sea and 6.8 km on landward side.</p> <p>Booster pump is not provided throughout the pipeline. However the material is transferred by using pumping system of respective vessels berthed at SPM.</p> <p>Anticorrosive 3 LPE coating is provided to the portion of onshore pipeline while offshore pipeline is also protected by concrete coating.</p> <p>For offshore pipeline, Cathodic Potential (CP) survey is being done once in five years. Last CP inspection of offshore pipeline done in Oct'2017 and report for the same was provided along with EC compliance report submission for the period of Apr'17 to Sep'17.</p> <p>For onshore pipeline also CP survey is being done by APSEZ on monthly bases. Report of monitoring done within this compliance period is enclosed as <b>Annexure – 5</b>.</p>	
12.	Markers shall be installed at every 30 m to indicate the position of the line. Regular patrolling of the pipelines needs to be done. This will help in identifying any activity that have the potential to cause pipeline damage or to identify small leaks whose effects are too small to be detected by instrument.	<p>Complied.</p> <p>Markers are installed at every 30 m to indicate position of pipeline. Details of the same were submitted during half yearly EC Compliance report for the period Oct'18 to Mar'19.</p> <p>Pressure at vessel and reception points of transfer line is being monitoring during operation to ensure no leakage in pipeline.</p> <p>Regular patrolling of pipeline is being done by APSEZL</p>	

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Sr. No.	Conditions	Compliance Status as on 30-09-2021								
		<p>Security Department. Following mitigation plan is followed in case of small leaks leading to spills.</p> <table><tr><th>Activity</th><th>Adequacy of Measures</th></tr><tr><td>Hose Connection / Disconnection (liquid operation)</td><td>It is collected in deep tray in case of leakage. Stop the supply of liquid discharge.</td></tr><tr><td>Hose Connection / Disconnection (liquid operation)</td><td>Immediately stop the supply of liquid discharge. Marine break away coupling available for control of load.</td></tr><tr><td>Tanker discharge operation (SPM operation)</td><td>Emergency operation shut off (stopping the discharge)</td></tr></table>	Activity	Adequacy of Measures	Hose Connection / Disconnection (liquid operation)	It is collected in deep tray in case of leakage. Stop the supply of liquid discharge.	Hose Connection / Disconnection (liquid operation)	Immediately stop the supply of liquid discharge. Marine break away coupling available for control of load.	Tanker discharge operation (SPM operation)	Emergency operation shut off (stopping the discharge)
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Tanker discharge operation (SPM operation)	Emergency operation shut off (stopping the discharge)									
13.	There should be display boards at critical locations along the pipeline viz. road / rail /river crossings giving emergency instructions as well as contact details of GAPL. This will ensure prompt information regarding location of accident during any emergency. Emergency Information board should contain emergency instructions in addition to contact details.	<p>Complied.</p> <p>Display boards with emergency contact detail are provided at critical locations.</p> <p>Photographs of the same were submitted as part of the compliance report for the period from Oct'16 to March'17 and there is no farther change.</p>								
14.	During operation phase, proper precautions should be taken to avoid any oil spills and no oily wastes shall be discharged into the water bodies.	<p>Complied</p> <p>During operation, SPM team takes responsibility and actively supervises the operation. Inspection and maintenance activities are carried out regularly for prevention of any kind of oil spill at SPM.</p> <p>No liquid waste are generated / discharged from the project activity. In order to analyze marine water quality, marine sampling is being carried out at a location near SPM. Please refer condition no 8 for further details.</p>								
15.	All conditions stipulated by the Forest and Environment Department, Government of Gujarat should be strictly implemented.	<p>Complied</p> <p>All the conditions stipulated by Forest and Environment Department are being complied. Point wise compliance report of CRZ recommendations issued vide letter No. <b>ENV-10-2002-124-P (Part1)</b></p>								

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		dated 8 <sup>th</sup> October 2003 is enclosed as <b>Annexure- A</b> .
16.	All conditions stipulated in Gujarat Pollution Control Board vide their letter No. PC/NOC/381/1039 dated 8 <sup>th</sup> January, 2002 should be implemented.	<p>Complied.</p> <p>Consent to Operate (CC&amp;A) was granted by GPCB based on the compliance of conditions of the No Objection Certificate (CtE). This CC&amp;A is renewed from time to time based on its validity. The last renewal was obtained vide GPCB consent no. WH 86980 valid till 26<sup>th</sup> April, 2022. Copy of the same was submitted as part of compliance report for the duration of Apr'17 to Sep'17 and there is no further change.</p>
<b>B. General Condition</b>		
1	Construction of the proposed structures should be undertaken meticulously confirming to the existing Central / local rules and regulations. All the construction designs / drawings relating to the proposed construction activities must have approvals of the concerned State Government Department / Agencies.	<p>Complied. Not applicable at present.</p> <p>Construction activities are completed &amp; project is in operation stage. Entire SPM pipeline is buried underground. Total pipeline length is 15.4 km including 8.6 km inside the open sea and 6.8 Km on landward side.</p> <p>Construction activities are carried out based on the approvals of the concerned state government department and prevailing laws.</p>
2	The project authorities should take appropriate community development and welfare measures for the villagers in the vicinity of the project site, including drinking water facilities. A separate fund should be allocated for this purpose.	<p>Complied</p> <p>APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation. Adani Foundation is working in main four persuasions as below.</p> <ul style="list-style-type: none"> <li> Education</li> <li> Community Health</li> <li> Rural Infrastructure</li> <li> Sustainability Livelihood</li> </ul> <p>Brief information about activities in the main four persuasions is mentioned below. Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations during this</p>



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Sr. No.	Conditions	Compliance Status as on 30-09-2021								
		compliance period Activities carried out for the same are summarized as below.								
		<table><tr><th>Area</th><th>Activity</th></tr><tr><td>Fight Against COVID-19</td><td><ul style="list-style-type: none"><li>Started Covid care centre service at Samudra town ship to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment &amp; co-ordination.</li><li>AF team voluntary performed patients care and co-ordination duty at GKGH, Bhuj for 23 days.</li><li>AHMPL, Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD.</li><li>Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill.</li><li>Provide Dead body van service to shift covid demise patients to Crematorium with all dignity.</li><li>Precautionary voice message dissemination through Awaj de voice message service Over Community.</li><li>Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution</li></ul></td></tr><tr><td>Community Health</td><td><ul style="list-style-type: none"><li>Mobile Heath Care Units and Rural Clinics</li><li>9 Rural Clinics</li><li>06 from Mundra, 02 from Anjar &amp; 01 from Mandvi block treated;</li><li>3843 patients</li><li>31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit</li><li>3364 patients benefited during six months</li><li>06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital.</li><li>471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.</li><li>For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka.</li><li>16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.</li></ul></td></tr><tr><td>Sustainable Livelihood – Fisher folk, Agriculture &amp; Women</td><td><ul style="list-style-type: none"><li>Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with water through GWIL and Mundra Gram Panachayat from which 355 households get benefited.</li><li>11 Fisher Youth were interviewed among that 5</li></ul></td></tr></table>	Area	Activity	Fight Against COVID-19	<ul style="list-style-type: none"><li>Started Covid care centre service at Samudra town ship to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment &amp; co-ordination.</li><li>AF team voluntary performed patients care and co-ordination duty at GKGH, Bhuj for 23 days.</li><li>AHMPL, Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD.</li><li>Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill.</li><li>Provide Dead body van service to shift covid demise patients to Crematorium with all dignity.</li><li>Precautionary voice message dissemination through Awaj de voice message service Over Community.</li><li>Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution</li></ul>	Community Health	<ul style="list-style-type: none"><li>Mobile Heath Care Units and Rural Clinics</li><li>9 Rural Clinics</li><li>06 from Mundra, 02 from Anjar &amp; 01 from Mandvi block treated;</li><li>3843 patients</li><li>31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit</li><li>3364 patients benefited during six months</li><li>06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital.</li><li>471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.</li><li>For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka.</li><li>16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.</li></ul>	Sustainable Livelihood – Fisher folk, Agriculture & Women	<ul style="list-style-type: none"><li>Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with water through GWIL and Mundra Gram Panachayat from which 355 households get benefited.</li><li>11 Fisher Youth were interviewed among that 5</li></ul>
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			<p>have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022.</p> <ul style="list-style-type: none"> <li>Facilitation of Pagadiya Welfare scheme &amp; boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department, Bhuj for pagadiya and boat License.</li> <li>During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation.</li> <li>To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield.</li> <li>23 wormicompost unit have been set-up. Which is facilitated through Government with farmer Contribution.</li> <li>50 Farmers have started to preparing Jiva Mrut &amp; Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation.</li> <li>Two Farmers Groups is registered with ATMA–Agricultural technology management Agency–it will leverage Government schemes.</li> <li>Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg.</li> <li>Fodder Cultivation-To made fodder sustain villages -25 Acre Gauchar land of Siracha village is being cultivated for the same.</li> <li>Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly.</li> <li>Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm –Total 11000 plants.</li> <li>Skill Development and Income Generation –Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job.</li> </ul>
		Education	<ul style="list-style-type: none"> <li>The Virtual and Offline classes (Shrisikshan) with parents permission with all precautionary measures as Government Guide Lines. Its very encouraging that inspired by Our Sheri Sikshan Initiative-Gov Teachers also started same approach.</li> <li>Online Outreach – 259 Students</li> <li>Individual Home visit – 415 Students</li> <li>Sheri sikshan and school students - 838 Students</li> <li>Uthhan First phase 17 Schools and 2951 students</li> </ul>

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			<p>were part of the program, and second phase 14 Schools and 1952 Students were part of the programme. Total 4903 students are getting benefit from Utthan.</p> <ul style="list-style-type: none"> <li>• Coaching of 49 students for National Means cum Merit Cum Scholarship Scheme (NMMS).</li> <li>• Coaching of 34 Students for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Months.</li> <li>• Total 394 webinar and capacity building program were arranged for Utthan Sahayaks and Government Officers.</li> <li>• Arranged Virtual Tour regarding Plastic Waste Management with Municipal Corporation, Surat and aware about waste Collection, Segregation, treatment and Disposal Process. Total 178 Students were participated for the same.</li> <li>• 508 underprivileged students of Fisherman &amp; Maldhari communities from 8 villages taking education at the Adani Vidya Mandir school</li> <li>• Celebration of various days in villages school.</li> </ul>
	Rural Infrastructure & Environmental Sustainability		<p>Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area.</p> <p><b><u>WORK COMPLETED</u></b></p> <ul style="list-style-type: none"> <li>• 31 RRWHS structure have been completed</li> <li>• 45 Bore-well recharging activity is completed.</li> <li>• Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara</li> <li>• Earthen bund Repairing work at Pond, Luni.</li> <li>• Pre-monsoon activity Approach repairing, Village Pond Lake strengthen and river cleaning (babul cutting) work is ongoing in Various Villages</li> <li>• Approach Road repairing at Various Fishermen Vasahat (ARC).</li> </ul> <p><b><u>WORK IN PROGRESS</u></b></p> <ul style="list-style-type: none"> <li>• Construction of common Gathering Rooms at Wandi village.</li> <li>• Development of Chain Link Fencing at tree forestation at Nana Kapaya.</li> <li>• Construction of community gathering Shed at Mundra -work in final Stage.</li> </ul> <p><b><u>ENVIRONMENT SUSTAINABILITY PROJECTS</u></b></p> <ul style="list-style-type: none"> <li>• <b>Miyawaki Forest Development, Nana Kapaya</b> - Plantation of 4965 saplings of different 42 species is completed which will result in dense forest within 2 years</li> <li>• <b>Smruti Van</b> – Plantation more than 40,000 sapling with more than 115 species through Miyawaki methodology.</li> <li>• <b>Ecosystem Restoration, Guneri</b> – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years</li> </ul>

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			<ul style="list-style-type: none"> <li>• <b>Multi-Species Mangrove Park</b> - Adani Foundation at Mundra 's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 hecter development is planned to extend biodiversity park.</li> <li>• <b>Home biogas</b> - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages.</li> <li>• <b>Seaweed Culture</b> - A pilot cultivation facility (5 KL tanks in 6 nos.) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red seaweeds Kappaphycus alvarezii, Gracilaria dura and green seaweed Ulva.</li> <li>• <b>Water Conservation Projects –</b> <ul style="list-style-type: none"> <li>✓ A large number of water harvesting structure (18 Nos. of check dams and Augmentation of 2check dams (1 Check dam current year).</li> <li>✓ Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan</li> <li>✓ Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage</li> <li>✓ Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to.</li> <li>✓ Drip Irrigation 980 Farmers (56 Application current year)</li> <li>✓ Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.</li> <li>✓ Luni Pond Bund Repairing Work.</li> </ul> </li> </ul>
		Skill Development	<p>Over the last few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes.</p> <p><b><u>ASDC, Mundra</u></b></p> <ul style="list-style-type: none"> <li>• RPL–Recognition of Prior Learning Training given to Adani Group Contractual Employees–Total 218 Employees have been benefitted</li> <li>• Junior Crane Operator practical training to 36 Candidates for (Group-1, 2 &amp; 3) At MICT Port.</li> <li>• Guest Lecture on Mehendi products, Beauty Therapist &amp; Resin art Total 100 candidate have been benefitted.</li> <li>• Certificate Distributed to Mud work candidates at</li> </ul>

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Sr. No.	Conditions	Compliance Status as on 30-09-2021
		<div> <p>MICT Colony – 30 women learnt Mud work.</p> <ul style="list-style-type: none"> <li>• Volunteer Support in GKGH and Adani Hospital during covid pandemic.</li> <li>• 21 students were coordinated for interview in seabird CFS of Mundra.</li> </ul> <p><b>ASDC, Bhuj</b></p> <ul style="list-style-type: none"> <li>• Launched New online General Duty Assistant &amp; Beauty Therapist for 63 candidates under (DDU-GKY).</li> <li>• Soft Skills Training Certificate distribution to Prisoners of Palara Special Jail.</li> <li>• Guest lecture on “Tally: Older vs New” &amp; “Concept of Emerging E-way Bill”</li> </ul> <p><b>Total Beneficiaries:</b></p> <ul style="list-style-type: none"> <li>• Technical Training: 365 Nos.</li> <li>• Sof-Skill Training: 52 Nos.</li> </ul> </div> <p>Please refer <b>Annexure – 2</b> for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2021-22 is to the tune of INR 1628.45 lakh. Out of which, Approx. INR 423.18 lakh are spent during current compliance period i.e. Apr'21 to Sep'21.</p>
3	<p>To meet any emergency situation, appropriate fire – fighting system should be installed. Appropriate arrangements for uninterrupted power supply to the environment protection equipment and continuous water supply for the firefighting system should be made.</p>	<p>Complied.</p> <p>Tug (Dolphin-11) has firefighting system of 1200 m3/hr. along with 20 ton lifting “A” frame and diving support facility for support at offshore.</p> <p>With respect to onshore facilities valve station, pumping station and transportation pipeline, foam base fire tender is available.</p> <p>With respect to onshore facilities valve station, pumping station and transportation pipeline, foam base fire tender, fire water network is available Fire-fighting system has been installed and maintained to meet emergency situations. Additionally for emergency, DG Set is provided for fire water pumps to ensure continuous water supply for firefighting purpose. Detail information on firefighting facility available at APSEZL was submitted as part of the compliance report for the period from Oct'16 to March'17 and there is no farther change.</p>
4	<p>A separate Environment Management Cell with suitably</p>	<p>Complied.</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	qualified staff to carry out various environment related functions should be set up under the charge of a Senior Executive who will report directly to the Chief Executive of the Company.	<p>APSEZL has a well-structured Environment Management Cell, staffed with qualified manpower for implementation of the Environment Management Plan at site. Site team report to Sr. Manager (Environment) at Corporate, who heads the Environment Management Cell who directly reports to the top management.</p> <p>Environment Management Cell Organogram is attached as <b>Annexure – 6</b>.</p>
5	The funds earmarked for environment protection measures should be maintained in a separate account and there should be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards should be reported to this Ministry's Regional Office at Bhopal.	<p>Complied.</p> <p>Separate budget for the Environment Protection measures is earmarked every year. All environmental and horticulture activities are considered at group level and budget allocation is also done accordingly. No separate bank account is maintained for the same however, all the expenses are recorded in advanced accounting system of the organization.</p> <p>Budget for environmental management measures (including horticulture) for the FY 2021-22 is to the tune of INR 1332 lakh. Out of which, Approx. INR 876 lakh are spent during the year 2021-22 (till Sep'21). Detailed breakup of the expenditures for the past 3 years is attached as <b>Annexure – 7</b>.</p>
6	Full support should be extended to the officers of this Ministry's Regional Office at Bhopal and the officers of the Central and State Pollution Control Board by the project proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental protection activities.	<p>Complied</p> <p>APSEZL is always extending full support to the regulatory authorities during their visit to the project site.</p> <p>Last visit of Regional Office, GPCB was done on 20.07.2017 for SPM facility. APSEZL has submitted the reply to the site visit report vide letter dated 04.08.2017 incorporating details of action taken in respect of the observations of the GPCB representative. Details were submitted during half yearly EC Compliance report for the period Apr'17 to Sep'17.</p> <p>There was no visit carried out by any SPCB during the compliance period of Oct'20 to Mar'21 with respect to</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
		<p>SPM project.</p> <p>Inline to the compliance certification process of Environment Clearance condition of Waterfront Development Plan, RO, MoEF&amp;CC Bhopal had visited the site on 27<sup>th</sup> &amp; 28<sup>th</sup> January, 2020 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&amp;CC). During the said compliance verification visit and as per the compliance certification received, there was no major non-compliance observed.</p> <p>Inline to the compliance certification process of Consent to Operates of existing facilities developed under Waterfront Development Plan, RO, GPCB, Gandhidham had visited the site on 17<sup>th</sup> March, 2021 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer GPCB). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed.</p> <p>Inline to the compliance of MoEF&amp;CC Order dated 18<sup>th</sup> September, 2015, Joint Review Committee (JRC) comprising officials from various competent authorities visited the APSEZ, Mundra from 1<sup>st</sup> to 3<sup>rd</sup> September, 2021 to monitor the progress of implementation of the conditions stipulated in the order. APSEZ provided all requisite information and documents required by the JRC.</p>
7	In case of deviation or alteration in the project including the implementing agency, a fresh reference should be made to this Ministry for modification in the clearance conditions or imposition of new one for ensuring environmental protection. The project proponents should be responsible for implementing	<p>Point noted.</p> <p>There is no change in the approved project proposal.</p>



	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	the suggested safeguard measures.	
8	This Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	Point noted.
9	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection, which should be complied with.	Point noted.
10	A copy of the clearance letter should be marked to the concerned Panchayat / local NGO, if any, from whom any suggestion / representation has been received while processing the proposal.	Not applicable at present
11	State Pollution Control Board / Committee should display a copy of the clearance letter at the District Industries Center and Collector's Office/ Tehsildar's Office for 30 days from the date of receipt of this letter.	Not Applicable This condition does not belong to project proponent.
12	The project proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letter are available with the Gujarat Pollution Control Board and may also be	Already Complied.

	<b>Adani Ports and Special Economic Zone Limited, Mundra</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated in Environment Clearance under CRZ notification</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	seen at the website of the Ministry of Environment & Forests at <a href="http://www.envfor.nic.in/">http://www.envfor.nic.in/</a>	
13	The project proponents should inform regional Office Bhopal as well as the Ministry, the date of financial closure and final approval of the project by the concerned authority and the date of start of work.	Already Complied
14	The project proponent will obtain Forest clearance for any stretch of land if it passes through the forest land.	Not Applicable No forest land was involved in the project.
15	So as to maintain ecological features and avoid damage to the ecosystem, movement of vehicles in the Inter Tidal Zone shall be restricted to minimum.	Complied.  All activities are carried out as per the permissions obtained from competent authorities. No unauthorized movement of vehicles is allowed in the intertidal zone.
16	Since the pipeline passes along mangrove areas and the mud flats of Mundra area, the project proponents will ensure adequate protection to mangroves.	Complied. Not applicable at present Construction activities are completed & project is in operation stage. Please refer to specific condition no 1 for detailed reply regarding mangrove plantation activity.
17	Budgetary break up for Environmental Management Plan for the project to be mentioned.	Complied.  Please refer to general condition no 5 for detailed reply regarding budgetary break up.

# **Compliance Report of CRZ Recommendations**

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

**Half yearly Compliance report of CRZ recommendation for “SPM,COT and connecting pipeline at Mundra Port, Dist. Kutch in Gujarat” issued by DoEF, GOG vide letter no. ENV-10-2002-124-P (Part 1) dated 8<sup>th</sup> October 2003.**

Sr. No.	Conditions	Compliance Status as on 30-09-2021
1	The provision of the CRZ notification of 1991 and its amendments issued from time to time shall be strictly complied with by the GAPL.	<p>Complied.</p> <p>Construction activities are completed and the project is in operation phase. All stipulations with respect to the CRZ notification and its subsequent amendments are complied with.</p>
2	This recommendation is only for those activities proposed to be commissioned before the end of the year 2008 as mentioned in the bar chart submitted by GAPL.	<p>Point noted.</p> <p>Construction activities are completed and the project is in operation phase.</p>
3	A separate clearance shall be obtained by the GAPL for construction of the SPM No. 3 and 4, corresponding pipelines and COTs after demonstrating the compliance of the conditions, ecological upliftment activities undertaken successfully and mitigative measures implemented while developing the SPM no.1 and corresponding COT. A regional EIA shall also be commissioned immediately by the GAPL and all future development should be based on the outcome of the said regional EIA only.	<p>Point Noted.</p> <p>APSEZL has only developed SPM no. 1 so far. SPM no. 3 and 4 are not developed yet and required permissions for the same will be obtained by following procedures mentioned in respective notifications.</p>
4	Before commissioning of the construction activities, the construction design and pipeline alignment shall be validated/ approved by National Institute	<p>Complied.</p> <p>Construction activities are completed and the project is in operation phase.</p> <p>The EIA report was prepared by NIO and specific design</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	<p>Oceanography to ensure that there is no negative impact on the coastal morphology, hydrodynamics and ecological systems including the corals, if any. The mitigative measures as may be suggested by the NIO for this purpose shall be implemented by the GAPL.</p>	<p>considerations were taken into account for carrying out various studies for preparation of the same. Findings of the studies were considered before commissioning of the construction activities.</p> <p>There are no corals present at the project site.</p>
5	<p>A comprehensive EIA shall be prepared and submitted to this Department by the GAPL, before commissioning of the SPM. All the suggestions for environmental protection /management that may be given in the comprehensive EIA shall be implemented by the GAPL.</p>	<p>Complied.</p> <p>EIA study has been completed and report is already submitted to MoEF&amp;CC and other concerned authorities. Based on the same, Environment and CRZ clearance was granted by MoEF&amp;CC.</p> <ul style="list-style-type: none"> <li>• A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region inline to ToR issued by GCZMA. CIA Report was prepared inline to the ToR by Chola MS and the same was submitted to the GCZMA on 30.04.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19.</li> <li>• Presentation on the findings of the report was made to GCZMA committee on 4<sup>th</sup> October 2019 and after detailed discussion, authority has decided to constitute committee to discuss the details of the report further.</li> <li>• Reminder Letter vide dated 07.09.2020 &amp; 10.03.2021 submitted to the GCZMA, Gandhinagar for further directives to present the findings of the CIA report in detail. Details of the same were submitted along with last half yearly EC Compliance report for the period Oct'20 to Mar'21.</li> </ul> <p>However, APSEZ is already complying with the Environment Management Plan (applicable to APSEZ) suggested in Cumulative Impact Assessment report. The detailed compliance, applicable to APSEZ is attached as <b>Annexure – 8</b>.</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
6	The ground water shall not be tapped in any case to meet with the water requirements during construction and/or operation phases.	<p>Complied.</p> <p>APSEZ does not draw any ground water for the water requirement. Present source of water for entire port and SEZ is desalination plant and/or Gujarat Water Infrastructure Limited.</p>
7	The GAPL shall ensure that the free flow of water in the intertidal area is not hampered due to proposed construction activities for pipeline corridor as well as other activities including the COT. Further, it shall be ensured by the GAPL that the nearby mangroves are not at all affected due to proposed development activities specifically the COT.	<p>Complied.</p> <p>Construction activity is already completed and the project is in operation phase.</p> <p>Free flow of water in the intertidal area is not hampered due to any operational activities. There are no filling or reclamation activities done at any of the creeks or mangrove areas in the vicinity of the project. As per the bathymetry study carried out by NCSCM in 2017-18, it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water.</p> <p>NCSCM study on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ and the same was submitted to the GCZMA on 04.06.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19.</p> <p>NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around was submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&amp;CC for their examination and recommendation vide (with a copy to MoEF&amp;CC vide letter dated 04.06.2018 &amp; reminder letter vide dated 4<sup>th</sup> Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4<sup>th</sup> October 2019 and the recommendation for the same has been received vide email dtd 22<sup>nd</sup> Sept, 2020 with conditions. Details of the same were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21.</p> <p>As a part of GCZMA recommendations and NCSCM</p>

**Status of the conditions stipulated under CRZ Recommendation**

Sr. No.	Conditions	Compliance Status as on 30-09-2021		
		mangrove conservation action plan, APSEZ has undertaken following activities.		
		Sr. No.	Recommendations	Compliance
		1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"> <li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li> <li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%</li> <li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction.</li> <li>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</li> <li>The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</li> </ul>
		2.	Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> <li>APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.</li> <li>The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.</li> <li>The cost of the said activity was INR 1.0 Lacs.</li> </ul>
		3.	Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> <li>Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has</li> </ul>



	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021		
				<p>been removed manually.</p> <ul style="list-style-type: none"> <li>The cost of the said activity was INR 1.2 Lacs.</li> </ul>
		4.	Awareness of mangroves importance in surrounding communities	<ul style="list-style-type: none"> <li>Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves.</li> <li>Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during last FY 2021-22 (Till Sep'21).</li> <li>Village Gauchar land development for the fodder cultivation to made fodder sustain village &amp; Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre &amp; Zarpara – 25 Acre done which resulted in total production of 82 ton.</li> <li>Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas.</li> <li>Refer CSR report attached as Annexure – 3.</li> </ul>
		<p>Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of last half yearly EC compliance report for the period Oct'20 to Mar'21.</p>		
8	The GAPL shall take up massive mangroves plantation activities in addition 25 Ha. of area suitably identified in consultation with the office of the Principal Chief Conservator of Forests, GoG, as well as this Department.	<p>Complied.</p> <p>Construction activities are completed &amp; project is in operation stage. Please refer to specific condition no 1 of the compliance of EC and CRZ clearance for detailed reply regarding mangrove plantation activity.</p>		

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<b>Status of the conditions stipulated under CRZ Recommendation</b>		


Sr. No.	Conditions	Compliance Status as on 30-09-2021
	The GAPL shall bear the cost of the said land as well as the cost of the plantation of mangroves & its sustenance for a reasonable period of time.	
9	In addition to the mangroves plantation, the GAPL shall also take up massive greenbelt development in and around the project site in consultation with the Forest Department.	<p>Complied.</p> <p>Construction activities are completed &amp; project is in operation stage. Please refer to specific condition no 2 of the compliance of EC and CRZ clearance for detailed reply regarding greenbelt development activity.</p>
10	The GAPL shall provide financial contribution as many as decided by this department for any common study like carrying capacity for the Gulf of Kachchh as well as for any common facilities including Vessels Traffic Management System in the Gulf of Kachchh, for the purpose of the environment protection/management.	<p>Complied.</p> <p>APSEZ is practicing well defined traffic control procedure.</p> <p>A VTMS service for Gulf of Kutch is provided by the VTS Gulf of Kutch, operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India.</p> <p>Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77.</p> <p>Arrival and departure information before arrival and departure respectively in Gulf of Kutch is provided to VTMS information cell through agent or by directly sending mail to <a href="mailto:vtmanagergulfofkutch@yahoo.com">vtmanagergulfofkutch@yahoo.com</a> and <a href="mailto:vtsgok@yahoo.com">vtsgok@yahoo.com</a></p> <p>Mundra port has subscribed and taking VTMS feed from Kandla from link <a href="http://www.vts.gov.in">www.vts.gov.in</a>.</p> <p>Necessary financial contribution if require will be provided on hearing from MOEF&amp;CC.</p>
11	The GAPL shall provide financial support in implementation of National Green Corps scheme (being implemented in Gujarat by the GEER Foundation) in	<p>Complied</p> <p>Necessary contribution if require will be provided on hearing from GEER foundation to support NGC scheme.</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	Kachchh district in consultation with Forests & Environment Department.	
12	The GAPL shall bear the cost of the external agency that may be appointed by the Forests and Environment Department, GoG for supervision/monitoring of their activities during construction and/or operational phases.	<p>Point noted.</p> <p>APSEZ will provide full support for supervision and monitoring of the project operations after due discussion with the concerned agency and Forests &amp; Environment Department, GoG. No such agency was appointed during the compliance period.</p> <p>As part of the directions given by MoEF&amp;CC vides order dated 18<sup>th</sup> Sep, 2015, following studies were conducted.</p> <ol style="list-style-type: none"> <li>1. NCSCM (MoEF&amp;CC promoted Government Agency) study on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ in year 2016-17. The cost of said study was 3.15 Cr, which was incurred by APSEZ.</li> </ol> <p>As a part of mangrove conservation plan, APSEZ has done following activities.</p> <ol style="list-style-type: none"> <li>a. Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island through NCSCM, Chennai. The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</li> <li>b. Tidal observation in creeks in and around APSEZ – The cost of the said activity was INR 1.0 Lacs incurred by APSEZ.</li> <li>c. Algal &amp; Prosopis removal from Mangrove area - The cost of the said activity was INR 1.2 Lacs incurred by APSEZ.</li> <li>d. Awareness of mangroves importance in surrounding communities &amp; Fodder support - The expenditure for fodder supporting activities was approx. 122.7 Lacs during last FY 2021-22 (Till Sep'21), which was incurred by APSEZ.</li> </ol> <ol style="list-style-type: none"> <li>2. A Regional Impact Assessment study through Chola MS, Chennai (NABET accredited consultant) to identify impacts of all the existing as well as proposed project activities in Mundra region inline to ToR issued by</li> </ol>

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
		GCZMA. The cost of said study was 1.3 Cr, which was incurred by APSEZ.
13	The dredged material that may be generated, if any, shall be disposed of at location suitably identified in consultation with the institute of repute like NEERI/NIO after due consideration of various environmental aspects and ensuring no significant negative impacts due to the same.	Complied. Construction activities are completed & project is in operation stage. SPM is approximately 8.6 km inside the open sea from the shore where 30 m of draft is naturally available. Hence no dredging is required.
14	No waste including the construction debris, oily waste from construction equipment's, untreated sewage, etc. would be disposed of in to sea/ river/ creek or in the CRZ areas. The treated sewage meeting with the norms fixed by the Gujarat Pollution Control Board and the reject water from RO plant if any, shall be disposed of at a point in the deep sea as may be suggested by the institute of repute like the NEERI/NIO.	Complied.  Construction activities are completed and the project is in operation phase.  There is no disposal of any waste including civil debris in CRZ area.  No Sewage or RO Reject water is being generated by SPM activity.
15	The Gujarat Maritime Board shall ensure that the Vessel Traffic Management System for safe navigation in the Gulf of Kachchh shall be established and commissioned before commissioning of the SPM No. 1 by the GAPL. The GAPL shall follow up for this with various stakeholders	Complied.  Kandla, GMB & DGLL are the agencies who financially support to VTMS. For SPM, APSEZ is mutual partner to support in case of Oil spill & vice versa. For further details regarding traffic management, please refer condition no. 10 of CRZ recommendations above.

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<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
	and provide financial and technical inputs for the same.	
16	A mutual aid system for the Mundra Port region shall be developed to meet with any unforeseen circumstances or to meet with any accidental condition. The GAPL shall take a lead for this by involving other stakeholders including HPCL.	<p>Complied.</p> <p>APSEZ has signed an MoU with HPCL, Mittal Pipeline Ltd., Mundra in the region of Gulf of Kutch to assist each other within stipulated time frame with best combination of resources.</p> <p><b>Interface with ROSDCP and NOSDCP</b> For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. The NOSDCP brings together the combined resources of the various organizations and departments, Coast Guard, Ports and Oil handling Agencies, and related industries, to provide a level of preparedness to the threat posed to the marine environment by oil spills.</p> <p>Regional Level Pollution Response exercise “<b>SWACHCHH SAMUDRA-NW 2019</b>” was carried out by Indian Coast Guard on 18<sup>th</sup> Dec, 2019. All participants from various Oil Handling Agencies and Stakeholders (ICG, GMB Port, DPT Vadinar, IOCL, RIL, NAYARA Energy, BORL, ESBTL Salaya, APSEZL, HMEL, GSFC, PCB, Forest Dept., Customs, Fisheries &amp; DPT Kandla) were participated in this exercise.</p>
17	A detailed Risk Assessment and Disaster Management Plan shall be worked out before commissioning of the SPM by the GAPL and the mitigative measures shall be identified and implemented. The local Oil Spill Contingency Plan in lines with the National Oil Spill Disaster Contingency Plan for the Mundra Port shall be put in to operation immediately.	<p>Complied.</p> <p>Detailed Risk Assessment and Disaster Management Plan were prepaid By Tata AIG risk assessment services and few mitigation measures are addressed in compliance of specific condition no 10 of EC &amp; CRZ clearance above. These studies were carried out before the start of the development activity and were considered by MoEF&amp;CC before grant of the EC and CRZ clearance.</p> <p>For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. Oil Spill Contingency Response Plan (OSCRP) is prepared in accordance with the NOSDCP.</p>

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<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
		Please refer specific condition no 5 of EC & CRZ clearance for further details.
18	Proper rehabilitation scheme shall be worked out for local fisherman communities in consultation with the District Collector/the Commissioner of Fisheries, Government of Gujarat, before commissioning of the SPM and report shall be furnished to the Forests and Environment Department.	<p>Not applicable</p> <p>Location of SPM is unmanned (approximately 8.64 km inside the open sea from the shore) hence, there is no displacement of people, houses or fishing activity as a result of the project. However, APSEZ performs large scale socio-economic upliftment program and shares the details with FOKIA (Federation of Kutch Industries Association) chaired by District Collector quarterly.</p> <p>For further information related to CSR activities carried out by Adani Foundation in the Mundra region, please refer to compliance of General condition no. 2 of the EC and CRZ clearance above.</p>
19	The construction labour shall be provided with adequate amenities/facilities including the water supply, sanitation and fuel to ensure that the existing environmental condition is not deteriorated by them. The camps for the construction labour shall be kept outside the CRZ area. The GAPL shall ensure that there is no confrontation amongst the local villagers and construction labour.	<p>Complied.</p> <p>Construction activity is already completed, project is in operation phase.</p> <p>No construction camps were located in CRZ area. Most workers came from nearby villages however, for others; construction camps were located outside CRZ area.</p> <p>All necessary infrastructure and facilities like mobile toilets, safe drinking water, medical health care etc. were provided.</p>
20	All possible social and health impacts due to the proposed development at Mundra Port shall be assessed in detail in the comprehensive EIA and a detailed management plan shall be developed to mitigate the same.	<p>Complied.</p> <p>Aspects of social and health impact were studied as part of EIA report prepared by NIO and mitigation measures have been implemented.</p> <p>APSEZ performs large scale socio-economic upliftment program and shares the details with FOKIA (Federation of Kutch Industries Association) chaired by District Collector quarterly.</p>
21	The GAPL shall work out a detailed socio-economic	For further information related to CSR activities carried

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021																																																		
	upliftment programme in consultation with the District Collector and District Development Officer and shall implement the same. Separate budgetary provisions shall be kept for this purpose.	out by Adani Foundation in the Mundra region, please refer to compliance of General condition no. 2 of the EC and CRZ clearance above.																																																		
22	An Environmental Management Cell with person having proper background shall be constituted. A separate budgetary provision shall have to be made for implementation of the Environmental Management Plan.	<p>Complied.</p> <p>APSEZL has a well-structured Environment Cell, staffed with qualified manpower for implementation of the Environmental Management Plan. For further details on the same, please refer to compliance of general condition no. 4 of the EC and CRZ clearance above.</p> <p>Separate budget for the Environment Protection measures is earmarked every year. For further details on the same, please refer to compliance of general condition no. 5 of the EC and CRZ clearance above.</p>																																																		
23	Post project environmental monitoring shall be carried out regularly through a reputed institute like NEERI/NIO and report shall be submitted to the Forests and Environment Department, GoG every year.	<p>Being complied.</p> <p>Monitoring of various environmental parameters for Ambient Air, Noise, marine water and sediments is being carried out by NABL accredited and MoEF&amp;CC approved agency namely M/s. Pollucon Laboratory Pvt. Ltd.</p> <p>Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&amp;CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Apr'21 to Sep'21 is mentioned below.</p> <p><b>Total Ambient Air &amp; Noise Sampling Locations: 4 Nos.</b></p> <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit<sup>\$</sup></th></tr><tr><td colspan="5"><b>AAQM</b></td></tr><tr><td>PM<sub>10</sub></td><td>µg/m<sup>3</sup></td><td>95.52</td><td>43.61</td><td>100</td></tr><tr><td>PM<sub>2.5</sub></td><td>µg/m<sup>3</sup></td><td>57.32</td><td>16.56</td><td>60</td></tr><tr><td>SO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>23.45</td><td>6.22</td><td>80</td></tr><tr><td>NO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>41.25</td><td>14.26</td><td>80</td></tr><tr><td colspan="5"></td></tr><tr><td>Noise</td><td>Unit</td><td>Leq Max</td><td>Leq Min</td><td>Leq Perm. Limit*</td></tr><tr><td>Day Time</td><td>dB(A)</td><td>73.1</td><td>48.7</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>69.8</td><td>52.4</td><td>70</td></tr></table> <p><sup>\$</sup> as per NAAQ standards, 2009</p>	Parameter	Unit	Max	Min	Perm. Limit <sup>\$</sup>	<b>AAQM</b>					PM <sub>10</sub>	µg/m <sup>3</sup>	95.52	43.61	100	PM <sub>2.5</sub>	µg/m <sup>3</sup>	57.32	16.56	60	SO <sub>2</sub>	µg/m <sup>3</sup>	23.45	6.22	80	NO <sub>2</sub>	µg/m <sup>3</sup>	41.25	14.26	80						Noise	Unit	Leq Max	Leq Min	Leq Perm. Limit*	Day Time	dB(A)	73.1	48.7	75	Night Time	dB(A)	69.8	52.4	70
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	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021
		<p>* as per CC&amp;A granted by SPCB Values recorded confirms to the stipulated standards.</p> <p>Marine water monitoring is carried out on monthly frequency. In order to analyzed marine water quality, marine sampling is being carried out at a location nearby SPM. Please refer specific condition No. 8 of EC &amp; CRZ clearance above.</p> <p>Environmental monitoring reports for the period from Apr'21 to Sep'21 are enclosed as <b>Annexure – 3</b>.</p>
24	No construction activities shall be carried out by the GAPL in any of the Forest areas.	<p>Already Complied. Not applicable at present.</p> <p>The construction work is completed and project is in operation phase. No construction activity at any of the forest area is carried out for project of SPM, COT and connecting pipeline.</p>
25	All necessary clearances from different Government Department/Agencies shall be obtained before commissioning any construction activities.	<p>Complied.</p> <p>All necessary clearances as per prevailing laws have been already obtained. Construction activity is already completed, project is in operation phase.</p>

	<b>Adani Ports and Special Economic Zone Limited, Mundra.</b>	<b>From : Apr'21 To : Sep'21</b>
<b>Status of the conditions stipulated under CRZ Recommendation</b>		

Sr. No.	Conditions	Compliance Status as on 30-09-2021																					
26	A half yearly compliance report with respect to above mentioned conditions as well as the implementation of the suggestions/ recommendations of the EIA and Risk Assessment reports shall be furnished to the Forest and Environment Department, GoG, without fail at regular interval.	<p>Complied.</p> <p>Compliance report of EC conditions is uploaded regularly. Last compliance report including results of monitoring data for the period of Oct'20 to Mar'21 was submitted to Regional Office of MoEF&amp;CC @ Bhopal, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar &amp; Gandhidham and Dept. of Forests &amp; Env., Gandhinagar vide our letter dated 18.05.2021. Copy of the same is also available on our web site <a href="https://www.adaniports.com/ports-downloads">https://www.adaniports.com/ports-downloads</a>. A soft copy of the same was also submitted through e-mail on 20.05.2021 to all the concern authorities. Please refer below for the details regarding past six compliance submissions.</p> <table border="1"> <thead> <tr> <th>Sr. No.</th><th>Compliance period</th><th>Date of submission</th></tr> </thead> <tbody> <tr> <td>1</td><td>Apr'18 to Sep'18</td><td>30.11.2018</td></tr> <tr> <td>2</td><td>Oct'18 to Mar'19</td><td>31.05.2019</td></tr> <tr> <td>3</td><td>Apr'19 to Sep'19</td><td>28.11.2019</td></tr> <tr> <td>4</td><td>Oct'19 to Mar'20</td><td>20.05.2020</td></tr> <tr> <td>5</td><td>Apr'20 to Sep'20</td><td>26.11.2020</td></tr> <tr> <td>6</td><td>Oct'20 to Mar'21</td><td>25.05.2021</td></tr> </tbody> </table> <p>All the recommendations given in the report of Tata AIG Risk Management Services are implemented. For further information related to the same, please refer to compliance of specific condition no. 10 of the EC and CRZ clearance above.</p>	Sr. No.	Compliance period	Date of submission	1	Apr'18 to Sep'18	30.11.2018	2	Oct'18 to Mar'19	31.05.2019	3	Apr'19 to Sep'19	28.11.2019	4	Oct'19 to Mar'20	20.05.2020	5	Apr'20 to Sep'20	26.11.2020	6	Oct'20 to Mar'21	25.05.2021
Sr. No.	Compliance period	Date of submission																					
1	Apr'18 to Sep'18	30.11.2018																					
2	Oct'18 to Mar'19	31.05.2019																					
3	Apr'19 to Sep'19	28.11.2019																					
4	Oct'19 to Mar'20	20.05.2020																					
5	Apr'20 to Sep'20	26.11.2020																					
6	Oct'20 to Mar'21	25.05.2021																					
27	The GAPL shall also have to comply with any other condition as may be stipulated by the Forests and Environment Department, GoG, from time to time.	Point noted.																					

# **Annexure – 1**

## Details of Greenbelt Development at APSEZ, Mundra

Total Green Zone Detail Till Up to Sep – 2021					
LOCATION	Area (In Ha.)	Trees (Nos.)	Palm (Nos.)	Shrubs (SQM)	Lawn (SQM)
SV COLONY	71.66	34920	7962	69696.00	100646.00
PORT & NON SEZ	81.61	149359	19220	75061.78	62966.38
SEZ	116.60	227120	20489	220583.60	28162.03
MITAP	2.52	8168	33	3340.00	4036.00
WEST PORT	109.37	256552	70831	24612.00	22854.15
AGRI PARK	8.94	17244	1332	5400.00	2121.44
SOUTH PORT	14.45	27530	3470	3882.00	3327.26
Samudra Township	57.27	63722	11834	23908.89	47520.07
Productive Farming (Vadala Farm)	23.79	27976	--	--	--
<b>TOTAL (APSEZL)</b>	<b>486.19</b>	<b>8,12,591</b>	<b>1,35,171</b>	<b>426484.27</b>	<b>271633.33</b>
		<b>Total Saplings: 9,47,762 Nos.</b>			

## **Details of Mangrove Afforestation done by APSEZ**

Sl. no.	Location	District	Area (Ha)	Duration	Species	Implementation agency
1	Mundra Port	Kutch	24	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	Kutch	25	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
3	Luni/Hamirmora (Mundra,)	Kutch	160.8	2007 - 2015	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
4	Kukadsar (Mundra)	Kutch	66.5	2012 - 2014	Avicennia marina	GUIDE, Bhuj
5	Forest Area (Mundra)	Kutch	298	2011 - 2013	Avicennia marina	Forest Dept, Bhuj
6	Jangi Village (Bhachau)	Kutch	50	2012 - 2014	Avicennia marina	GUIDE, Bhuj
7	Jakhau Village (Abdasa)	Kutch	310.6	2007-08 & 2011-13	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
8	Sat Saida Bet	Kutch	255	2014-15 & 2016-17	Avicennia marina & Bio diversity	GUIDE, Bhuj
9	Dandi Village	Navsari	800	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GEC, Gandhinagar
10	Talaja Village	Bhavnagar	50	2011-12	Avicennia marina	Forest Dept, Talaja
11	Narmada Village	Bhavnagar	250	2014 - 2015	Avicennia marina	GEC, Gandhinagar
12	Malpur Village	Bharuch	200	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village	Bharuch	50	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village	Bharuch	150	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat)	Anand	100	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat)	Anand	38	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot)	Bharuch	62	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
<b>Total</b>			<b>2889.9</b>			

# **Annexure – 2**



# CSR KUTCH

Six Monthly  
Report 2021-22



# PREFACE

Corporate Social Responsibility in India is going through an interesting phase where the need for community centered impact is increasingly becoming more important than ever before. It is not just about the compliance with the laws and regulations but also about transitioning beyond the mandated CSR. Stakeholder engagement is a critical tool to ensure a comprehensive approach in carrying out responsible business and within that community ownership holds an important place.

In Year 2021-22 Uthhan Project spread the wings from 17 Primary schools to 31 Primary schools with MOU with Education Department. Natural Farming Promotion concept is started as a mission with training to 500+ Farmers and pure chemical free farming with 50+ Farmers. Mangroves coastal biodiversity, water harvesting structures and Tissue is ongoing sustainable Project with proper documentation and demarcation. Adani Vidya Mandir has proven best in education by reaching to unreached through digital technology, happy to see the fisherman students studying sincerely sitting in fisherfolk settlements by operating tablets. "

Under guidance of seniors proper frame work was developed for supporting community as a bridge between various Government schemes and needy people by "Community Resource Centre" its true need and real sustainable way. Fisherman and women employment sourcing created very positive impact as a regular source of income for them.

Adani skill Development center started General Duty Assistant Course training under DDUGKY. The ASDC is committed to the cause of the deprived and underprivileged to generate employment through enhancing skills. It has been working relentlessly which resulted in rapport building with District Administration Kachchh also.

Success is due to presence of torch bearer and mentor in life who is Respected Dr. Priti Adani. We heartily thanks our Rakshit bhai, Respected Gadhvi sir and Respected COO sir for guidance and motivation.

We wish all the very best to whole Adani Foundation Parivar !



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Environment Sustainability Projects : Ensuring ecological balance, protection of flora and fauna, terrestrial and coastal species conservation, welfare, agro forestry, conservation of natural resources and maintaining quality of soil, air and water



# Reducing Carbon footprint

## 1. Miyawaki – Nana Kapaya

Nana Kapaya village and proposed site for Miyawaki- Dense Plantation is very close to many industries in and around the Mundra landscape. This area is also very close to main roads and coastal creeks. Mainly dense to sparse *Prosopis juliflora*- Ganda Bavar cover is recorded surrounding to project site with very few scattered native trees like- Limda, Deshi Bavar etc. Shrubs species like- Akado and Aavar are also predominant close to site; while, grasses like Chhabar and Dhrab are recorded in proposed plot area.

As shared and discussed by villagers, this proposed plot is also very close to sewage water tank and nallahs; and proposing for watering to our proposed plantation.

As discussed with villagers and Adani Foundation, we proposed the close or dense plantation at site- called 1Miyawaki Types of Plantations with following four major compartments (45X20 meters approx.) and with following strategies:

1. Mixed Plantation dominant Drought Resistant Plants
2. Mixed Plantation dominant by Larger Leaves
3. Mixed Plantation dominant by Saline Resistant Plants
4. Mixed Plantation dominant by Medicinal Values.

Plantation of 4965 saplings of different 42 spices is completed which will result in dense forest within 2 years



# Reducing Carbon footprint

Species Name/ Botanical Name	Local Name in Gujarati	Saplings Required	TOTAL ACTUAL	TOTAL ACTUAL	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4
Acacia nilotica (L.) Del. subsp. indica (Bth.) Brenan	દેશી બાવળ	300	500	500	200	75	150	75	6	15	9	15
Cordia gharaf (Forsk.) E.&A.	નાના ગુંદા, લિયાર	500	400	400	80	100	140	80	16	11	10	14
Pithecellobium dulce (Roxb.) Bth.	ગોરસ આમલી	400	400	400	80	100	150	70	16	11	9	16
Moringa oleifera Lam.	મીઠો સરગવો	300	300	300	75	75	90	60	17	15	15	19
Salvadora persica L.	ખાળી જાળ- પીલુડી ખાળી	100	250	250	40	60	100	50	32	19	14	23
Derris indica (Lam.) Bennet	કરંજ	200	200	200	25	75	25	75	52	15	55	15
Azadirachta indica A. Juss.	લીમડો	200	200	200	40	40	70	50	32	28	20	23
Moringa concanensis Nimmo	ખારો- જંગલી સરગવો	200	200	200	50	50	60	40	26	23	23	29
Morus alba L.	શેતુર	200	200	200	50	50	50	50	26	23	28	23
Tinospora cordifolia Roxb.	ગળો, ગિલોય	200	200	200	50	50	50	50	26	23	28	23
Tecomella undulata(Sw.) Seem.	રગત રોહિડો	300	200	200	50	60	60	30	26	19	23	38
Commiphora wightii (Arn.) Bhandari	ગુગળ	200	200	200	75	25	25	75	17	46	55	15
Dalbergia sissoo Roxb.	સીસમ	200	200	200	100	25	25	50	13	46	55	23
Zizyphus mauritiana Lam.	બોરડી, મોટા બોર	200	180	180	50	30	70	30	26	38	20	38
Vitex negundo L.	નગોડ	200	150	150	35	55	30	30	37	21	46	38

# Reducing Carbon footprint

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Adhatoda zeylanica Medic.	અરડૂસી	100	100	100	15	20	25	40	86	57	55	29
Parkinsonia aculeata	રામ બાવળ	100	100	100	20	10	50	20	65	114	28	58
Albizia lebbeck (L.) Bth.	કાળો શિરીષ	100	100	100	25	20	35	20	52	57	40	58
Terminalia arjuna (Roxb.) W. & A.	અર્જુન સાદડ	100	80	80	20	20	20	20	65	57	69	58
Grewia tiliaefolia Vahl var. tiliaefolia	ફાલસા	100	60	60	15	20	10	15	86	57	139	77
Abrus precatorius L.	ચણોલી	50	50	50	15	10	15	10	86	114	92	115
Aegle marmelos (L.) Corr.	બીલીપત્ર	50	50	50	15	10	10	15	86	114	139	77
Ailanthus excelsa Roxb.	અરડૂસો	50	50	50	15	10	10	15	86	114	139	77
Asparagus racemosus Willd. var. javanicus	શતાવરી	50	50	50	15	10	10	15	86	114	139	77
Cassia fistula L.	ગરમાળો	50	50	50	15	10	10	15	86	114	139	77
Cordia dichotoma Forst.	મોટા ગુંદા	50	50	50	15	10	10	15	86	114	139	77
Holoptelia integrifolia	કણજી	50	50	50	10	15	10	15	129	76	139	77
Murraya koenigii (L.) Spr.	મીઠો લીમડો	50	50	50	10	15	10	15	129	76	139	77
Psidium guajava L.	જામફળ	50	50	50	15	10	10	15	86	114	139	77
Punica granatum L.	દાડમ	50	50	50	15	10	10	15	86	114	139	77
Syzygium cumini	જાંબુ	50	50	50	15	10	10	15	86	114	139	77

# Reducing Carbon footprint

Species Name/ Botanical Name	Local Name in Gujarati	Saplings Required	TOTAL ACTUAL	TOTAL ACTUAL	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4
Tamarindus indica L.	આમલી ખાટી	50	50	50	15	10	10	15	3	6	4	Tamarindus indica L.
Butea monosperma (Lam.) Taub.	કેસુડો	30	30	30	5	10	5	10	8	6	7	Butea monosperma (Lam.) Taub.
Manilkara zapota (L.) van Royen	ચિકકુ	30	30	30	5	10	5	10	8	6	7	Manilkara zapota (L.) van Royen
Mimusops elengi L.	બોરસલી	30	30	30	5	10	5	10	8	6	7	Mimusops elengi L.
Plumeria rubra L.	ચંપો સફેદ કે ગુલાબી	30	30	30	5	10	5	10	8	6	7	Plumeria rubra L.
Ficus benghalensis L.	વડ	10	10	10	2	4	2	2	20	15	18	Ficus benghalensis L.
Ficus religiosa L.	પીપળો	10	10	10	2	4	2	2	20	15	18	Ficus religiosa L.
Gmelina arborea L.	શેવળ	30	5	5	1	1	1	2	40	59	35	Gmelina arborea L.
Arygyreia nervosa (Burm.f.) Boj.	સમુદ્ર શોષ	50	0	0	0	0	0	0	0	0	0	Arygyreia nervosa (Burm.f.) Boj.
Bauhinia racemosa Lam.	આસીત્રો	50	0	0	0	0	0	0	0	0	0	Bauhinia racemosa Lam.
Ficus racemosa L.	ઉમરો	10	0	0	0	0	0	0	0	0	0	Ficus racemosa L.
Grewia tenax (Forsk.) Fiori	ગાંગણી	300	0	0	0	0	0	0	0	0	0	Grewia tenax (Forsk.) Fiori
Grewia villosa Willd.	લુસ્કા	200	0	0	0	0	0	0	0	0	0	Grewia villosa Willd.
Prosopis cineraria (L.) Druce	ખીજડો	200	0	0	0	0	0	0	0	0	0	Prosopis cineraria (L.) Druce
Salvadora oleoides Decne.	મીઠી જાળ- પીલુડી મીઠી	100	0	0	0	0	0	0	0	0	0	Salvadora oleoides Decne.

TOTAL SAPLINGS PLANTED 4965



# Reducing Carbon footprint

## Smritivan Memorial park– Bhuj

**Smritivan Memorial park** is a unique initiative by Prime Minister in order to commemorate the death of about 13,805 people during this massive earthquake which had its epicenter in Bhuj District.

The memorial will occupy around 406 acres of space of the **Bhujia Dungar near Bhuj, Kutch** that will show people's **oppressive response to a natural disaster**.

As a part of this Smritivan Memorial Park, it will have a museum, convention Centre, sunset point and **Ecological park** with around varied species of trees to attract different biodiversity.

For the ecological park, approx. **24 acres** of land has been demarcated, wherein it is proposed to plant **~3 lakh local species trees**.





# Reducing Carbon footprint

## Smritivan Memorial park– Bhuj

Under Phase – 1 project, Govt of Gujarat through GSDMA will be planting across **1 lakh trees, across 8 acres** through “**Miyawaki**” methodology (Japanese technology of tree plantation). They have already enrolled the services of **M/s Forest Creator**, a Mumbai, based agency expertise in carrying out afforestation project, through Miyawaki technology.

Forest Creators have already been involved and completed **58** such kind of project of Terrestrial afforestation, across India and this will be their 59<sup>th</sup> project. (***Details of project carried out Forest Creator attached***)

Under this project, **~60+ local species of trees** will be planted and further the entire scope of development of Nursery, Soil enrichment, Plantation of saplings, mulching, biomass application, water supply & maintenance for 3 years are considered under their proposal. All Corporate of Kutch has supported fund for the same. APSEZ has done monitory support under CSR and Adani Foundation is coordinating for monitoring



# Reducing Carbon footprint

## Grassland Ecosystem Restoration project - Guneri

As a part of Biodiversity initiatives, APSEZ has proposed to take the pioneering steps towards building sustainable growth in the Lakhpat region, Kutch by taking the initiation of restoring the natural grassland habitats (Ecological Restoration) along the Guneri village, i.e. ~40 Ha grassland ecosystem in gauchar land, by involving Gujarat Ecology Society (GES) – A Nonprofit Organization, based in Vadodara, Gujarat.

The Restoration & Conservation Plan, will be executed in a phase wise manner over 40Ha of the area, over a period of 4 years

Guneri village is situated north of Lakhpat fort with a population of 967 as per the 2011 census. A Biodiversity Management Committee (BMC) already exists there and hence it becomes easy to undertake grassland restoration with the help of

committee members. The gauchar land available for restoration is around 100 Ha and about 40 Ha of the area can be considered for restoration. The restoration process will be spread over a time period of three years, starting initially with 10 Ha and slowly moving up to 40 Ha by the third year.

The project aims to take the pioneering steps towards building sustainable growth in the Lakhpat region by taking the initiation of restoring the natural habitats along the Guneri village. In the long run, this area can be declared as a Indigenous and Community Conserved Area (ICCA) in lines with a new category of protection status followed by IUCN.

Despite changes in hydrological regimes, there are certain pockets where unique biodiversity endemic to the area has

established itself with relics of past vegetation, the inland mangroves are one such area. Inland mangroves of Guneri village are a living example of the presence of rich estuary in the region sustained by a larger riverine system. The area has been well documented and proposed as Biodiversity Heritage Site. The rare and threatened species present in the area include *Helichrysum cutchicum* (endemic species), *Cistanche tubulosa*, *Campylanthus ramoissimus*, and *Sida tiagii*. Apart from the listed species, Guneri's unique ecosystem sustains good faunal diversity from herpetofauna to birds to mammals.

It is combined efforts of Environment APSEZ and Adani Foundation under consultation of GEC

# Reducing Carbon footprint

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# Reducing Carbon footprint

## Coastal Biodiversity

In the coastal environment mangroves and mudflats are dynamic ecosystems that usually support a large population of floral and faunal life forms. Mangrove forests are highly productive ecosystems, which provide numerous goods and services both to the marine environment and people. Mangroves in India are spread over nine maritime states and three Union Territories. Gujarat has the longest (1,650 km) coastline among the maritime states of the country. With the second largest mangrove cover in India after West Bengal, Gujarat's mangrove area has increased from 1,140 km<sup>2</sup> in 2017 to 1,177 km<sup>2</sup> now.

A major portion of human population of Gujarat is solely dependent on these coastal ecosystems for their livelihood. Thus, several mangrove restoration programme/ activities are in progress in the state. Mangrove restoration activities in Gujarat are mostly single species stands of *Avicennia marina*. Adani Foundation at Mundra's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Due to geological set up of Kutch where fresh water source is atypical, the survival and growth of mangrove plantation remains poor. Thus, a survival rate of 30% is expected for this multi-species plantation. Mangrove biodiversity park of its kind will help in disseminating knowledge on mangrove ecosystem and simultaneously conserving the species.

Since, some of the mangrove species are not readily available in Kutch, their seeds/ propagates were procured from other districts of Gujarat and other states. The proposed species of mangroves that have the potential for enhancing mangrove biodiversity in and around APSEZL include *Rhizophora mucronata*, *Ceriops tagal*, *Ceriops decandra*, *Rhizophora apiculata* and *Aegiceroscorniculatum*.

Current year 3 hector development is planned to extend biodiversity park







# Reducing Carbon footprint

## Homebiogas -

Home biogas is the Israel based company was founded in 2012 manufactures dynamic biogas unit not only for farm waste but for kitchen waste too.

Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages.

- Reducing organic waste,
- Transitioning to renewable energy
- Motivation for reduction in use for fertilizer

Promotion of Natural Farming–Home biogas

And Improving the health and living conditions for the millions of families that are still cooking on charcoal and wood. Adani Foundation is not only supporting but creating awareness to save environment and health of the community who regularly cooking on Chula. **It is proven that one hour cooking on Chula is as dangerous as smoking 40 cigrates.**

As a Main Process, Bacteria break down organic waste in a naturally occurring process, and Home Biogas stores and harnesses the energy created so that it can be used for gas.

Earlier we had proceeded for capacity 2 cum but after visit and series of meetings with farmer group –we need to take up plant capacity 6 cum. Till date 120 farmers are utilizing it with satisfaction and considerable outcome by saving Average Rs. 23,400 for gas and fertilizer as well - Homebiogas is base of promotion of natural farming.



**2,053** TONS OF ANIMAL MANURE TREATED

**159,687** HOURS OF CLEAN COOKING;

**4.3** TONS OF BIOGAS CREATED

**125** TONS OF FIREWOOD REPLACED;

**27,375** HOURS SAVED ON REDUCTION OF FIREWOOD  
& COLLECTION

**625** TONS CO2 EMISSION REDUCTION

# Reducing Carbon footprint

## See Weed Culture -

### Vision

The consortium aims to take a holistic view of transforming seaweed resources as natural capital and use open source knowledge to build an innovative technology platform for harnessing the economic potentials along with the associated ecological benefits thereof. Also, foster a cordial relationship with visionary sponsors and collaborators from India and abroad for sustainable production and utilisation of seaweed resources for the production of innovative products while engaging the coastal communities as direct beneficiaries (human capital) of this unique effort.

### Collabration

Agrocel, Piddilite, Adani Foundation has jointly initited the Pilot Project with a objective transform sew weed into Natual Capital as well as engaging community as a human capital.

### Achievements

A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red seaweeds *Kappaphycus alvarezii*, *Gracilaria dura* and green seaweed *Ulva*. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period. The successful completion of pilot cultivation trials of *Kappaphycus* has helped to move forward to set up raceway type tanks of 26 m Length × 6 m Width × 1.1 m Height in 2 nos for large scale cultivation of *Kappaphycus* in Balavadi campus at Juna Bandar, Mundra. The cultivation trials are in progress.





# Water conservation Project

Since 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased in coastal belt of Mundra as per Government Figures. Our water conservation work is as Below.

- A large number of water harvesting structure ( 18 Nos. of check dams in coordination with salinity department) and Augmentation of 2 check dams **(1 Check dam current year)**
- Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers
- Roof Top Rain Water Harvesting 90 Nos. **(35 Nos current year)** which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.
- Recharge Bore well 125 Nos **(50 Nos current year)** which is best ever option to
- Drip Irrigation 980 Farmers **(56 Application current year)** benefitted in coordination with Gujrat Green Revolution Company
- Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.
- **Luni Pond Bund Repairing Work is completed**



# Water conservation Project

- **Basis of Requirements of Drip Irrigation**

The main source of livelihood being agriculture, the cultivators tend to use more and more underground water for irrigation. Underground waters have gone very highly saline. The use of such water for irrigation has made the soil also saline and the crop yields have dwindled.

- **Process of Drip Support**

Farmer have to applied in the prescribed form of Adani foundation with photograph.

Inspection and verification will be by AF representative.

Ration card, work order of G.G.R.C, 7/12 certificate and all bills must be attached.

Farmer will be informed by telephonic to have form query.

Primary information about farmer land will be received by telephone.

Farm visit within 10 days of after received of application and verified the installation of system as per map and material as per bill will be checked and get farmer feed back.

Verification report submitted to account office.

Payment within 20 days if all document is complete through net banking.

Farmer economic study after our support. – Follow up

- **We have covered 295 farmers and 1422 acre drip irrigation area in last two years which is remarkable for water conservation in first phase – in this phase we have covered 66 farmers and 360 Acre land for the same.**
- **Total 968 Farmers and 5626 Acre Drip since 2011-12 to 2020-21 and process is going on for 56 farmers for year 2021-22.**





# Education Projects

## Utthan

- The Virtual and Offline classes (Shri sikshan) with parents permission with all precautionary measures as Government Guide Lines. Its very encouraging that inspired by Our Shri Sikshan Initiative - Gov Teachers also started same approach.
  - **Online Outreach-259 Students**
  - **Individual Home visit-415 Students**
  - **Sheri sikshan and school students- 838 Students**
- Coaching of 49 students for National Means cum Merit Cum Scholarship Scheme (NMMS).
- Coaching of 34 Students for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Months.
- Total 93 Meetings were carried out with parents to create awareness for education progress. Apart from that aware about Precautionary measures and Covid -19 vaccination and Gyan-setu Program Telecast on Girnar Channel regularly approximately 1503 Mothers were engaged through various events and programmes.
- As Schools learning is not possible, our Library books corner Initiate is not in Function. Hence started to issue Library books to Students during Home Visit.
- Total 394 webinar and capacity building program were arranged for Utthan Sahayaks and Government Officers.
- **Uthhan First phase 17 Schools and 2951 students were part of the program, and second phase 14 Schools and 1952 Students were part of the programme. Total 4903 students are getting benefit from Utthan.**
- Second phase inauguration was held in last week of September in which District Primary Education Officer was remained present.



# Education Projects

- Tree plantation at Utthan Primary School - Total 1000 saplings have been planted in the schools premises and laid responsibility for nurturing and care.
- Celebrated World Emoji Day. Its an unofficial holiday that is celebrated every year on July 17. Students prepared / draw 157 no of various and gifted to their friends and teachers.
- International Yoga Day celebration on 21<sup>st</sup> June Through Virtually and Physically. More than 520 Family members were participated
- Utthan Students had participated in **Lets us sing the National Anthem Contents** ,an Initiative of Government to Mark Azadi ka Amrit Mahotsav. Total 389 students and 76 parents have participated.
- Celebrated 75th Independence day with Commemorate 75 untold story , A Freedom Fighters who paid remarkable contribution for Indian Independence.



Activities	Location	
	Mundra	Nakhatrana
Silent reading	367	253
Virtual group reading – Classes: 7 and 8	42	30
Book review – Classes: 5 and 6	38	22
Puppetry show- Classes: 1-4	80	28
<b>Total</b>	<b>527</b>	<b>333</b>

# Education Projects

- On the Rakhi festival Students made Eco friendly Rakhi and tied to the **104 Frontline corona warriors** who had paid remarkable service during Pandemic. (Doctor, Police, PHS and health Staff ,Sarpanch as well as Collector, Kutch and DDO ,Kutch).
- Arranged **Virtual Tour** regarding Plastic Waste Management with Municipal Corporation, Surat and aware about waste Collection , Segregation, treatment and Disposal Process. **Total 178 Students were participated for the same.**
- Teacher day celebration by preparing gratitude wall with card at all 17 schools.
- D- Talks are an Initiative of Global Dream, a Disruptive Movement for Universal Foundational Literacy and Numeracy. Mr. Jatin Upadhyay Talk On "Empowering the Marginalized Communities in Gujarat Through rejuvenating Education.
- World Book Day celebration on 23 April with various activities





# Education Projects

Adani Vidya Mandir, Bhadreshwar  
(SDG - 4/4.1)



**EDUCATION: FREE AND COMPULSORY –**  
WHAT A WAY TO LEARN LOGIC!" The quote mentioned unfolds the distinguished vision of Adani Foundation to provide cost-free education, food, uniform, books to the children of economically challenged families of Mundra Bock. Adani Vidya Mandir, Bhadreshwar was established in June 2012, with aim of uplifting the communities through education. The school is equipped with excellent infrastructure and resources required for all-round development of the student. The child is given admission in class 1 and is molded to be an educated and a good human being by experienced and compassionate teachers. The school follows a curriculum designed by GSEB. Due to Covid Pandemic this year Class 1<sup>st</sup> Admission was done -

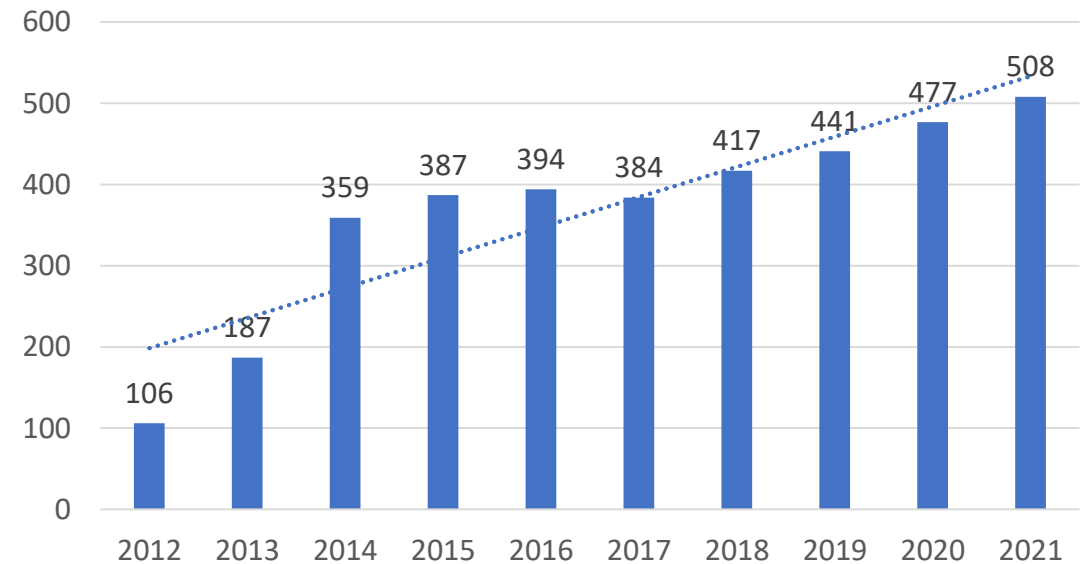
# Education Projects



Adani Vidya Mandir Bhadreswar Gujrat Board Standard 10th Examination Result is 100% as board examination was not held due to Covid. Adani Foundation will take all responsibility of further study of students with respect to their interest.

The global upsurge of the Covid-19 pandemic and the resultant lockdown has brought all of us to face such unprecedented times and situations. The challenge was rural locality, network unavailability, lack of health awareness, apprehensions for technology and gadgets and financial crunch to spend on mobile / Internet.

No's of Students



But We did not Give-up and reached out to our students to pursuit educational through virtual platform by various initiatives. Not only that, our teachers started visiting their home and initiated sheri shikshan concept.



# Adani Vidya Mandir, Bhadreshwar

## Objective

- Provide free and quality education to economically and socially under-privileged students
- Support to students for academics and co-curricular activities and overall well-being

## Project Activity

- Balwadis started in 2010, for students in age group of 2-5 yrs. In 2013, this school was built on a donated land
- Free food, education, uniforms, online tablets
- Classes from Gr-I to Gr-X with 22 qualified teachers and 8 helping staffs
- Monthly stay of Gr-X students at school before exam, along with teachers

## Outcome

- **508 underprivileged students** of Fisherman & Maldhari communities from **8 villages** taking education at the school
- Educated children have better opportunities of income beyond fishing
- Quality of life and change of mindset of students & families
- With education, many addictions reduced

## Closer to SDG

1. No poverty
2. Zero hunger
3. Good Health & Well-being
4. Quality Education



# Farmers Sustainable Livelihood Projects

## Promotion of Natural Farming



- To promote Natural farming Adani Foundation has originated cow based farming initiative with interconnected techniques which can increase farmer yield – our main objective is to improve quality of soil.

### Implementation

- Survey and identification of farmers to adopt Natural farming –Total 50 Farmers are selected as criteria in first phase of the Project.
- Water & Soil Testing- Most of Farm soil contain low organic carbon.
- Arranged Workshop & Hands on training for them which was conducted by Agri expert ,KVK and Progressive farmers with 500+ farmers
- 23 wormi compost unit have been set-up. Which is facilitated through Government with farmer Contribution.
- 50 Farmers have started to preparing JivaMrut & Gaukrupa Amrutam Bio-fertilizer and using in agri crop. Series of Training is arranged by ATMA and Adani Foundation
- Two Farmers Groups is registered with **ATMA –Agricultural technology management Agency – it will leverage Government schemes**









# Farmers Sustainable Livelihood Projects

## Pashudhan : " Fodder Support Programme, Individual Fodder Cultivation and Preventive Health Care

- Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green – 2425230Kg
- Fodder Cultivation- To made fodder sustain villages - 25 Acre Gauchar land of Siracha village is being cultivated for the same.
- To protect Cattles against Bovine Brucellosis zoonotic disease, Awareness and vaccination program is ongoing with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages , **Total 1076 Female calves** below 3 years have been vaccinated in six months.

**બ્રુસેલોસિસ કંટ્રોલ પ્રોગ્રામ**  
Brucellosis Control Program

**શું તમારા પશુમાં બ્રુસેલોસિસ રોગનાં લક્ષણો તો નથી ને ? જો હોય, તો સાવધાન...!!!**

**બ્રુસેલોસિસ રોગના લક્ષણો...**

- માદા પશુએ ૫ મહિના પછી ગર્ભવત્ત થાય
- જડ / મેલી ના પડવો
- પામના સાંધાઓમાં કોષ્ટકો આવવો

**આ ભયંકર ચોપી ગર્ભપાત રોગ મનુષ્યમાં પણ ફેલાઈ શકે છે.**

જડ / મેલી તથા ચોપી રક્તપાના સંપર્કમાં આવવાથી

મનુષ્યમાં થક-ઉતરતો તાવ આવવો, સાંધા જકઠાઈ જવા અને પુષ્ટતામાં કોષ્ટકો આવવો વગેરે લક્ષણો જોવા મળે છે.

મનુષ્ય જાડિયાં આ રોગનું મિટાન કરવું અને તેની સારવાર કરવી પછી અપહી તેમજ અર્ધાંગ છે અને આ રોગને અટકાવવા કોઈ રસી પણ નથી.

પુખ્ત વયના પશુઓમાં આ રોગ ભેગવાર ફેલાઈ જવા પછી તેની સારવાર શક્ય નથી પણ તેવી પશુઓથી અન્ય પશુઓમાં આ રોગ ફેલાતો અટકાવવો એમણે છે.

**એક માત્ર ઉપાય : રસીકરણ**

પશુને અપાવવા માટે એક જ ઉપાય છે :  
જ મહિના થી મોટી વાસણીઓ અને પાડીઓને રસીકરણ કરાવવો.  
રસી મુકેલા અપાવણીઓ અને પાડીઓથી અન્ય રાત્રનાં કિતાબક છે.  
તેની જોતજ માટે કાનમાં રેગ / કટી લગાવવી પુરુષ જરૂરી છે.

શું તમે તમારી જ મહિના થી મોટી વાસણીઓ અને પાડીઓને રસીકરણ કરાવવું હો? અન્ય રોગથી સંભાળત પશુઓનું મિટાન કરાવવું હો? જો આ કાર્યનું કોમ તો : તમારા ગામના "પશુપાલક મિત્ર" નો સંપર્ક કરો...

**સંપર્ક**

**adani** Foundation

સહાયતા : M. 99011 67148  
જયદીપસાઈ : M. 99080 99740

સંકીર્ણ : M. 97379 93362  
રાજુભાઈ : M. 97277 60919

**સહાયતા**

સહાયતા પ્રદાન કરનાર : KFFD



# Farmers Sustainable Livelihood Projects

## Promotion of Horticulture : Date Palm and Dragon fruits

Kutch Kalpaturu Producer Company (KKPC) is established to address the challenges faced by the farmers, particularly to enhanced access for inputs, technology up gradation in Agri practices, output, Sorting, Grading, Value addition & marketing. by the farmers of Mundra Block in the year of 2020. The company is started with 196-shares of 89 Farmers , that is Rs.0.96 lacs Fund in the year of 2020. Right now it is on path of expansion up to 5000 Farmers.

- Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly.
- Regular Director Board Meeting as well as capacity building Training were arranged.

Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm – Total 11000 plants. Pleasure to share that Auspicious presence of Respected Douglas Smith sir, our CEO ,APSEZ the First batch of fruit was harvested.









# Fisher folk Sustainable Livelihood Projects

- Get the technical and Non-technical Man-power Requirement details from CFS and APSEZ, Mundra And inform to fishermen Youth and Leader. Later Eligible fisher Youth had trained for interview facing and soft skilled practices and interviewed in respective Company. 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022.
- Fishermen Government Scheme awareness Program was Arranged at Adani Guest House Mundra on 11<sup>th</sup> Augusts. The schematic details was Felicitated by Fisheries Department Staff. As well as Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department ,Bhuj for pagadiya and boat License.
- ASDC Courses Induction Meeting with Fishermen Youth at Navinal and as well as listed out their name to start computer & Spoken English classes through Adani Skill Development Center, Mundra.
- During the **Taukate cyclone** fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation.
- Fishermen's boat get across the vessel approach often while fishing Often , which create issue due to miscommunication Between Fishermen and Vessel crew members to clear vessel approach. its delay vessel berthing





# Women Empowerment Projects

"You can tell the condition of a nation by looking at the status of its women" – Women are central to the entire development process, be it in an individual family, village, state and to the whole nation.

The below mentioned figure shows determinants associated with the empowerment of women and these are the challenges for us as a CSR to work upon.

Adani Foundation is considering all parameters as a part of Empowerment.

- Education – Uthhan Project promotes girl child education, Creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samridhhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it.
- Health and Nutrition – Suposhan Project focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescent under this Project and brought them to considerable status.
- Skill Development and Income Generation – Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job – this will give them identity, confidence and right to speak in any decision for home, village and working area.
- Drinking Water and Sanitation – Total 89 Roof Top Rain Water Harvesting is supported for reducing hassle of the women to fetch the water as well as making clean water available.



# Women Sustainable Livelihood Projects

- Total 15 Active SHG Group are engage as Mentioned Income generation activity. We facilitate them capacity building training for quality ,Marketing Finance and team work to made them self sustain.
- Saheli Swa Sahay Juth have completed order of 1500 Sanitary pad from District Health Department.
- "Shradhha Saheli Sva sahay Juth" is won the tender to provide Catering service in Block level Government
- Tejasvini SHG has received order of three layer mask preparation worth Rupees Nine Lacks
- Sonal Saheli Women SHG had supplied 500 KG washing powder to Adani port & Will mar.
- Shradha Saheli & Jay Adhar Saheli have been registered in FSSAI (Food safety and standards Authority of India.

Sr.No	Name of IG activity	Activity	Nos
1	Sonal Saheli Swa Sahay Juth	Phynale & Washing Powder	11
2	Jay Adhar Saheli Swa Sahay Juth	Dry Nasta	12
3	Tejasvi Saheli Swa Sahay Juth	Stiching,Uniform,Bag	12
4	Umang Saheli Swa Sahay Juth	Soft toys, Jula,	13
5	Vishvas Saheli Swa Sahay Juth	Tie & Die, Stitching	13
6	Jay Momay Saheli Swa Sahay Juth	Tie & Die, Stitching	12
7	Meghadhanush Saheli Swa Sahay Juth	Mud Works,	10
8	Saheli Swa Sahay Juth	Sanitary Pad	10
9	Radhe Saheli Swa Sahay Juth	Dhadaki, Small Godadi	14
10	Shraddha Saheli Swa Sahay Juth	Fresh Food	10
11	Chamunda Saheli Swa Sahay Juth	Tie & Die	10
12	Jay shakti Saheli Swa Sahay Juth	Stitching	10
13	Navdurga Saheli Swa Sahay Juth	Sanitary Pad Sale	10
14	Sakhi Saheli Swa Sahay Juth	Sanitary Pad Sale	10
15	Sonal Krupa Saheli Swa Sahay Juth	Stitching	10
168 Members in Group			

# Women Sustainable Livelihood Projects



Economic Empowerment of women means "Enhancing the role of women as drivers of poverty reduction, promoting female investors and entrepreneurs as per SDG 5" in this half year all 15 women groups did turn over of Rs. 11.5 Lacs. 43 women got job in various SEZ industries by AF intervention and 11 women got absorbed as Gram Rakshak Dal, Bank Sakhi and Bima Sakhi.

**Registration Certificate**  
**Government of Gujarat**  
**Food And Drugs Control Administration**  
**Food Safety and Standards Authority of India**  
**Registration Certificate under FSS Act, 2006**

Registration Number: 2071983060348

1. Name and permanent address of Food Business Operator (FBO): JAT AJODHAR SAHELI TIVA SAKHI 50TH BRIDGE, Baria, Mundra, BHUSKUTCHAK, Gujarat-370421

2. Address of location where food business is to be conducted / premises: BAROL Baria, Mundra, BHUSKUTCHAK, Gujarat - 370421

3. Kind of Business: General Manufacturing

4. Photo Identity Card: N/A

Place / BHUSKUTCHAK  
 Issued On / 12-08-2021 (New Registration)  
 Valid Upto / 11-08-2022 (For details, refer Annexure)

Registering Authority

Annexures:  
 1. Product Abstract  
 2. Layout Diagram  
 3. Registration ID Card

Note:  
 1. Application for renewal of Registration Certificate can be filed as early as 180 days prior to expiry date of Registration Certificate. You can file application for renewal or modification of Registration Certificate by login into FSSAI's Food Safety Compliance System (<https://www.foodsafegov.in>) with your user id and password or call us at 18001121100 for any clarification.  
 2. This Registration Certificate is only to commence or carry on food businesses and not for any other purpose.  
 3. This is computer generated Registration Certificate and doesn't require any signature or stamp by authority.  
 4. This Registration Certificate is allowed to conduct food businesses activities having annual turnover upto Rs. 12 Lacs only.

# Community Health Projects

Mobile Health Care Units  
and Rural Clinics



9 Rural Clinics

06 from Mundra 02 from Anjar & 01 from Mandvi block treated ;

**3843** patients.

31 villages covered, with 94 types of general and life saving medicines through Mobile healthcare unit

**3364** patients benefited during six months



# Community Health Projects

## Swasthaya Seva to needy Patients

06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital

471 – Economically Challenged patients have been supported for operation ,OPD ,IPD ,Medicines and lab-test.

## Promoting preventive health care

Initiated identifying patients of NCD-Non communicable disease by survey which will help to diagnosed chronic disease at early stage and treated as well. From 960 patients - **80 Patients are find symptomatic to Hype, tension, Diabetic.**

As a part of emergency situation - Rural clinic and Mobile van are equipped with Portable ECG machine & Life saving medicines to treat cardiac patients For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in nine villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka.

16 Senior Citizen have been linked with Government Niradhar pension scheme, 34 senior citizen linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.



# Community Health Projects

## Corona Related Work at GKGH and AHMPL

- Started Covid care centre service at **Samudra town ship** to Provide medical services at 24 x7 hrs. Home Visit for Medical Prescription and advise for further treatment & co-ordination.
- AF team voluntary performed patients care and co-coordination duty at GKGH ,Bhuj for 23 days.
- AHMPL,Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend Covid medical treatment over community. All related coordination done by our team for more than 353 OPD and IPD.
- Provided Oxygen Concentrator machines for Home isolated patients resulted in goodwill.
- Provide Dead body van service to shift covid demise patients to Crematorium with all dignity.
- Precautionary voice message dissemination through Awaj de voice message service Over Community.
- Started Village Sanitizing activities and Ukalo, Vitamin C tablet distribution



# Community Resource Center

Scheme	Detail	Total
Widow	Widow pension	78
Fishermen	Pagadiya License & Boat License	59
Kitchen Garden Kit	Kitchen Garden kit	20
Mukhya Mantri Yojna	Orphan Covid Child	14
Su-kanya Yojna	Fix deposit	11
Manav Garima	Tools & Kit support	1
Agriculture	Barrel & Chaff Cutter	12
Bal Ayog Yojna	health	19
Senior Citizen	Pension Yojna	06
Vahali Dikri Yojna	Fix deposit	2
Total		222



Though there are huge number of Government welfare scheme but people could not get it s benefit because of awareness and access facilities.

We have started community resource center at Field office Mundra to facilitated Government scheme as below

Till the date more than 2100 beneficiaries and during past six months 222 application have been submitted to Government Department i.e. widow pension scheme, Senior Citizen pension scheme, agriculture and fisherfolk related scheme, child support scheme after pandemic, vahali dikri Yojana etc.

# Community Infrastructure

## Work Completed

- 31 RRWHS structure have been completed
- 45 Bore-well recharging activity is completed .
- Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara
- Earthen bund Repairing work at Pond, Luni.
- Pre-moon soon activity Approach repairing, Village Pond lake strengthen and river cleaning (babul cutting) work is ongoing in Various Villages
- Approach Road repairing at Various Fishermen Vasahat(ARC ).

## Work in progress

1. Construction of common Gathering Rooms at Wandi village.
2. Development of Chain Link Fencing at tree forestation at Nana Kapaya.
3. Construction of community gathering Shed at Mundra- work in final Stage.





# Adani Skill Development Centre

ASDC, Mundra

Courses	Female	Male	Total
Digital Literacy	10	20	30
Tally with GST	02	03	05
General Duty Assistant	04	01	05
Dori work	21	00	21
Mudwork	18	00	18
Basic Functional English	09	12	21
Beauty Therapist	01	00	01
Manicure and pedicure	20	0	20
Data entry operator	02	0	2
Junior crane operator	00	48	48
Total	87	84	171

RPL – Recognition of Prior Learning Training given to Adani Group Contractual Employees –Total 218 Employees have been benefitted Junior Crane Operator practical training to 36 Candidates for ( Group-1,2 & 3 ) At MICT Port

Guest Lecture On Mehendi products , Beauty Therapist & Resin art Total 100 candidate have been benefitted.

Certificate Distributed to Mud work candidates at MICT Colony-30 women learnt Mud work.

Volunteer Support in GKGH and Adani Hospital during covid pandemic

21 students were coordinated for interview in sea bird CFS of Mundra.

Centre Inspection by Mr. Krunal ( GSDM) At Solar Mundra Under Sankalp project

We Received 4 Star rating from the Department.



# Adani Skill Development Centre

ASDC,Bhuj

Courses	Female	Male	Total
General Duty Assistant	47	16	63
Diet & Nutrition (Chanakya College)	36	5	41
Digital Literacy (Chanakya College: 30 + Online: 5 + University: 3)	26	12	38
GST with Tally (Online: 1 + University: 22)	20	3	23
First Aid (Chanakya College)	35	6	41
Basic Functional English	3	1	4
Beauty Therapist	3	0	3
Financial Literacy (Chanakya College: 18+ University: 3)	20	1	21
Junior Crane Operator	0	3	3
Welding Technician	0	1	1
Logistics & Supply Chain Management	0	1	1
Frontline Health Worker	5	0	5
Occupational Safety and Health Administration	1	0	1
Domestic Data Entry Operator	0	1	1
<b>Total</b>	<b>196</b>	<b>50</b>	<b>246</b>



## Other Activities:

Launched New online General Duty Assistant & Beauty Therapist for 63 candidates under (DDU-GKY).

Certificate Distribution program to Old GDA batch (DDU-GKY).

Soft Skills Training Certificate distribution to Prisoners of Palara Special Jail.

Guest lecture on " **Tally: Older vs New**" & " **Concept of Emerging E-way Bill**"

total 100 Candidate had attend Guest Lecture.

# Nakhatrana CSR

CSR activities being executed for the holistic development of eight most effected villages. in four core area Education, health, SLD and CID

- Carried out Survey of Widow women for Gov Pension scheme. There are Total 246 widow women among them 121 have been facilitated with Widow pension scheme@ Rs.1250/Month i.e. Rs.121250 /Month.
- To increase the ground water table we have started Ground water Recharging activity.Total 22 Bore well have been recharged at Ugedi and Deshalpar Villages.
- Repairing of Four Old check dam ,two pond have been deepen in Ugedi Village.
- World Environment day celebration on 5<sup>th</sup> June by tree Plantation at Jinjay & Ugedi Villages.
- Tree Plantation at Ugedi primary School with nurturing responsibility over Students **one Tree one Child**.
- Respected Gautam sir Birthday celebration with Tree Plantation at Ugedi schools.
- Adani Foundation day celebration at Deshpar –Gantuli Wiodw pension Government scheme form filling and brief about adani foundation activities.
- Mangoes sapling have been Given to Farmers and aware and awake about the important of Horticulture Cropping to doubling the farmer Income. 1000 Mangoes Sapling had been Distributed to Ugedi and Deshalpar Villages Farmers Accordingly.



Sr. No	Village Name	Total Widow woman	Eligible for Pension scheme	Total remaining	Facilitated Through AF
1	Ratdiya	45	27	18	26
2	Ugedi	42	36	6	19
3	Amara	43	17	26	17
4	Deshalpar (G)	69	44	25	39
5	Jinjay	25	18	7	12
6	Dhamay Navi	13	5	8	5
7	Dhamay Juni	9	3	6	3
Total		246	150	96	121

# Nakhatrana CSR



- Under Utthan project total 8 schools and 1165 students are getting benefit since two years
- Even though the covid pandemic Utthan education is ongoing with innovative teaching method.
  - **Online Outreach- Students-375**
  - **Individual Home visit-138**
  - **Sheri sikshan and school students- 313**
- Apart from regular classes Utthan Sahayks conducted online Covid awareness session. In which 100+ students and 80+ mothers took participate
- Utthan Sahayks approached Virtual classes for progressive learner before 9:00 am and after 8:30 pm.
- 21 students have been coached guided for National Means cum Merit Cum Scholarship Scheme (NMMS).
- Mothers Day Celebration and sensitized about how they are key point for their family growth. Total 350 mothers were participated
- International Yoga Day celebration on 21<sup>st</sup> June Through Virtually and Physically. More than 100 Family had participated
- More than 504 Mother were informed and awaked durinh mother meeting in Utthan Villages and aware about their wards education progress Health ,Hygine.
- Capacity building program for Utthan Sahayaks and Government Officers.
- Celebrated 75th Independence day with Commemorate 75 untold story , A Freedom Fighters who paid remarkable contribution for Indian Independence. And 139 Utthan school students and 53 parents had participated in Rashtragaan ,an initiative by the Ministry of Culture to Mark Azadi ka Amrit Mahotsav.
- Rakhi festival Students made Eco friendly Rakhi and tied to the 108 Frontline corona warriors.
- Arranged Virtual Tour on Plastic Waste Management with Municipal Corporation, Surat 73 Students were participated for the same.
- Teacher day celebration by preparing gratitude wall with card at 08 Utthan schools.
- D- Talks are an Initiative of Global Dream, a Disruptive Movement for Universal Foundational Literacy and Numera. Mr. Jatin Upadhayay Talk On "Empowering the Marginalized Communities in Gujarat Through rejuvenating Education.
- World Bool day celebration and started issue our library corner Books ,297 Books were issued by 6 to 9 standard students through our Library corner initiative which prompted them for reading nd created curiosity to know more.
- Teacher day celebration by preparing gratitude wall with card at all 08 schools.
- 25 Students are being taught for Javahar Navoday Entrance Exam by Utthan Sahayak since last Three Month.



# Tuna CSR



CSR activities being executed for the holistic development of three most effected villages and two fisherfolk settlement AKBTPL, Tuna.

We are Providing sage and clean potable water to Vira and Ghavarvado Fishermen vasahat and Vandi Village.  
Total 11310 KL water was supplied by coordination with GWIL.

Two Pond Deepening at at Rampar Village and Community training center construction at Vandi Village.

Tree Plantation at Rampar primary School with **one Tree one Child concept to Nurturing Environment. 500+ trees planted**

Fodder distribution to Rampar and Tuna Villages.  
Green Fodder -720310Kg  
Dry Fodder -26680Kg Green.

# Bitta CSR

Under Adani Solar Limited – 40 MW Solar Panel Power Unit is Situated at Bitta Village in Abdasa Taluka. We have done various activity under the CSR work.

As Abdasa is water scared region awareness for water conservation was provided to 50+ farmers of Bitta, Dhrufi and Moti Dhrufi villages.

Cleanliness of village Pond inlet in the Bita Village which lead more storage capacity and Village. Pond bunding construction in Dhufi village.

Panchayat Building construction was carried out by Adani Foundation's support and technical guidance.

Drainage line maintenance and Cleanliness is frequently done in Bita which lead Swachh Village



# Dignity of Work Force Programme - EVP

Presently in Mundra Population of migrated labour community is increasing. Some of them are living in pathetic condition due to lack of awareness and education. It is true that we cannot achieve our goal of development until we support to up bring lives of this community. Basic needs of this labour force needs to be address. In labour Vasahats they are not getting facility of health facilities, proper living condition, sanitation or proper living atmosphere. This leads to addiction and various diseases.

Under Employee Volunteering Programme, Adani Foundation employees are supporting to more than 800 students of Hindi Medium from workforce background.

Adani Foundation Medical officers are providing their services at Labour clinic at Every Saturday Sunday and covering more than 150 patients in a week.

Joy of giving week celebration is scheduled twice in a year. In June 2021, more than 7500+ cloth distribution to workforce families by Employees of Adani Group under EVP.

DE addiction Awareness Campaign is going on with "Prajapita Brahmakumaris" at Labour Vasahat Areas. This campaign has changed life of many labours. Cleanliness Drive is organized in May and August with Adani Willmar Limited at vasahat areas.

Rakshabandhan and Ashadhi bij celebration by Mundra Solar

Dignity of workforce programme is arranged by joining collaboration with Adani Wilmar Limited, APSEZ, labour contractor and leaders of union. adan





# Dignity of Work Force Programme - EVP



India's National TB Elimination Programme (NTEP) aims to meet the ambitious goal, announced by the Honorable Prime Minister Shri. Narendra Modi, of ending the TB epidemic by 2025, five years ahead of the UN Sustainable Development Goals (SDG) of 2030. In response to this call, the Government of India and USAID jointly launched the Corporate TB pledge (CTP), in April 2019 to galvanise corporate support to end TB. To continue the momentum and efforts, the USAID-supported iDEFEAT TB project,

which is working towards institutional strengthening to accelerate actions for Tuberculosis (TB) and drug resistant TB (DR-TB) in India; was launched as USAID/India's flagship TB project. The project works in collaboration with the Central TB Division (CTD), Ministry of Health and Family Welfare (Mo HFW) of the Government of India across a network of diagnostic, treatment, and program management institutions.

The CTP secretariat, hosted at The Union under the iDEFEAT TB project, provides technical assistance to government and corporates to adapt, implement TB interventions, and guide corporate resources for TB and DR-TB care.

Early diagnostics and treatment initiation are key to saving lives and minimizing disease transmission. In 2019, India reached a milestone of 24 lakh notified cases in India, an increase of 12% compared with 2018. Even then, an estimated 5.4 lakh were 'missing' across India, a serious drawback to our TB

elimination efforts as what is not measured is unlikely to be improved. Diagnostic delays are also prevalent in India, with studies indicating that these can be attributed to patients as well as health systems.

Adani foundation with APSEZ, APML, AWL and MSPVL HR department in coordination of FOKIA has launched cluster based screening program to eliminate TB in labours under Dignity of workforce program. Adani Ports and SEZ Limited has initiated screening with 2300 work force in first phase with target of screening more than 10,000 workforce of all group businesses and SEZ Industries.

USAID/India team including Director – Health Office has planned to visit Adani Foundation CSR Activities related to community health. He visited Adani Hospital, GKGH Hospital and related activities.



## Success Stories : Stories of 9 Empowered Women of Mundra



Educating and investing in women and girls has a multiplier effect on productivity, efficiency and economic growth but economically strengthening women is not only a means by which to spur and sustain inclusive industrial development, it is also a matter of advancing women's human rights.

# Success Stories



"Biogas asanje kutum jo hakdo sabhy j aay"  
(Homebiogas is our family member now )  
words by Gita Bharu sheda residing in  
Zarpara village. We get bio slurry which is  
golden material for growth and I am so happy  
to cook on gas flame !! Earlier we have to  
collect wood and 5 hours per day breathing  
carbon during cooking period..  
We will create awareness of the same to  
other farmers also.



Jetbai Gadhvi residing in Bhorara, she is  
saying " Now rural women can enjoy a smoke  
free life and almost entirely freedom from  
firewood collection and management. We  
feel safer, healthier and less worried - now  
we have time for other activities.

# Success Stories



Valbai Sheda is residing at Zarpara village Prasla Vadi Vistar. She is Arts graduate and very much interested in developing various types of fodder. Having 5 cows and 2 buffalos, use of biogas since 4 years soil become fertile. She is developing Super Napier Bajra - NB21 and using chaff cutter for cutting it. She always use to make silage and cattle food with high protein. With all experiments milk quality and also quantity increased by half ltr to one ltr per day per cow



Heerbai sodham residing at Nana kapaya who is progressive lady farmer. She lost her husband in 2015 in road accident. Responsibility of 4 children made her determined to earn for family. Her mother in law encouraged her for continue agriculture work. Her daughter is studying BSc nursing at Ahmedabad. Since 3 years she is doing cow based natural farming. After knowing about homebiogas she approached Adani foundation and today on world environment day with her contribution installation carried out at her farm. We salute her strong approach for natural farming and courage to take care of whole family with confidence

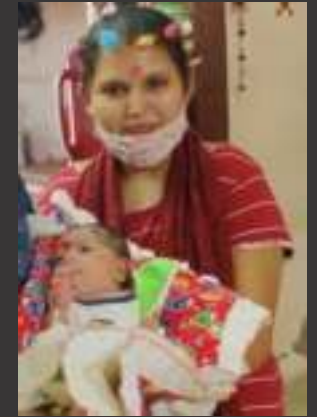


# Success Stories



Gitaben is lady farmer doing natural farming at Bhorara Village. She is taking care of her dragon fruit farm having more than 3000 plants with zero chemicals. She is widow and having 3 children . Her daughter is civil engineer and helping her in cultivation. When we meet her in month of March and offered our support – she told she just required guidance for jeevamrut and Gau Krupa Amrutam. She took part in "Kamlam" Exhibition at Ahmedabad. Adani Foundation salutes her confidence and self respect.

When a sweet little angel came into this world she was not at all aware about condition of her parents !!  
Divyanen soni residing at Gandhidham was nine month pregnant, delivery date was having only 7 days time period.  
In this happiness time - suddenly symptoms of corona appeared and corona test came out positive.  
Her husband Nikunj soni inquired to many private hospital but nobody was ready to take responsibility of delivery of corona patient.  
Finally the couple came to Adani GKGH hospital. Including corona treatment safe Delivery happened of patient - saved two lives !!  
When divya ben left for home with a cute baby girl she said " Thanks word is very small for this nobel help - I got great gift of the God "





# Success Stories



Ranjana ba is 28 years old lady lives in bhorara. She has 4 children. Her husband Raghuvirsinh lost his life before 3 months due to corona.

For Ranjan ba it was a very crucial time - socially and financially..

Jagrutiben meet her n fill forms of bal sanrakshan for 4 children. She will start getting 2000 per child - Rs 8000 per month from GOG. This support will be blessings for her.



Diwali Ben Parmar age 62 Years living at Mundra. Her name is totally opposite to her personality - she is 100 percent blind. With help of karsanbhai she started getting Niradhar vridhd pension Rs 750 per month as well as she received bus pass today. We can see her blessings by her innocent smile..

# Success Stories

"if you are planning for one year grow crops, if you are planning for 10 years grow the fruit saplings, but if your planning is for 100 years grow education" – this is a well-known proverb. It is not that person does not know about education but when a person has to make choice of education v/s hunger the later one wins the battle. Dearth for education burns to extinguish fire of hunger.

The war of Education v/s hunger was the same in the house of Haribhai Khetshi Sheda a resident of Zarpara Village of Mundra. The couple Haribhai Sheda has 7 daughters and 5 sons was earning livelihood through grazing animals, working in others farm, and trying to grow something in his own farm with great difficulty. In the grave financial conditions there was no scope that children could be educated as all were occupied as child labourers and all gave priority to work as compared to education. But, story was

different with the fourth child Nagajan Sheda. For him detection of polio followed by permanent defect in leg due to doctors fault turned as a blessing in disguise as he completed education till class 9 and dropped out after failing in class 10.

In 1991, when Adani Company started Mr Nagajan got labour work from a contractor. His first marriage had failed but was comfortable with the second wife. His first daughter from first marriage was Jyoti. He tried to give her best of childhood. He took an oath to educate the daughter by any means and make her doctor. It was his burning desire to see the upcoming generation of Charan samaj educated. He determined to do anything to have the tag of Dr. for his daughter.

Mr Nagajan started a tea stall for the people coming to work at Adani Port. But too bad of

his fate nobody turned up for 08 days as he was using cow and buffalos milk and not of the packet. He didn't have enough fund to invest for the same. Meanwhile one contractor came with 50 labourers to do some civil work and they all started coming to his tea stall. Gradually, he borrowed 5000 rupees to bring things for the shop and also took the franchisee for Amul. He admitted Jyoti in the govt school of Dhrub. The family of Nagajanbhai also got two more sons and a daughter.

In order to fulfill his desire Nagajanbhai started searching for a good school in nearby area and narrowed down to Adani Public School, CBSE school. The family members opposed for the same as it would increase the expense for all. He was firm and said " I will eat chapatti and salt but will educate my daughter".

# Success Stories



Jyoti was admitted in the school in Jr.Kg. The teachers of the school could understand the passion of the parent and her journey in APS started which was followed by her 03 siblings joining her in the same school.

Inspite of distance, different timings of all

the section Mr Nagajan use to meticulously do pickup and drop for all the children. His wife supported him by doing all the household chores on her own, managing livestock and farm to earn some amount.

Time flied and Ms Jyoti secured 92% in Class 12 Science. The first target of Mr Nagajan was achieved. He received great appreciation and could set an example for his community. At present his two sons Rudra and Shivam are in 11<sup>th</sup> and 7<sup>th</sup> respectively and daughter Sonal is in class 9. It is not been an easy task to regularly pay fees of 04 kids. Yet he managed to do so. At times he has become fee defaulter which created various issues like result on hold etc. At one point of time he sold his plot and paid fees. His all the four children are good at studies and other co-curricular activities. Jyoti has got first position in district level

throw ball, has got the best school award in swachagraha, gave a speech on kargil day and many others.

Jyoti is firm to fullfil the dream of her parents. She is able to drive vehicles like bolero, bike and grows different plants.

In the community of Nagajan Bhai early marriages are still prevalent. But, he has not done so for any of his kids. Nagajan bhai has proved to be a living example that if one decides he could achieve anything be it education of kids or their bright future.

Our country needs many such Nagajan bhai to have many Jyoti's!!!!

# Events



Inauguration of **Community Resource Centre on 3<sup>rd</sup> April** to bridge the gap between Government and community to facilitate government schemes with Launching of "Super 51" Book Let by auspicious presence of Respected DM kutchh Ms.Pravina D K - IAS, District Development Officer Mr Bhavya Verma - IAS, Director, DRDA Mr Joshi , Director- Social welfare office Mr Arvind Rohadiya, Mr Chaudhary Sub Divisional Magistrate.

All dignitaries has visited Sanitary pad making unit and discussed with Saheli group women regarding orders and capacity. Pravina D K mam meet all women groups and asked NRLM department to prepare empowerment plan for the SHG's.



# Events



## ❖ Super specialist health camps

With Joint Collaboration of Adani Foundation, Adani Hospital Mundra & Sterling Ramakrishna Hospital Gandhidham at Adani Hospital Mundra on 26<sup>th</sup> August. With availability of **Dr. Ankur Gupta** (Neuro & spine surgeon), **Dr. Tausif Sauravardi** (Pulmonologist), **Dr. Gautam Pipara** (Urologist), **Dr. Kunal Thakkar** (Endocrinologist) from Sterling Ramakrishna Hospital Gandhidham render their services accordingly.

With Joint Collaboration of Adani Foundation, Adani Hospital Mundra & Sterling Ramakrishna Hospital Gandhidham at Rotary hall on 28<sup>th</sup> September. **Dr. Ankur Gupta** (Neuro & spine surgeon), **Dr. Tausif Sauravardi** (Pulmonologist), **Dr. Gautam Pipara** (Urologist), **Dr. Kunal Thakkar** (Endocrinologist) Dr. Sachin Patel (MD), Dr. Rajesh Shukla (Surgeon) and Dr. Treyank Shukla (Pediatrician) had provided their services

Total 961 **Patients** had benefitted.



## Doctor's Day Celebration

Kutch Kalpataru farmer producer organization is working for promoting dates of Kutch. On the occasion of Doctor day on 1<sup>st</sup> July, KKPC Farmers honored Doctor, Nurses and House keeping staff of GKGH, Bhuj & AHMPUL, Mundra with great respect to paid their sincere contribution during Covid -19 Pandemic.

On this day all Directors of KKPC were remain present and facilitate all medical staff with dates packet. More than 800 Staff members have been facilitated with the same.

This shows great feelings of farmers towards remarkable work of Adani healthcare in pandemic condition at Mundra and Bhuj Hospital.

# Events



We celebrated **25<sup>th</sup> Silver Jubilee of Adani Foundation** at Adani House Mundra. On this Auspicious day We facilitated 11 women of Mundra Villages who have done Remarkable work in their filed in the Presence of EDM Shree Rakshit sir and HOD of APSEZ. acquainted about Adani Foundation Journey.

As well as Appointment letter Felicitated to Mamd Shakil Manjaliya, a First Fisher Youth who have peruse Mechanical Diploma



On the occasion of **Respected Dr. Pritiben Birthday** at 29<sup>th</sup> August, 21 Ration kit were distributed by APSEZ & AWL Employee To needy widow and senior citizen Women who are alone & passing measurable life

As well as ensure to continue ration kit support for life long to them.

# Events



## World Environment Day Celebration

Miyawaki forest development inauguration was held in coordination with Gram Panchayat, Forest Department and Mnrega. Additional collector, Sub division Magistrate, Range forest officer, TDO, Head environment, Panchayat members and Talati remained present. Press media was also live in this virtual event. Executive Director Mr. V. S. Gadhvi had given motivational speech on the occasion.

MOU signing ceremony for promotion of Natural farming with KSKV kutchh University. Dr.Jayrajsinh Jadeja vice chancellor and Dr.Mrugesh trivdi HOD of earth and environmental science were present and discussed about the road map for involving more than 2000 farmers for natural farming



## International Coastal Clean up Day

Adani foundation MUNDRA has celebrated International Coastal Clean up Day with Coast Guard" with theme swachhagraha.. School students, Coast Guard staff and Adani foundation staff had cleaned Mandvi beach and give a message of swachhagraha.. In this event more than 150 students and 120 staff members of coast guard and Adani Foundation had taken part



# Visits



- **ESG team** of Adani Group had visited AF Mundra - sustainable Project & business
- **Adani Foundation COO**, Respected Chandrasekhar Gowda sir-COO Adani Foundation had visit of all AF Project Mundra.
- **Adani Digital Lab & AF Communication Team**, had visit all AF Project Mundra.
- **MOEF team** had visit about APSEZ & AF Sustainability Projects.
- **EDI -Entrepreneurship Development Institute Team** had visit to frame out sustainable SHG development Project
- Gujarat Ecology Commission has visited grassland development project
- **100 VVIP Investor had Visit** APSEZ ,Mundra as well as Briefed about CSR activities and Gifted with NAMDA Frame which is unique combination to Revival of NAMDA craft and Mangrove Bio diversity- Fauna.





# Mapping AF Projects with Sustainable Development Goals...

Sr No	UN-Sustainable Development Goals	Illustrative Mapping of Mundra Projects
1	No Poverty	Support to Farmers, Fishermen and Locals, Adani Skill Development Centre (ASDC)
2	Zero Hunger	Natural Farming, Drip Irrigation Project, Dragon Fruit Farming, Date Tissue Culture
3	Good Health & Well-being	Gujarat Adani Institute of Medical Sciences (GAIMS), Health Clinics, Mobile Health Vans
4	Quality Education	Adani Vidya Mandir, GAIMS & ASDC
5	Gender Equality	Co-education in Adani Vidya Mandir & ASDC, Saheli Samitis, Support to Women Farmers
6	Clean Water & Sanitization	Water Conservation Projects, Potable Water to Fishermen
7	Affordable & Clean Energy	Usage of Solar Energy, Promotion of Bio-Gas Plants
8	Decent Work & Economic Growth	ASDC, Self Help Groups (SHG), Local Arts Revival
9	Industry, innovation & infrastructure	Tissue Culture, Seaweed Culture, Local Arts Revival
10	Reduced Inequalities	SHGs, Local CSR Leadership
11	Sustainable Cities & Communities	Community Infrastructure, Smriti Van
12	Responsible Consumption & Production	Usage of Solar Energy, Natural Farming
13	Climate Action	Mangroves Conservation, Biodiversity, Water Conservation, Seaweed Culture
14	Life below Water	Mangroves Conservation, Seaweed Culture
15	Life on Land	Mangroves Conservation, Smriti Van, Animal Husbandry
16	Peace, Justice & Strong Institutions	Local CSR Leadership, Self-sustained Open Structures
17	Partnerships for Goals	Revival of Local Arts, Smriti Van, Project Swavalamban, Seaweed Culture

# Stories of change - impact in numbers...



**175+**

Hectares of Land Luni  
Mangroves Biodiversity

**5820+**

Fisherman person days  
employed in Mangroves  
Plantation

**41000+**

Plantations at Smriti Van  
of **115 varieties**

**950+**

Beneficiaries of  
multispecialty health camp

**500+**

Students at Adani Vidya  
Mandir

**8900+**

Beneficiaries of Health  
Initiatives

**15**

SHGs under 'Saheli'  
initiative for Women

**121**

Home Biogas Plants  
installed in 5+ villages

**8700+**

Special health care for Sr  
Citizens in **68 Villages**

**1632+**

Beneficiaries enrolled in  
Govt Schemes in FY21

**20**

Check Dams constructed  
and rejuvenated

**5000+**

Students under Utthan  
initiative in **39 Schools**

## Summary - Budget Utilization of six month F.Y. 2021-2022

Sr No	Particulars	Approved Budget	Budget Utilization	% of utilization
<b>A.</b>	General Management and Administration	76.12	23.67	31.10%
<b>B.</b>	Education	172.05	18.07	10.50%
<b>B1</b>	Utthan-Education -Mundra & Anjar	149.51	16.91	11.31%
<b>B2</b>	Utthan : Fisherfolk	22.54	1.16	5.14%
<b>C.</b>	Community Health	330.38	107.47	32.53%
<b>D.</b>	Sustainable Livelihood Development	426.28	171.64	40.26%
<b>E.</b>	Community Infrastructure Development	141.35	11.18	7.91%
<b>F.</b>	EDM Recommended Projects	100.00	2.65	2.65%
<b>G.</b>	COVID 19 Support	25.00	12.16	48.63%
	Total AF CSR Budget :	1,271.18	346.84	27.28%
<b>[I]</b>	Adani Vidya Mandir-Bhadreshwar	189.84	40.41	21.28%
<b>[II]</b>	Project Udaan-Mundra	167.42	17.99	10.75%
	GRAND TOTAL Budget F.Y. 2021-22 :	1,628.45	405.24	24.89%

# Media coverage

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મુલાકાત દરમિયાન સરકારી અધિકારીઓએ સમુદાયના સભ્યોના પ્રશ્નોનો સમાવેશ કરીને સરકારી સેવાઓની વિગતો આપી હતી. આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી. આ સંદર્ભે સરકારી સેવાઓની વિગતો આપવામાં આવી હતી. આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી. આ સંદર્ભે સરકારી સેવાઓની વિગતો આપવામાં આવી હતી. આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી.

આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી. આ સંદર્ભે સરકારી સેવાઓની વિગતો આપવામાં આવી હતી. આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી. આ સંદર્ભે સરકારી સેવાઓની વિગતો આપવામાં આવી હતી. આમાં કોઈ એમ.કે.સી. સુધીના સમાવેશનો સમાવેશ થઈ શકે તેવી વ્યવસ્થા કરવામાં આવે તેવી સલાહ આપવામાં આવી હતી.

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# “શાળા બંધ પણ શિક્ષણ નહિ”

અહાલી વિદ્યા મંદિર, બહેશ્વર દ્વારા અંતરિયાળ નામોર્મો સેરી શિક્ષણ શરૂ કરાવ્યું

**કચ્છ પત્રિકા**

ગુજરાત સરકારે શાળા બંધ કરી દેવાની જાહેરાત કરી હતી. આ જાહેરાતને કારણે શાળાઓ બંધ થઈ ગઈ હતી. પરંતુ શિક્ષણનું અભિયોગ નહોતો રૂક્યો. અહાલી વિદ્યા મંદિરે આ સંજોગોમાં શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું.



અહાલી વિદ્યા મંદિરના અંતરિયાળ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું. આ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું.

અહાલી વિદ્યા મંદિરના અંતરિયાળ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું. આ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું.

અહાલી વિદ્યા મંદિરના અંતરિયાળ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું. આ શિક્ષણ કાર્યકરોએ જણાવ્યું હતું કે, શાળા બંધ થવાને કારણે શિક્ષણનું અભિયોગ રૂકી જાય તેવી સ્થિતિ ટાળવા માટે અંતરિયાળ શિક્ષણ શરૂ કરવાનું નિર્ણય લીધું હતું.

# કચ્છ

## મુંદરામાં કોમ્યુનિટી રિસોર્સ સેન્ટરનો કરાયેલો પ્રારંભ

મુંદરા, તા. ૩ : આગાંવી સરકારના હાથે મળાઈને સરકારી અને આગાંવી સરકારી સંસ્થાઓ દ્વારા મુંદરામાં કોમ્યુનિટી રિસોર્સ સેન્ટરનો પ્રારંભ કરાયેલો. આ સમગ્ર કાર્યક્રમમાં આગાંવી સરકારના મુખ્યમંત્રી, મુંદરાના મેયર, સરકારી સંસ્થાઓના અધિકારીઓ, શાળાના બાળકો અને સ્થાનિક નેતાઓ હાજર રહ્યા હતા. આ સમગ્ર કાર્યક્રમમાં આગાંવી સરકારના મુખ્યમંત્રી, મુંદરાના મેયર, સરકારી સંસ્થાઓના અધિકારીઓ, શાળાના બાળકો અને સ્થાનિક નેતાઓ હાજર રહ્યા હતા.

આગાંવી સરકારના મુખ્યમંત્રી, મુંદરાના મેયર, સરકારી સંસ્થાઓના અધિકારીઓ, શાળાના બાળકો અને સ્થાનિક નેતાઓ હાજર રહ્યા હતા. આ સમગ્ર કાર્યક્રમમાં આગાંવી સરકારના મુખ્યમંત્રી, મુંદરાના મેયર, સરકારી સંસ્થાઓના અધિકારીઓ, શાળાના બાળકો અને સ્થાનિક નેતાઓ હાજર રહ્યા હતા.



# Adani Foundation Kutch

## Thank You

# **Annexure – 3**



**POLLUCON**

LABORATORIES PVT. LTD.

Environmental Auditors, Consultants & Analysts.  
Cleaner Production / Waste Minimization Facilitator

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

# **"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"**

**FOR**



**ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED  
TAL: MUNDRA, KUTCH, MUNDRA – 370 421**

**MONITORING PERIOD:  
APRIL 2021 TO SEPTEMBER 2021**

**PREPARED BY:**



**POLLUCON LABORATORIES PVT.LTD.**

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,  
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,  
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.**

**PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.**

**E-mail: [pollucon@gmail.com](mailto:pollucon@gmail.com) web: [www.polluconlab.com](http://www.polluconlab.com)**

**TC - 5945**

**ISO 9001:2015**

**ISO 14001:2015**

**ISO45001:2018**

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## MARINE WATER MONITORING SUMMARY REPORT

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.41	8.35	8.32	8.25	8.27	8.21	8.24	8.31	8.17	8.12	8.13	8.09	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.5	30.1	30.2	30	29.5	29.3	29.9	29.8	29.9	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	102	88	119	102	127	108	107	92	113	102	93	85	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	5.0	Not Detected	4.2	Not Detected	3.4	Not Detected	3.1	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.0	5.8	5.9	5.8	6.0	5.8	5.9	5.7	6.0	5.8	6.0	5.95	IS3025(P38)89Re.99
6	Salinity	ppt	37.1	37.4	36.2	36.7	35.2	35.6	35.72	36.18	35.14	35.46	34.90	35.32	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)5520 D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.21	2.40	2.98	2.75	2.54	2.39	2.86	2.74	2.36	2.14	2.17	2.06	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.75	0.81	0.83	0.79	0.35	0.46	0.92	0.81	0.75	0.63	0.63	0.54	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.90	2.72	2.76	2.51	2.13	1.97	2.35	2.16	2.59	2.48	2.38	2.13	IS3025(P34)88Cla.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.58	2.04	1.93	1.72	2.64	2.48	1.97	1.83	2.28	2.19	2.46	2.35	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.86	5.93	6.57	6.05	5.02	4.82	6.13	5.71	5.70	5.25	5.18	4.73	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	8.0	Not Detected	14.0	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38712	38901	37804	38216	36809	37118	36802	37184	36758	37066	35994	36384	IS3025(P16)84Re.02
15	COD	mg/L	20	Not Detected	23.6	19.8	21.6	Not Detected	15.4	Not Detected	12.9	10.8	10.28	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.62	2.25	2.59	2.20	2.67	2.25	2.21	2.16	2.18	2.13	2.23	2.12	APHA (22 <sup>nd</sup> Edi) 10200-H



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)



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16.2	Phaeophytin	mg/m <sup>3</sup>	0.15	0.32	0.18	0.38	0.1	0.3	0.36	0.60	0.59	0.44	0.54	0.46	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	162	96	150	94	146	102	124	94	156	106	142	96	APHA (22 <sup>nd</sup> Edi) 10200-H
16.4	Name of Group Number and name of group species of each group	--	<i>Biddulphia sp.</i> <i>Cheatoce rous sp.</i> <i>Skeletonema sp.</i> <i>Rhizosolenia sp.</i>	<i>Nitzschia sp.</i> <i>Stauroneis sp.</i> <i>Navicula sp.</i>	<i>Rhizosolenia sp.</i> <i>Stauroneis sp.</i> <i>Pleurosira sp.</i> <i>Coscinodiscus sp.</i>	<i>Navicula sp.</i> <i>Skeletonema sp.</i> <i>Nitzschia sp.</i>	<i>Thalassiosira sp.</i> <i>Cheatoce rous sp.</i> <i>Skeletonema sp.</i> <i>Thalassionema sp.</i>	<i>Nitzschia sp.</i> <i>Navicula sp.</i> <i>Melosira sp.</i> <i>Synedra sp.</i>	<i>Ceratium sp.</i> <i>Pleurosira sp.</i> <i>Rhizosolenia sp.</i> <i>Mastogloia sp.</i> <i>Thalassionema sp.</i>	<i>Synedra sp.</i> <i>Nitzschia sp.</i> <i>Rhizosolenia sp.</i> <i>Cyclotella sp.</i> <i>Melosira sp.</i>	<i>Skeletonema sp.</i> <i>Rhizosolenia sp.</i> <i>Coscinodiscus sp.</i> <i>Thalassionema sp.</i>	<i>Navicula sp.</i> <i>Nitzschia sp.</i> <i>Cyclotella sp.</i> <i>Melosira sp.</i>	<i>Chaetoceros sp.</i> <i>Coscinodiscus sp.</i> <i>Biddulphia sp.</i> <i>Skeletonema sp.</i>	<i>Rhizosolenia sp.</i> <i>Pleurosira sp.</i> <i>Navicula sp.</i> <i>Synedra sp.</i>	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> /100 m <sup>3</sup>	24		22		32		27		33		25		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Chaetognathes Polychaetes Amphipods Decapods		Copepods Isopods Polychaetes Nematodes		Copepods Polychaetes Decapods Ostracods		Bivalves Gastropods Polychaetes		Decapods Gastropods Polychaetes		Polychaetes Lamellibranches Gastropods Ostracods		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.1		1.9		2.25		2.4		3.1		2.45		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2410		2320		2540		2550		2610		2740		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah  
Lab Manager



Dr. ArunBajpai  
Lab Manager (Q)

**RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]**

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.63	0.52	0.48	0.43	0.39	0.42	FCO:2007
2	Phosphorus as P	µg/g	529	463	593	528	613	574	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	5.59	4.26	4.87	4.37	4.56	4.98	AAS APHA 3111 B
5.2	Total Chromium as Cr <sup>+3</sup>	µg/g	128	110	126	109	127	112	AAS 3111B
5.3	Manganese as Mn	µg/g	716	673	706	684	639	728	AAS APHA 3111 B
5.4	Iron as Fe	%	4.93	4.39	4.68	4.47	4.61	4.76	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	57	31.72	39.5	29.84	33.58	28.64	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	48	28.6	42.6	32.6	49.8	46.70	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	135	107	113	97.5	110	92.70	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	2.76	3.28	2.59	3.16	2.68	2.38	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	Polychaetes Ostracods Gastropods	Polychaetes Amphipods Gastropods	Polychaetes Amphipods Branchyaran	Gastropods Crustaceans Decapods	Gastropods Crustaceans Bivalves	Gastropods Polychaetes Bivalves	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans Nematodes	Foraminiferams	Nematodes	Foraminiferams Nematodes	Foraminiferams	Nematodes	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/m2	379	262	350	440	352	499	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**

**Lab Manager**




**Dr. Arun Bajpai**

**Lab Manager (Q)**

### RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.39	8.37	8.32	8.25	8.23	8.17	8.17	8.14	8.13	8.09	8.09	8.04	IS3025(P11)8 3Re.02
2	Temperature	oC	30.9	30.8	30.8	30.6	30.2	30.1	29.6	29.3	29.9	29.8	29.8	29.7	IS3025(P9)84 Re.02
3	Total Suspended Solids	mg/L	109	124	123	107	135	119	123	107	113	102	102	91	IS3025(P17)8 4Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.5	Not Detected	3.2	Not Detected	3.0	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re. 03Edition2.1
5	Dissolved Oxygen	mg/L	5.9	5.7	5.9	5.8	6.0	5.9	5.9	5.7	6.0	5.7	6.0	5.8	IS3025(P38)8 9Re.99
6	Salinity	ppt	37	37.3	37.2	37.5	35.3	35.5	35.46	35.92	35.26	35.74	34.86	35.2	APHA (22 <sup>nd</sup> Edition) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edition) 5520D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.56	2.74	2.96	2.63	2.61	2.42	2.37	2.19	2.47	2.39	2.53	2.41	IS3025(P34)8 8
9	Nitrite as NO <sub>2</sub>	μmol/L	0.65	0.74	0.75	0.51	0.45	0.56	0.89	0.75	0.76	0.68	0.81	0.73	IS3025(P34)8 8 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.45	2.80	2.34	2.24	2.51	2.34	2.38	2.23	2.57	2.41	2.34	2.19	IS3025(P34)8 8Cla.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.71	2.49	2.69	2.47	2.37	2.28	1.75	1.68	1.36	1.27	1.75	1.63	APHA(22 <sup>nd</sup> Edition) 4500 C
12	Total Nitrogen	μmol/L	5.66	5.49	6.05	5.38	5.57	5.32	5.64	5.17	5.80	5.48	5.68	5.33	IS3025(P34)8 8
13	Petroleum Hydrocarbon	μg/L	6.0	Not Detected	10.5	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38544	38675	38664	38926	36898	37104	37066	37504	36862	37314	35964	36276	IS3025(P16)8 4Re.02
15	COD	mg/L	14	8	21.7	19.3	19.4	Not Detected	16.2	Not Detected	13.4	12.8	10.48	Not Detected	APHA(22 <sup>nd</sup> Edition) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.71	2.63	2.65	2.49	2.58	2.4	2.37	2.29	2.26	2.18	2.24	2.16	APHA (22 <sup>nd</sup> Edition) 10200-H



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

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16.2	Phaeophytin	mg/m <sup>3</sup>	0.99	0.19	1.04	0.33	0.2	1.3	0.45	1.40	0.65	1.51	0.67	1.54	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	156	95	142	86	152	106	134	99	152	106	138	108	APHA (22 <sup>nd</sup> Edi) 10200-H
16.4	Name of Group Number and name of group species of each group	--	Rhizosolenia sp. Biddulphia sp. Thallasiosira sp. Coscinodiscus sp.	Synedra sp. Nitzschia sp. Pleurosigma sp.	Thalassiosira sp. Pleurosigma sp. Biddulphia sp.	Navicula sp. Synedra sp. Cheatocerous sp.	Thalassiosira sp. Cheatocerous sp. Biddulphia sp. Coscinodiscus sp.	Synedra sp. Navicula sp. Nitzschia sp. Pleurosigma sp.	Biddulphia sp. Stauroneis sp. Coscinodiscus sp. Skeletone ma sp.	Navicula sp. Nitzschia sp. Cyclotella sp. Thalassiothrix sp.	Rhizosolenia sp. Synedra sp. Thalassiosira sp. Skeletone ma sp. Biddulphia sp.	Thalassiosira sp. Navicula sp. Thalassiosira sp. ema sp. Rhizosolenia sp.	Coscinodiscus sp. Biddulphia sp. Thalassiosira sp. Rhizosolenia sp.	Synedra sp. Nitzschia sp. Navicula sp. Stauroneis sp.	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	27		25		31		23		29		24		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Ostracods Gastropods Chaetognaths Polychaetes		Nematodes Copepods Polychaetes Mysids		Decapods Polychaetes Gastropods		Polychaetes Bivalves Decapods Ostracods		Polychaetes Bivalves Decapods Chaetognaths		Lamellibranches Polychaetes Gastropods		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.6		2.2		2.35		2.2		2.9		2.15		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2240		2380		2450		2600		2580		2710		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi) 9221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981 Edi.2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah

Lab Manager



Dr. ArunBajpai

Lab Manager (Q)



**RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK – N 22°44'239" E 069°43'757"]**

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	--	--	--	--	0.47	0.37	FCO:2007
2	Phosphorus as P	µg/g	--	--	--	--	619	568	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	--	--	--	--	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	--	--	--	--	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	--	--	--	--	4.78	4.88	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	--	--	--	--	169	152	AAS 3111B
5.3	Manganese as Mn	µg/g	--	--	--	--	852	783	AAS APHA 3111 B
5.4	Iron as Fe	%	--	--	--	--	4.8	4.72	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	--	--	--	--	42.96	37.98	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	--	--	--	--	37.64	41.23	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	--	--	--	--	152	139	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	--	--	--	--	2.75	1.86	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	--	--	--	--	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	--	--	--	--	Gastropods Polychaetes Crustaceans	Gastropods Polychaetes Crustaceans	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	--	--	--	--	Nematodes	--	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/m <sup>2</sup>	--	--	--	--	499	469	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**  
**Lab Manager**




**Dr. Arun Bajpai**  
**Lab Manager (Q)**

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## RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLAND - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.43	8.47	8.31	8.27	8.24	8.20	8.19	8.13	8.12	8.09	8.09	7.98	IS3025(P11)83Re.02
2	Temperature	oC	30.8	30.9	30.7	30.5	30.1	29.8	29.6	29.5	29.9	29.8	29.8	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	98	85	110	92	123	107	114	93	128	104	107	89	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4.0	Not Detected	3.6	Not Detected	3.4	Not Detected	3.2	Not Detected	2.8	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03 Edition 2.1
5	Dissolved Oxygen	mg/L	6.2	6	6.0	5.9	6.0	5.8	5.9	5.8	6.0	5.7	6.0	5.85	IS3025(P38)89Re.99
6	Salinity	ppt	36.9	37.3	37.1	37.4	35.3	35.6	35.74	36.18	35.14	35.89	35.24	35.76	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)5520D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.41	2.65	2.87	2.74	2.69	2.47	2.39	2.13	2.57	2.41	2.39	2.27	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.55	0.60	0.93	0.81	0.75	0.68	0.68	0.52	0.73	0.68	0.64	0.58	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.75	2.84	2.68	2.58	2.53	2.45	2.28	2.17	2.39	2.17	2.47	2.30	IS3025(P34)88Cla 2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.66	2.14	2.57	2.41	2.39	2.31	1.99	1.75	2.15	2.10	2.25	2.17	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.71	5.14	6.48	6.13	5.97	5.60	5.35	4.82	5.69	5.26	5.50	5.15	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	18.0	Not Detected	16.8	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38241	38656	38558	38282	36894	37180	37312	37726	36748	37456	36318	36784	IS3025(P16)84Re.02
15	COD	mg/L	24	17	21.6	19.4	20.5	Not Detected	16.3	Not Detected	13.6	11.4	10.86	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.87	2.34	2.71	2.29	2.61	2.34	2.33	2.25	2.26	2.10	2.34	2.27	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	0.12	0.16	0.39	0.22	0.5	0.2	0.77	0.26	0.83	0.40	0.14	0.80	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	137	103	117	89	131	104	117	84	131	97	123	91	APHA (22 <sup>nd</sup> Edi) 10200-H



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

16.4	Name of Group Number and name of group species of each group	--	Nitzschia sp. Pleurosig ma sp. Biddulphi a sp. Coscinodi scus sp.	Navicula sp. Stauronei s sp. Cheatocer ous sp. Synedra sp.	Pleurosig ma sp. Thallasios ira sp. Biddulphi a sp. Rhizosole nia sp.	Cyclotella sp. Navicula sp. Nitzschia sp.	Skeletone ma sp. Biddulphi a sp. Coscinodi scus sp. Rhizosole nia sp.	Navicula sp. Nitzschia sp. Pleurosig ma sp. Melosira sp.	Skeletone ma sp. Biddulphi a sp. Thallasion ema sp. Coscinodi scus sp.	Nitzschia sp. Rhizosole nia sp. Synedra sp. Pleurosig ma sp.	Nitzschia sp. Biddulphi a sp. Skeletone ma sp. Rhizosole nia sp.	Navicula sp. Pleurosig ma sp. Synedra sp. Cheatocer ous sp.	Gyro sigma sp. Guinardia sp. Thallasion ema sp. Coscinodi scus sp. Cyclotella sp.	Nitzschia sp. Amphipr ora sp. Biddulphi a sp. Melosira sp. Synedra sp.	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> /100 m <sup>3</sup>	28		26		30		25		31		26		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Decapods	Polychaetes	Si phonophores	Chaetognathes	Ostraco ds	Gastropods	Polychaetes	Decapods	Ostracods	Polychaetes	Gastropods	Decapods	APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.6		2.3		2.45		2.4		2.9		2.55		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2390		2450		2520		2320		2490		2640		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)922 1-D
18.3	Ecoli	/ml	Present		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2 .4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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## RESULTS OF SEDIMENT ANALYSIS [M3 RIGHT SIDE OF BOCHA CREEK - N 22°46'530" E 069°41'690"]

SR NO	TEST PARAMETERS	UNIT	APRIL 2021 SEDIMENT	MAY 2021 SEDIMENT	JUNE 2021 SEDIMENT	JULY 2021 SEDIMENT	AUGUST 2021 SEDIMENT	SEPTEMBER 2021 SEDIMENT	TEST METHOD
1	Organic Matter	%	0.56	0.47	0.43	0.42	0.37	0.35	FCO:2007
2	Phosphorus as P	µg/g	539	603	576	537	569	542	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	4.72	4.39	4.63	4.46	4.68	4.58	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	119	127	119	106	132	107	AAS 3111B
5.3	Manganese as Mn	µg/g	703	613	710	692	613	592	AAS APHA 3111 B
5.4	Iron as Fe	%	4.81	4.68	4.56	4.37	4.58	4.63	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	63	35.7	39.28	35.6	31.24	41.28	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	40	32.6	42.5	37.48	41.98	36.7	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	139	112	119	102	129	109	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	2.75	2.93	2.64	2.36	2.75	2.17	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	Polychaetes Crustaceans Bivalves	Polychaetes Gastropods Crustaceans	Amphipods Polychaetes Crustaceans	Gastropods Polychaetes Bivalves	Crustaceans Polychaetes Bivalves	Gastropods Polychaetes Bivalves	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	Nematodes Turbellaria	Namatodes	Namatodes	Foraminiferams	--	--	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/m <sup>2</sup>	324	352	411	471	353	372	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)



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## RESULTS OF MARINE WATER [M4 JUNA BANDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.38	8.35	8.29	8.17	8.24	8.20	8.19	8.15	8.15	8.12	8.07	8.01	IS3025(P11)83R e.02
2	Temperature	oC	30.8	30.5	30.6	30.4	30.3	30	29.7	29.5	29.9	29.8	29.8	29.6	IS3025(P9)84Re .02
3	Total Suspended Solids	mg/L	94	80	97	86	119	102	105	93	113	102	97	83	IS3025(P17)84R e.02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.4	Not Detected	3.2	Not Detected	3.1	Not Detected	2.7	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	6.0	5.9	5.9	5.8	6.0	5.8	5.9	5.8	6.0	5.7	5.9	5.75	IS3025(P38)89R e.99
6	Salinity	ppt	36.8	37.2	37.3	37.6	35.4	35.7	35.68	35.92	35.29	35.68	35.16	35.42	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)5 520D
8	Nitrate as NO <sub>3</sub>	µmol/L	2.45	2.14	2.73	2.59	2.61	2.53	2.74	2.58	2.47	2.31	2.46	2.31	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	µmol/L	0.59	0.45	0.65	0.53	0.75	0.65	0.69	0.61	0.73	0.64	0.57	0.49	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	µmol/L	2.58	2.50	2.38	2.29	2.51	2.38	2.37	2.29	2.16	1.97	2.28	2.17	IS3025(P34)88C la.2.3
11	Phosphates as PO <sub>4</sub>	µmol/L	2.64	2.44	2.84	2.76	2.69	2.58	1.99	1.87	2.39	2.31	2.53	2.46	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	µmol/L	5.02	5.09	5.74	5.41	5.87	5.56	5.8	5.48	5.36	4.92	5.31	4.97	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	9.0	Not Detected	13.6	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38415	37818	38742	39052	36992	37280	37256	37472	36874	37258	36472	36472	IS3025(P16)84R e.02
15	COD	mg/L	15	10	26.8	17.2	19.6	Not Detected	17.3	Not Detected	13.2	11.6	10.28	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.61	2.32	2.52	2.28	2.56	2.37	2.48	2.25	2.21	2.13	2.04	1.95	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	0.77	0.65	0.86	0.69	0.8	0.6	0.90	0.72	1.17	0.84	0.93	0.30	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	131	101	121	91	139	109	123	96	134	110	127	89	APHA (22 <sup>nd</sup> Edi) 10200-H



**H. T. Shah**

**Lab Manager**




**Dr. Arun Bajpai**

**Lab Manager (Q)**

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16.4	Name of Group Number and name of group species of each group	--	Melosira sp. Closteriu m sp. Biddulphi a sp. Rhizosole nia sp.	Thallasios ira sp. Nitzschia sp. Navicula sp. Fragillaria sp.	Thallasios ira sp. Coscinodi scus sp. Rhizosole nia sp. Pleurosig ma sp.	Navicula sp. Nitzschia sp. Melosira sp.	Rhizosole nia sp. Nitzschia sp. Synedra sp. Pleurosig ma sp. Coscinodi scus sp.	Navicula sp. Cheatocer ous sp. Biddulphi a sp. Melosira sp.	Navicula sp. Pleurosig ma sp. Biddulphi a sp. Coscinodi scus sp.	Synedra sp. Chetocen s sp. Stauronds sp. Nitzschia sp.	Navicula sp. Pleurosig ma sp. Biddulphi a sp. Coscinodi scus sp.	Synedra sp. Chetocen s sp. Stauronds sp. Nitzschia sp.	Nitzschia sp. Melosira sp. Ceratium sp. Pleurosig ma sp. Coscinod iscus sp.	Cyclotella sp. Biddulphi a sp. Synedra sp. Nitzschia sp.--	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	31		27		30		25		31		28		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Decapods Gastropods Medusae		Siphonophores Chaetognathes Polychaetes Isopods		Polychaetes Decapods Ostracods Copepods		Polychaetes Gastropods Bivalves Ostracods		Polychaetes Gastropods Decapods		Foraminiferans Gastropods Lamellibranches Amphipods		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.9		2.5		2.65		2.5		3.0		2.75		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2450		2340		2540		2160		2180		2390		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)9 221-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi .2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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**RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANDAR N 22°47'577" E 069°43'620"]**

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.54	0.48	0.46	0.4	0.42	0.39	FCO:2007
2	Phosphorus as P	µg/g	603	590	560	574	664	582	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	4.86	4.72	4.82	4.62	4.83	4.64	AAS APHA 3111 B
5.2	Total Chromium as Cr <sup>+3</sup>	µg/g	152	129	139	114	129	112	AAS 3111B
5.3	Manganese as Mn	µg/g	693	658	587	630	675	576	AAS APHA 3111 B
5.4	Iron as Fe	%	4.78	4.42	4.69	4.27	4.78	4.52	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	59	38.6	43.2	35.6	41.92	51.6	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	47	52.9	39.5	27.4	38.4	32.94	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	127	108	117	92.8	113	98.7	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	3.38	2.93	2.59	2.17	2.64	2.17	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	Gastropods Amphipods Bivalves	Polychaetes Gastropods Crustaceans	Polychaetes Amphipods Branchyans	Polychaetes Gastropods Bivalves	Gastropods Amphipods Decapods	Gastropods Polychaetes Amphipods	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	Nematodes	Foraminiferams	Foraminiferams	Foraminiferams	Foraminiferams	Nematodes	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/m <sup>2</sup>	351	292	322	499	322	352	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**  
**Lab Manager**




**Dr. Arun Bajpai**  
**Lab Manager (Q)**

### RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.43	8.40	8.34	8.25	8.23	8.16	8.15	8.12	8.13	8.09	8.08	8.03	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.6	30.4	30.3	30.1	29.7	29.4	29.9	29.8	29.9	29.8	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	88	80	95	87	104	116	102	89	113	91	105	89	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4.0	Not Detected	3.5	Not Detected	3.2	Not Detected	3.1	Not Detected	2.7	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.2	6	5.9	5.8	6.0	5.9	5.9	5.8	5.9	5.7	6.0	5.85	IS3025(P38)89Re.99
6	Salinity	ppt	37.2	37.5	37.1	37.4	35.3	35.7	35.86	36.12	35.36	35.69	35.14	35.388	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)55 20D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.71	2.78	2.83	2.51	2.47	2.38	2.36	2.19	2.47	2.39	2.37	2.26	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.59	0.66	0.75	0.60	0.59	0.51	0.64	0.53	0.68	0.57	0.74	0.53	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	1.95	2.10	2.31	2.24	2.28	2.17	2.17	2.10	2.31	2.24	2.59	2.47	IS3025(P34)88Cl a.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.69	2.51	2.19	1.93	2.49	2.43	2.13	1.95	2.39	2.33	2.17	2.08	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.75	5.54	5.89	5.35	5.34	5.06	5.17	4.82	5.46	5.20	5.70	5.26	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	7.0	Not Detected	15.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38612	38796	38556	38842	36897	37286	37148	37684	36948	37264	36234	36462	IS3025(P16)84Re.02
15	COD	mg/L	20	17.2	25.2	18.4	21.4	Not Detected	17.2	Not Detected	12.76	Not Detected	10.76	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.75	2.61	2.65	2.57	2.56	2.4	2.37	2.30	2.24	2.20	2.21	2.13	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	2.26	1.08	2.35	1.12	2.5	1.3	1.60	1.39	1.73	1.50	1.48	1.84	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	162	116	152	102	190	118	164	98	168	108	156	98	APHA (22 <sup>nd</sup> Edi) 10200-H

H. T. Shah

Lab Manager



Dr. ArunBajpai

Lab Manager (Q)



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16.4	Name of Group Number and name of group species of each group	--	Skeletonema sp. Navicula sp. Biddulphia sp. Coscinodiscus sp.	Nitzschia sp. Fragillaria sp. Synedra sp. Melosira sp.	Amphipods sp. Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp.	Navicula sp. Nitzschia sp. Synedra sp. Melosira sp.	Rhizosolenia sp. Cheatoceros sp. Pleurosigma sp. Skeletonema sp. Melosira sp.	Synedra sp. Coscinodiscus sp. Navicula sp. Nitzschia sp.	Coscinodiscus sp. Cheatoceros sp. Skeletonema sp. Thalassionema sp.	Nitzschia sp. Synedra sp. Cyclotella sp. Pleurosigma sp.	Coscinodiscus sp. Cheatoceros sp. Skeletonema sp. Rhizosolenia sp.	Nitzschia sp. Biddulphia sp. Pleurosigma sp. Navicula sp.	Gyrodinium sp. Skeletonema sp. Cyclotella sp. Melosira sp. Nitzschia sp.	Thalassionema sp. Amphiproteron sp. Cymbella sp. Pleurosigma sp.	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	28		24		28		23		29		26		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Amphipods Decapods Medusae		Polychaetes Gastropods Decapods		Gastropods Decapods Mysids Chaetognathes		Polychaetes Bivalves Decapods Foraminiferans		Polychaetes Chaetognaths Decapods		Gastropods Amphipods Ostracods Lamellibranches		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.4		2.1		2.4		2.2		2.8		2.55		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2340		2310		2280		2530		2510		2780		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)92 21-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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### RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021 SEDIMENT	MAY 2021 SEDIMENT	JUNE 2021 SEDIMENT	JULY 2021 SEDIMENT	AUGUST 2021 SEDIMENT	SEPTEMBER 2021 SEDIMENT	TEST METHOD
1	Organic Matter	%	0.58	0.47	0.45	0.41	0.38	0.36	FCO:2007
2	Phosphorus as P	µg/g	593	618	574	517	629	528	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	4.87	4.53	4.69	4.46	4.67	4.53	AAS APHA 3111 B
5.2	Total Chromium as Cr <sup>+3</sup>	µg/g	143	117	127	107	119	129	AAS 3111B
5.3	Manganese as Mn	µg/g	724	692	568	612	635	558	AAS APHA 3111 B
5.4	Iron as Fe	%	4.76	4.52	4.72	4.58	4.73	4.80	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	61	53.7	35.64	31.76	37.94	42.99	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	35	41.9	47.3	39.84	31.26	35.6	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	123	109	128	112	135	128	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	3.17	2.67	2.59	2.19	2.28	2.16	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	Polychaetes Crustaceans Bivalves	Polychaetes Gastropods Crustaceans	Polychaetes Bivalves Crustaceans	Polychaetes Gastropods Bivalves	Polychaetes Crustaceans Decapods	Gastropods Polychaetes Amphipods	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	--	Nematodes	Nematodes	Foraminiferams	Foraminiferams	Nematodes	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/m 2	409	322	353	439	350	322	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

### RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.46	8.40	8.34	8.29	8.27	8.22	8.17	8.14	8.11	8.07	8.02	7.95	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.6	30.3	30.3	30.1	29.9	29.8	30	29.8	29.8	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	129	102	112	98	105	118	114	97	121	105	113	93	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4.0	Not Detected	3.9	Not Detected	3.2	Not Detected	3.2	Not Detected	2.9	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03 Edition 2.1
5	Dissolved Oxygen	mg/L	6.4	6	6.0	5.9	6.0	5.8	5.9	5.7	5.8	5.7	6.0	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.9	37.3	37.4	37.6	35.4	35.7	36.12	36.34	35.69	35.98	35.14	35.46	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)5520D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.44	2.65	2.69	2.51	2.75	2.51	2.57	2.39	2.41	2.35	2.57	2.40	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.25	0.36	0.57	0.43	0.46	0.42	0.49	0.41	0.73	0.68	0.53	0.34	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.71	2.84	2.86	2.59	2.61	2.53	2.38	2.18	2.27	2.21	2.36	2.28	IS3025(P34)88Cla 2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.65	2.78	2.49	2.24	2.37	2.21	2.51	2.39	2.43	2.38	2.31	2.19	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.4	5.85	6.12	5.53	5.82	5.46	5.44	4.98	5.41	5.22	5.46	5.02	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	9.0	Not Detected	16.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37948	38984	38842	39026	37108	37290	37669	37864	37264	37530	36242	36514	IS3025(P16)84Re.02
15	COD	mg/L	29	18	28.7	17.3	21.6	Not Detected	17.8	Not Detected	13.9	10.76	9.94	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
A	<b>Phytoplankton</b>														
16.1	Chlorophyll	mg/m <sup>3</sup>	2.69	2.48	2.77	2.40	2.67	2.53	2.48	2.37	2.36	2.21	2.2	1.94	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	0.30	0.43	0.22	0.51	0.3	0.4	0.52	0.54	0.64	0.70	0.80	0.97	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	136	104	130	92	152	98	136	90	130	104	124	86	APHA (22 <sup>nd</sup> Edi) 10200-H

H. T. Shah

Lab Manager



Dr. ArunBajpai

Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Cymbella sp. Thallasioema sp. Melosira sp. Peridinium sp.	Coscinodiscus sp. Navicula sp. Nitzschia sp. Fragillaria sp.	Thallasioira sp. Rhizosolenia sp. Pleurosigma sp. Coscinodiscus sp. Melosira sp.	Cyclotella sp. Navicula sp. Nitzschia sp. Guinordia sp.	Thallasioira sp. Rhizosolenia sp. Pleurosigma sp. Coscinodiscus sp. Melosira sp.	Melosira sp. Navicula sp. Nitzschia sp. Synedra sp.	Rhizosolenia sp. Chaetognathes sp. Pleurosigma sp. Skeletonema sp.	Nitzschia sp. Navicula sp. Coscinodiscus sp. Synedra sp.	Amphora sp. Peridinium sp. Skeletonema sp. Thallasiosira sp. Surirella sp.	Navicula sp. Rhizosolenia sp. Synedra sp. Biddulphia sp.	Pinnularia sp. Staurocnis sp. Cymbella sp. Fragillaria sp. Coscinodiscus sp.	Cyclotella sp. Chaetoceros sp. Gyrodinium sp. Melosira sp.	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	29		26		30		24		32		28		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Gastropods Foraminiferans	Polychaetes Ostracods	Polychaetes Molluscs	Copepods Foraminiferans	Polychaetes Decapods	Copepods Polychaetes	Polychaetes Gastropods	Hydrozoa Crustaceans	Polychaetes Bivalves	Foraminiferans Gastropods	Amphipods Bivalves		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.4		2.1		2.45		2.3		3.0		2.60		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2440		2370		2270		2490		2340		2610		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)922 1-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2 .4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



**H. T. Shah**  
**Lab Manager**





**Dr. Arun Bajpai**  
**Lab Manager (Q)**




**RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]**

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.45	8.48	8.31	8.26	8.25	8.20	8.16	8.13	8.14	8.10	8.05	7.99	IS3025(P11)83Re.02
2	Temperature	oC	30.6	30.9	30.7	30.5	30.3	30	30	29.9	30	29.8	29.9	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	101	117	105	96	117	108	104	98	117	103	104	91	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3.0	Not Detected	3.4	Not Detected	3.2	Not Detected	3.0	Not Detected	2.9	Not Detected	2.3	Not Detected	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.1	5.8	6.0	5.8	6.0	5.9	5.9	5.7	5.9	5.8	6.0	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.9	37.4	37.2	37.6	35.3	35.6	36.24	36.48	35.73	35.96	35.20	35.72	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)552 OD
8	Nitrate as NO <sub>3</sub>	μmol/L	2.56	2.71	2.89	2.71	2.65	2.47	2.48	2.36	2.56	2.48	2.43	2.37	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.2	0.27	0.67	0.53	0.48	0.39	0.7	0.61	0.87	0.79	0.69	0.52	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.61	2.75	2.51	2.34	2.76	2.62	2.35	2.19	2.27	2.20	2.17	2.04	IS3025(P34)88Cla.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.56	2.40	2.47	2.29	2.35	2.17	1.75	1.63	2.16	1.97	2.28	2.13	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.37	5.73	6.07	5.58	5.89	5.48	5.53	5.16	5.70	5.47	5.29	4.93	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	7.0	Not Detected	12.3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37844	38814	38652	39034	36914	37214	37782	37982	37306	37512	36284	36764	IS3025(P16)84Re.02
15	COD	mg/L	25	16	20.8	17.2	20.2	Not Detected	16.2	Not Detected	12.9	10.2	9.82	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.61	2.48	2.67	2.42	2.71	2.5	2.45	2.25	2.28	2.13	2.14	1.93	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	0.36	0.44	0.30	0.50	0.3	0.4	0.52	0.67	0.69	0.79	0.82	0.99	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	148	98	136	90	152	118	134	92	150	104	142	92	APHA (22 <sup>nd</sup> Edi) 10200-H

  
**H. T. Shah**  
Lab Manager



  
**Dr. ArunBajpai**  
Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

16.4	Name of Group Number and name of group species of each group	--	Rhizosolenia sp. Biddulphia sp. Thalassiosira sp. Coscinodiscus sp.	Navicula sp. Fragillaria sp. Nitzschia sp. Melosira sp.	Biddulphia sp. Rhizosolenia sp. Amphipods sp. Thalassiosira sp. Coscinodiscus sp.	Nitzschia sp. Pleurosigma sp. Melosira sp. Synedra sp.	Thalassiosira sp. Peridinium sp. Thalassiosira sp. Melosira sp. Coscinodiscus sp.	Navicula sp. Nitzschia sp. Rhizosolenia sp. Synedra sp.	Rhizosolenia sp. Chaetognathes sp. Thalassiosira sp. Biddulphia sp.	Nitzschia sp. Navicula sp. Coscinodiscus sp. Synedra sp.	Skeletonema sp. Synedra sp. Pleurosigma sp. Amphora sp.	Thalassiosira sp. Navicula sp. Synedra sp. Surirella sp.	Skeletonema sp. Pleurosigma sp. Cyclotella sp. Melosira sp. Guinardia sp.	Nitzschia sp. Amphiproteron sp. Biddulphia sp. Gyrosigma sp.--	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> /100 m <sup>3</sup>	26		21		27		22		28		25		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Amphipods Gastropods Polychaetes Ostracods		Gastropods Decapods Nematodes Fish eggs		Foraminiferans Polychaetes Copepods Ostracods		Decapods Copepods Gastropods		Polychaetes Ostracods Decapods Bivalves		Polychaetes Decapods Lamellibranches Isopods		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.4		2.1		2.4		2.1		2.7		2.45		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2410		2320		2490		2570		2840		2480		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)922 1-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

## RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK – N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021	MAY 2021	JUNE 2021	JULY 2021	AUGUST 2021	SEPTEMBER 2021	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.57	0.46	0.47	0.54	0.43	0.38	FCO:2007
2	Phosphorus as P	µg/g	518	612	568	603	638	570	APHA(22 <sup>nd</sup> Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
5	<b>Heavy Metals</b>								
5.1	Aluminum as Al	%	4.81	4.63	4.76	4.58	4.7	4.56	AAS APHA 3111 B
5.2	Total Chromium as Cr <sup>+3</sup>	µg/g	135	112	129	117	128	138	AAS 3111B
5.3	Manganese as Mn	µg/g	746	674	583	619	650	564	AAS APHA 3111 B
5.4	Iron as Fe	%	4.73	4.58	4.69	4.52	4.64	4.72	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.5	Nickel as Ni	µg/g	65	48.35	37.6	31.76	37.93	41.98	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.6	Copper as Cu	µg/g	53	39.68	43.2	35.2	42.8	32.6	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.7	Zinc as Zn	µg/g	112	105	128	98.52	110	115	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.8	Lead as Pb	µg/g	3.18	2.87	2.59	2.18	3.14	2.30	AAS APHA(22 <sup>nd</sup> Edi)3111 B
5.9	Mercury as Hg	µg/g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	AAS APHA- 3112 B
6	<b>Benthic Organisms</b>								
6.1	Macrobenthos	--	Polychaetes Crustaceans Amphipods	Polychaetes Gastropods Crustaceans	Polychaetes Amphipods Crustaceans	Polychaetes Crustaceans Decapods	Polychaetes Gastropods Amphipods	Gastropods Polychaetes Amphipods	APHA (22 <sup>nd</sup> Edi) 10500-C
6.2	MeioBenthos	--	Nematodes	Foraminiferams	Foraminiferams	Foraminiferams Nematodes	Foraminiferams	Nematodes	APHA (22 <sup>nd</sup> Edi) 10500-C
6.3	Population	no/ m <sup>2</sup>	379	382	262	408	294	350	APHA (22 <sup>nd</sup> Edi) 10500-C



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

**RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]**

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.39	8.35	8.31	8.27	8.24	8.19	8.21	8.17	8.17	8.13	8.09	8.02	IS3025(P11)83Re.02
2	Temperature	oC	30.7	30.5	30.6	30.4	30	29.8	29.9	29.7	30	29.8	29.8	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	107	96	112	98	109	113	112	95	109	87	97	81	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	2.8	Not Detected	3.2	Not Detected	3.0	Not Detected	3.1	Not Detected	2.5	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.2	6	6.0	5.8	6.1	5.9	5.9	5.7	6.0	5.8	6.0	5.8	IS3025(P38)89Re.99
6	Salinity	ppt	37	37.3	37.3	37.7	35.2	35.5	36.42	36.68	35.82	36.24	35.28	35.72	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)552 OD
8	Nitrate as NO <sub>3</sub>	μmol/L	2.4	2.71	2.58	2.41	2.64	2.53	2.47	2.35	2.39	2.25	2.48	2.40	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.45	0.49	0.69	0.53	0.78	0.69	0.69	0.57	0.58	0.41	0.53	0.42	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.80	2.54	2.76	2.49	2.45	2.36	2.38	2.19	2.27	2.19	2.35	2.29	IS3025(P34)88Cla.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.45	2.16	2.38	2.16	2.57	2.48	1.91	1.77	2.28	2.10	2.24	2.18	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.65	5.84	6.03	5.43	5.87	5.58	5.54	5.11	5.24	4.85	5.36	5.11	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	7.8	Not Detected	10.3	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	37945	38812	38742	39117	36814	37129	38014	38192	36834	37798	36346	36754	IS3025(P16)84Re.02
15	COD	mg/L	25	17	21.8	18.4	20.1	Not Detected	16.4	Not Detected	10.98	Not Detected	9.24	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
A	<b>Phytoplankton</b>														
16.1	Chlorophyll	mg/m <sup>3</sup>	2.99	2.77	2.93	2.67	2.83	2.61	2.56	2.50	2.5	2.34	2.21	1.92	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	2.84	2.19	2.89	2.30	2.1	2.1	2.41	2.16	2.16	2.25	0.89	0.59	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	158	102	142	94	172	104	138	96	146	106	134	90	APHA (22 <sup>nd</sup> Edi) 10200-H

H. T. Shah

Lab Manager



Dr. ArunBajpai

Lab Manager (Q)



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16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp. Thallasiosira sp.	Nitzschia sp. Thallasiosira sp. Pleurosigma sp.	Coscinodiscus sp. Rhizosolenia sp. Pleurosigma sp. Gyrosigma sp. Peridinium sp.	Cyclotella sp. Nitzschia sp. Melosira sp. Synedra sp.	Thallasiosira sp. Peridinium sp. Biddulphia sp. Rhizosolenia sp.	Melosira sp. Synedra sp. Nitzschia sp. Skeletone ma sp.	Thallasiosira sp. Pleurosigma sp. Biddulphia sp. Skeletone ma sp.	Navicula sp. Synedra sp. Coscinodiscus sp. Rhizosolenia sp.	Thallasiosira sp. Amphora sp. Peridinium sp. Gyro sigma sp.	Nitzschia sp. Skeletone ma sp. Navicula sp. Synedra sp.	Surirella sp. Amphiprotra sp. Cyclotella sp. Ceratum sp. Guinardia sp.	Biddulphia sp. Cymbella sp. Skeletone ma sp. Gyro sigma sp.--	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	26		22		27		22		28		24		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Amphipods Gastropods Ostracods Foraminiferans		Decapods Isopods Polychaetes Nematodes		Decapods Isopods Polychaetes Nematodes		Decapods Gastropods Polychaetes Ostracods		Hydrozoa Gastropods Polychaetes Ostracods		Foraminiferans Polychaetes Gastropods		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.4		2.0		2.45		2.2		2.7		2.35		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2290		2430		2510		2400		2480		2540		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)922 19.21-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

### RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2021		MAY 2021		JUNE 2021		JULY 2021		AUGUST 2021		SEPTEMBER 2021		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.47	8.43	8.34	8.29	8.21	8.18	8.17	8.13	8.13	8.09	8.07	8.02	IS3025(P11)83Re.02
2	Temperature	oC	30.6	30.3	30.7	30.4	30.2	30	30	29.9	29.9	29.8	29.7	29.5	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	119	133	129	102	114	109	119	105	125	110	114	103	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4.0	Not Detected	3.5	Not Detected	3.1	Not Detected	3.2	Not Detected	2.9	Not Detected	2.4	Not Detected	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.1	5.8	6.0	5.8	6.1	5.9	5.9	5.7	5.9	5.8	6.0	5.7	IS3025(P38)89Re.99
6	Salinity	ppt	37.2	37.5	37.3	37.5	35.5	35.7	36.32	36.58	35.94	36.32	35.32	35.84	APHA (22 <sup>nd</sup> Edi) 2550 B
7	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	APHA(22 <sup>nd</sup> Edi)5520D
8	Nitrate as NO <sub>3</sub>	μmol/L	2.14	2.43	2.47	2.39	2.53	2.39	2.48	2.35	2.68	2.59	2.54	2.48	IS3025(P34)88
9	Nitrite as NO <sub>2</sub>	μmol/L	0.35	0.41	0.58	0.47	0.76	0.60	0.81	0.73	0.75	0.63	0.65	0.52	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH <sub>3</sub>	μmol/L	2.41	2.68	2.93	2.76	2.65	2.47	2.54	2.39	2.39	2.28	2.27	2.20	IS3025(P34)88Cla.2.3
11	Phosphates as PO <sub>4</sub>	μmol/L	2.31	2.16	2.57	2.41	2.31	2.28	1.89	1.75	2.24	2.13	2.38	2.31	APHA(22 <sup>nd</sup> Edi) 4500 C
12	Total Nitrogen	μmol/L	5.05	5.42	5.98	5.62	5.94	5.46	5.83	5.47	5.82	5.50	5.46	5.20	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	10.1	Not Detected	13.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	PLPL-TPH
14	Total Dissolved Solids	mg/L	38689	38974	38759	38927	37093	37276	37294	38094	37498	37846	36384	36928	IS3025(P16)84Re.02
15	COD	mg/L	29	18	24.3	17.5	19.9	Not Detected	16.8	Not Detected	12.8	10.6	9.58	Not Detected	APHA(22 <sup>nd</sup> Edi) 5520-D Open Reflux
<b>A Phytoplankton</b>															
16.1	Chlorophyll	mg/m <sup>3</sup>	2.65	2.40	2.61	2.40	2.67	2.45	2.5	2.40	2.56	2.45	2.24	2.16	APHA (22 <sup>nd</sup> Edi) 10200-H
16.2	Phaeophytin	mg/m <sup>3</sup>	2.52	2.19	2.58	2.19	2.5	2.1	2.31	2.19	2.26	2.14	0.78	0.33	APHA (22 <sup>nd</sup> Edi) 10200-H
16.3	Cell Count	No. x 10 <sup>3</sup> /L	144	118	138	103	152	118	126	101	158	103	146	101	APHA (22 <sup>nd</sup> Edi) 10200-H



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)

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16.4	Name of Group Number and name of group species of each group	--	Biddulphia sp. Rhizosolenia sp. Skeletone ma sp. Coscinodiscus sp.	Nitzschia sp. Navicula sp. Pleurosigma sp. Melosira sp.	Guinordia sp. Melosira sp. Peridinium sp. Thalassiosira sp.	Nitzschia sp. Navicula sp. Biddulphia sp. Skeletone ma sp. Coscinodiscus sp.	Rhizosolenia sp. Thalassiosira sp. Biddulphia sp. Melosira sp. Synedra sp.	Navicula sp. Nitzschia sp. Biddulphia sp. Melosira sp. Synedra sp.	Biddulphia sp. Coscinodiscus sp. Chaetognathes sp. Rhizosolenia sp.	Nitzschia sp. Navicula sp. Pleurosigma sp. Synedra sp.	Pleurosigma sp. Peridinium sp. Thalassiosira sp. Biddulphia sp. Melosira sp.	Synedra sp. Nitzschia sp. Surirella sp. Navicula sp.	Thalassiosira sp. Loscinosia sp. Cyclotella sp. Amphiproteron sp. Rhizosolenia sp.	Nitzschia sp. Synedra sp. Skeletone ma sp. Biddulphia sp. Gyrodinium sp.	APHA (22 <sup>nd</sup> Edi) 10200-H
<b>B Zooplanktons</b>															
17.1	Abundance (Population)	noX10 <sup>3</sup> / 100 m <sup>3</sup>	30		25		27		23		26		23		APHA (22 <sup>nd</sup> Edi) 10200-G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes Decapods Amphipods Mysids		Isopods Decapods Polychaetes Mysids		Copepods Decapods Gastropods Ostracods		Polychaetes Decapods Chaetocenes Ostracods		Polychaetes Gastropods Chaetognaths Bivalves		Polychaetes Gastropods Decapods Lamellibranches		APHA (22 <sup>nd</sup> Edi) 10200-G
17.3	Total Biomass	ml/100 m <sup>3</sup>	2.6		2.2		2.25		2.1		2.5		2.25		APHA (22 <sup>nd</sup> Edi) 10200-G
<b>C Microbiological Parameters</b>															
18.1	Total Bacterial Count	CFU/ml	2350		2470		2350		2220		2480		2620		IS 5402:2002
18.2	Total Coliform	/ml	Present		Present		Present		Present		Present		Present		APHA(22 <sup>nd</sup> Edi)922 19.21-D
18.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
18.4	Enterococcus	/ml	Present		Present		Present		Present		Present		Present		IS : 15186 :2002
18.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
18.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
18.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

### RESULTS OF ETP OUTLET

SR. NO.	TEST PARAMETERS	UNIT	Liquid Terminal ETP Outlet						GPCB Permissible Limit
			APR-21	MAY-21	JUN-21	JUL-21	AUG-21	SEP-21	
1	Colour	Co-pt	20	30	30	25	30	25	100
2	pH	--	7.59	7.68	7.99	7.84	7.94	6.58	6.5 to 8.5
3	Temperature	°C	30.2	30.1	30.3	29.9	30.1	30	40
4	Total Suspended Solids	mg/L	29	32	52	24	37	27	100
5	Total Dissolved Solids	mg/L	793	819	2069	1839	1968	1568	2100
6	COD	mg/L	65	72	84	70	86	78	100
7	BOD (3 Days @ 27 °C)	mg/L	12	16	19	15	17	15	30
8	Chloride as Cl	mg/L	243	352	415	408	374	358	600
9	Oil & Grease	mg/L	2.8	3.4	3.6	2.9	3.8	4.2	10
10	Sulphate as SO <sub>4</sub>	mg/L	206	238	401	320	276	216	1000
11	Ammonical Nitrogen as NH <sub>3</sub>	mg/L	1.76	2.34	5.3	8.56	7.39	8.13	50
12	Phenolic Compound	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1
13	Copper as Cu	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	3
14	Lead as Pb	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1
15	Sulphide as S	mg/L	0.28	0.14	0.5	0.12	0.16	0.18	2
16	Cadmium as Cd	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	2
17	Fluoride as F	mg/L	0.13	0.12	0.3	0.21	0.32	0.27	2
18	Residual Chlorine	mg/L	0.6	0.8	0.6	0.7	0.8	0.7	0.5 min



**H. T. Shah**  
Lab Manager




**Dr. Arun Bajpai**  
Lab Manager (Q)



**RESULT OF AMBIENT AIR QUALITY MONITORING**

ADANI PORT – TUG BERTH 600 KL PUMP HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
1	02/04/2021	62.72	28.62	20.52	34.26	0.30	ND*	ND*
2	06/04/2021	72.44	36.36	16.33	29.48	0.74	ND*	ND*
3	09/04/2021	68.49	27.71	19.59	37.57	0.65	ND*	ND*
4	13/04/2021	76.33	32.37	23.41	40.28	0.55	ND*	ND*
5	16/04/2021	63.47	29.41	17.71	35.43	0.82	ND*	ND*
6	20/04/2021	80.38	46.39	14.43	33.48	0.52	ND*	ND*
7	22/04/2021	74.26	42.52	18.50	30.56	0.76	ND*	ND*
8	26/04/2021	66.53	31.41	15.48	36.22	0.63	ND*	ND*
9	29/04/2021	78.58	35.32	10.57	24.23	0.37	ND*	ND*
10	03/05/2021	57.54	31.54	9.50	24.33	0.29	ND*	ND*
11	07/05/2021	77.56	46.51	15.31	28.61	0.57	ND*	ND*
12	10/05/2021	63.45	34.53	18.46	32.58	0.48	ND*	ND*
13	13/05/2021	70.56	38.40	16.25	29.35	0.47	ND*	ND*
14	19/05/2021	62.51	27.50	12.70	18.66	0.30	ND*	ND*
15	21/05/2021	71.52	37.65	19.40	35.44	0.49	ND*	ND*
16	24/05/2021	80.23	41.56	13.50	31.53	0.66	ND*	ND*
17	27/05/2021	61.56	45.35	17.51	34.52	0.53	ND*	ND*
18	31/05/2021	72.43	40.56	8.78	26.76	0.71	ND*	ND*
19	03/06/2021	80.47	35.70	17.34	33.47	0.37	ND*	ND*
20	07/06/2021	72.66	26.34	18.67	39.53	0.21	ND*	ND*
21	10/06/2021	68.22	31.24	9.85	20.29	0.52	ND*	ND*
22	14/06/2021	77.52	40.27	19.57	30.27	0.66	ND*	ND*
23	17/06/2021	65.45	45.35	16.32	34.56	0.85	ND*	ND*
24	21/06/2021	59.65	32.37	10.26	29.52	0.53	ND*	ND*
25	24/06/2021	75.68	46.26	15.62	37.54	0.89	ND*	ND*
26	28/06/2021	82.62	43.60	12.54	26.61	0.41	ND*	ND*
27	02/07/2021	90.30	50.30	10.66	19.65	0.24	ND*	ND*
28	05/07/2021	95.36	46.85	11.40	23.53	0.38	ND*	ND*
29	08/07/2021	85.36	53.46	16.26	18.67	0.63	ND*	ND*
30	12/07/2021	75.62	36.45	13.41	21.36	0.29	ND*	ND*

Continue ...



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON**

LABORATORIES PVT. LTD.

Environmental Auditors, Consultants & Analysts  
Cleaner Production / Waste Minimization Facilitator

Recognised by MoEF New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

**RESULT OF AMBIENT AIR QUALITY MONITORING**

ADANI PORT – TUG BERTH 600 KL PUMP HOUSE								
Sr.No.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO2) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO2) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
31	15/07/2021	86.36	47.51	21.36	33.24	0.18	ND*	ND*
32	19/07/2021	77.52	40.23	18.34	22.83	0.33	ND*	ND*
33	22/07/2021	70.37	38.32	12.44	25.58	0.40	ND*	ND*
34	26/07/2021	65.25	28.33	17.36	28.67	0.50	ND*	ND*
35	29/07/2021	79.62	44.35	19.27	32.51	0.76	ND*	ND*
36	16/08/2021	75.34	39.65	8.65	20.31	0.26	ND*	ND*
37	19/08/2021	80.42	35.45	12.39	23.34	0.16	ND*	ND*
38	23/08/2021	72.12	33.53	23.45	38.45	0.55	ND*	ND*
39	26/08/2021	66.60	36.24	20.23	33.45	0.41	ND*	ND*
40	30/08/2021	74.42	40.31	17.42	28.38	0.46	ND*	ND*
41	02/09/2021	70.63	40.23	19.60	33.40	0.41	ND*	ND*
42	06/09/2021	74.35	43.39	12.55	24.31	0.25	ND*	ND*
43	09/09/2021	81.36	45.35	16.23	32.68	0.37	ND*	ND*
44	13/09/2021	86.30	36.40	14.54	25.66	0.23	ND*	ND*
45	16/09/2021	60.33	24.34	9.62	18.70	0.46	ND*	ND*
46	20/09/2021	85.66	47.55	11.21	26.36	0.34	ND*	ND*
47	23/09/2021	67.62	26.38	8.36	16.36	0.39	ND*	ND*
<b>LIMIT<sup>#</sup></b>		<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>Not Specified</b>	<b>5</b>
<b>TEST METHOD</b>		IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric- CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO <sub>2</sub> )	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

\*Not Detected

#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

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LABORATORIES PVT. LTD.

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Cleaner Production / Waste Minimization Facilitator

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**RESULT OF AMBIENT AIR QUALITY MONITORING****NEAR FIRE STATION**

Sr. No.	Date of Sampling	Particulate Matter (PM <sub>10</sub> ) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM <sub>2.5</sub> ) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
1	02/04/2021	73.54	32.45	14.58	27.54	0.24	ND*	ND*
2	06/04/2021	84.62	50.39	12.48	22.25	0.62	ND*	ND*
3	09/04/2021	56.37	33.42	8.35	16.69	0.54	ND*	ND*
4	13/04/2021	66.45	37.56	13.68	28.52	0.61	ND*	ND*
5	16/04/2021	54.24	23.63	11.23	20.30	0.49	ND*	ND*
6	20/04/2021	45.96	20.45	6.53	17.60	0.60	ND*	ND*
7	22/04/2021	52.63	38.39	9.42	14.26	0.22	ND*	ND*
8	26/04/2021	61.24	26.43	7.54	25.52	0.36	ND*	ND*
9	29/04/2021	53.23	22.46	15.28	19.27	0.31	ND*	ND*
10	03/05/2021	63.53	28.56	13.57	20.40	0.60	ND*	ND*
11	07/05/2021	72.55	40.27	7.63	15.29	0.41	ND*	ND*
12	10/05/2021	58.46	26.56	14.27	25.38	0.33	ND*	ND*
13	13/05/2021	65.42	23.63	17.59	32.39	0.78	ND*	ND*
14	19/05/2021	50.26	20.49	21.54	29.30	0.54	ND*	ND*
15	21/05/2021	60.23	25.64	15.71	30.57	0.42	ND*	ND*
16	24/05/2021	69.53	36.47	18.36	21.30	0.63	ND*	ND*
17	27/05/2021	57.58	24.34	10.27	16.58	0.70	ND*	ND*
18	31/05/2021	66.54	29.36	12.49	22.38	0.44	ND*	ND*
19	03/06/2021	65.65	26.56	15.32	25.65	0.48	ND*	ND*
20	07/06/2021	55.64	20.33	16.20	23.87	0.58	ND*	ND*
21	10/06/2021	71.33	36.51	11.54	28.53	0.54	ND*	ND*
22	14/06/2021	66.56	27.56	8.66	16.37	0.36	ND*	ND*
23	17/06/2021	60.36	32.66	10.23	20.34	0.70	ND*	ND*
24	21/06/2021	49.55	23.63	12.55	27.51	0.22	ND*	ND*
25	24/06/2021	61.25	33.50	14.22	24.64	0.73	ND*	ND*
26	28/06/2021	88.45	48.64	9.57	21.56	0.63	ND*	ND*
27	02/07/2021	71.81	43.20	8.59	16.37	0.57	ND*	ND*
28	05/07/2021	78.45	41.32	10.70	14.31	0.49	ND*	ND*
29	08/07/2021	73.66	46.34	15.42	15.31	0.30	ND*	ND*
30	12/07/2021	70.36	32.41	9.56	23.41	0.22	ND*	ND*

Continue ...

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

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**RESULT OF AMBIENT AIR QUALITY MONITORING****NEAR FIRE STATION**

Sr.No.	Date of Sampling	Particulate Matter (PM <sub>10</sub> ) µg/m <sup>3</sup>	Particulate Matter (PM <sub>2.5</sub> ) µg/m <sup>3</sup>	Sulphur Dioxide (SO <sub>2</sub> ) µg/m <sup>3</sup>	Oxides of Nitrogen (NO <sub>2</sub> ) µg/m <sup>3</sup>	Carbon Monoxide as CO mg/m <sup>3</sup>	Hydrocarbon as CH <sub>4</sub> mg/m <sup>3</sup>	Benzene as C <sub>6</sub> H <sub>6</sub> µg/m <sup>3</sup>
31	15/07/2021	67.34	26.31	11.51	27.68	0.15	ND*	ND*
32	19/07/2021	58.38	29.32	13.66	30.32	0.47	ND*	ND*
33	22/07/2021	66.36	34.17	16.43	33.62	0.23	ND*	ND*
34	26/07/2021	60.27	37.51	14.23	31.21	0.32	ND*	ND*
35	29/07/2021	48.54	24.51	17.82	22.35	0.37	ND*	ND*
36	23/08/2021	92.38	45.33	11.58	32.32	0.48	ND*	ND*
37	26/08/2021	52.45	31.32	9.43	26.25	0.24	ND*	ND*
38	30/08/2021	65.67	36.43	12.81	20.52	0.58	ND*	ND*
39	02/09/2021	52.47	44.21	14.24	29.46	0.34	ND*	ND*
40	06/09/2021	62.36	27.64	7.70	18.48	0.29	ND*	ND*
41	09/09/2021	70.37	32.66	13.24	20.83	0.45	ND*	ND*
42	13/09/2021	80.36	31.45	9.46	28.40	0.14	ND*	ND*
<b>LIMIT<sup>#</sup></b>		<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>Not Specified</b>	<b>5</b>
<b>TEST METHOD</b>		IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO <sub>2</sub> )	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

\*Not Detected

#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)



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**RESULT OF AMBIENT AIR QUALITY MONITORING****ADANI HOUSE**

Sr. No.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO2) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO2) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
1	02/04/2021	56.28	29.60	11.58	23.63	0.34	ND*	ND*
2	06/04/2021	67.57	26.59	19.30	32.54	0.29	ND*	ND*
3	09/04/2021	62.16	31.52	16.53	29.22	0.32	ND*	ND*
4	13/04/2021	70.27	34.58	9.53	22.66	0.24	ND*	ND*
5	16/04/2021	51.55	16.56	15.32	31.56	0.38	ND*	ND*
6	20/04/2021	60.45	35.58	10.36	26.59	0.41	ND*	ND*
7	22/04/2021	58.66	28.68	14.28	21.27	0.58	ND*	ND*
8	26/04/2021	50.42	22.53	12.42	28.45	0.40	ND*	ND*
9	29/04/2021	63.22	25.38	17.60	30.40	0.48	ND*	ND*
10	03/05/2021	52.52	22.67	15.59	27.62	0.23	ND*	ND*
11	07/05/2021	82.42	33.49	9.55	19.40	0.50	ND*	ND*
12	10/05/2021	72.55	30.52	7.84	16.32	0.79	ND*	ND*
13	13/05/2021	60.24	20.53	10.34	17.53	0.58	ND*	ND*
14	19/05/2021	56.36	23.54	19.54	24.35	0.56	ND*	ND*
15	21/05/2021	65.31	34.62	12.40	28.26	0.55	ND*	ND*
16	24/05/2021	59.64	29.43	8.32	20.21	0.37	ND*	ND*
17	27/05/2021	53.41	21.62	11.32	30.34	0.82	ND*	ND*
18	31/05/2021	61.27	26.26	6.22	15.40	0.68	ND*	ND*
19	03/06/2021	71.23	33.41	11.61	20.34	0.31	ND*	ND*
20	07/06/2021	65.37	23.41	13.42	34.27	0.39	ND*	ND*
21	10/06/2021	58.65	26.59	15.30	31.42	0.32	ND*	ND*
22	14/06/2021	70.26	31.65	6.56	23.41	0.23	ND*	ND*
23	17/06/2021	55.31	28.56	8.33	16.56	0.62	ND*	ND*
24	21/06/2021	64.56	35.37	14.40	32.58	0.33	ND*	ND*
25	24/06/2021	52.47	39.30	10.40	35.35	0.68	ND*	ND*
26	28/06/2021	60.42	27.09	7.60	19.38	0.50	ND*	ND*
27	02/07/2021	94.36	55.35	13.40	27.55	0.48	ND*	ND*
28	05/07/2021	82.62	49.67	7.52	17.53	0.56	ND*	ND*
29	08/07/2021	91.36	56.86	9.64	22.6	0.42	ND*	ND*
30	12/07/2021	88.67	44.57	14.35	28.44	0.16	ND*	ND*

Continue ...

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

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**ADANI HOUSE**

Sr. No.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
31	15/07/2021	92.36	53.35	12.35	24.68	0.39	ND*	ND*
32	19/07/2021	87.62	46.53	10.23	18.84	0.57	ND*	ND*
33	22/07/2021	93.62	41.52	8.56	21.32	0.46	ND*	ND*
34	26/07/2021	83.43	48.62	11.38	25.38	0.60	ND*	ND*
35	29/07/2021	71.28	35.66	6.39	31.81	0.55	ND*	ND*
36	02/08/2021	60.44	27.26	12.44	20.35	0.53	ND*	ND*
37	05/08/2021	65.16	24.54	15.68	31.31	0.27	ND*	ND*
38	09/08/2021	77.62	28.56	13.72	24.50	0.18	ND*	ND*
39	12/08/2021	69.54	21.41	17.55	29.35	0.50	ND*	ND*
40	16/08/2021	86.28	47.32	11.43	23.47	0.62	ND*	ND*
41	19/08/2021	70.61	29.48	9.45	21.29	0.25	ND*	ND*
42	23/08/2021	80.35	40.60	21.37	41.25	0.57	ND*	ND*
43	26/08/2021	87.62	57.32	16.48	30.40	0.29	ND*	ND*
44	30/08/2021	78.45	43.44	10.62	25.76	0.19	ND*	ND*
45	02/09/2021	67.52	28.43	6.56	18.85	0.49	ND*	ND*
46	06/09/2021	56.51	33.61	16.39	32.50	0.40	ND*	ND*
47	09/09/2021	76.38	38.46	9.35	25.35	0.26	ND*	ND*
48	23/09/2021	71.66	29.31	14.26	33.66	0.21	ND*	ND*
49	27/09/2021	58.45	23.62	10.24	36.50	0.13	ND*	ND*
<b>LIMIT*</b>		<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>Not Specified</b>	<b>5</b>
<b>TEST METHOD</b>		IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric- CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO <sub>2</sub> )	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

\*Not Detected

#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

**H. T. Shah****Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

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**RESULT OF AMBIENT AIR QUALITY MONITORING****CT-3 RMU-2**

Sr.N o.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO2) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO2) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
1	02/04/2021	79.62	37.51	18.66	30.46	0.63	ND*	ND*
2	06/04/2021	93.52	47.62	22.50	38.43	0.46	ND*	ND*
3	09/04/2021	89.62	43.63	12.51	19.59	0.57	ND*	ND*
4	13/04/2021	77.52	38.43	15.40	31.56	0.30	ND*	ND*
5	16/04/2021	92.76	52.40	20.23	39.43	0.77	ND*	ND*
6	20/04/2021	88.24	42.29	8.60	20.62	0.23	ND*	ND*
7	22/04/2021	86.34	48.53	16.24	26.46	0.42	ND*	ND*
8	26/04/2021	94.38	53.61	19.37	22.47	0.50	ND*	ND*
9	29/04/2021	69.52	30.86	21.28	33.60	0.53	ND*	ND*
10	03/05/2021	80.36	44.50	22.62	34.66	0.50	ND*	ND*
11	07/05/2021	66.26	39.51	14.58	26.36	0.24	ND*	ND*
12	10/05/2021	71.86	41.55	16.52	22.64	0.62	ND*	ND*
13	13/05/2021	76.78	35.43	12.21	20.42	0.76	ND*	ND*
14	19/05/2021	82.42	52.61	17.54	27.69	0.34	ND*	ND*
15	21/05/2021	94.38	33.64	9.20	21.62	0.60	ND*	ND*
16	24/05/2021	72.62	50.53	10.87	23.41	0.52	ND*	ND*
17	27/05/2021	95.52	45.70	8.61	19.55	0.40	ND*	ND*
18	31/05/2021	83.42	55.56	15.84	35.22	0.38	ND*	ND*
19	03/06/2021	92.62	45.33	12.62	29.57	0.76	ND*	ND*
20	07/06/2021	85.35	42.67	9.66	22.53	0.65	ND*	ND*
21	10/06/2021	93.42	38.72	17.45	34.66	0.71	ND*	ND*
22	14/06/2021	83.42	50.32	11.63	25.41	0.82	ND*	ND*
23	17/06/2021	90.36	54.52	14.54	28.62	0.98	ND*	ND*
24	21/06/2021	43.61	20.34	16.56	23.70	0.45	ND*	ND*
25	24/06/2021	78.65	49.57	8.59	26.53	0.34	ND*	ND*
26	28/06/2021	94.28	55.35	15.23	30.55	0.60	ND*	ND*
27	02/07/2021	55.96	29.49	16.37	37.56	0.39	ND*	ND*
28	05/07/2021	73.55	36.43	18.56	33.43	0.52	ND*	ND*
29	08/07/2021	51.33	25.49	14.23	28.32	0.82	ND*	ND*
30	12/07/2021	84.35	39.47	17.61	31.58	0.34	ND*	ND*

Continue ...

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

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**RESULT OF AMBIENT AIR QUALITY MONITORING****CT-3 RMU-2**

Sr.No.	Date of Sampling	Particulate Matter (PM <sub>10</sub> ) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM <sub>2.5</sub> ) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO <sub>2</sub> ) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO $\text{mg}/\text{m}^3$	Hydrocarbon as CH <sub>4</sub> $\text{mg}/\text{m}^3$	Benzene as C <sub>6</sub> H <sub>6</sub> $\mu\text{g}/\text{m}^3$
31	15/07/2021	77.47	56.52	19.61	38.38	0.24	ND*	ND*
32	19/07/2021	71.36	32.44	12.84	26.40	0.64	ND*	ND*
33	22/07/2021	85.35	45.62	20.22	29.37	0.71	ND*	ND*
34	26/07/2021	78.26	42.63	10.35	34.54	0.54	ND*	ND*
35	29/07/2021	65.65	31.57	8.69	19.36	0.61	ND*	ND*
36	02/08/2021	81.37	48.41	14.37	28.47	0.71	ND*	ND*
37	05/08/2021	78.63	38.47	17.61	35.84	0.36	ND*	ND*
38	09/08/2021	85.64	44.58	19.29	31.31	0.22	ND*	ND*
39	12/08/2021	76.53	41.30	15.37	25.45	0.56	ND*	ND*
40	16/08/2021	90.34	52.57	18.64	39.49	0.47	ND*	ND*
41	19/08/2021	94.35	45.37	20.43	33.45	0.40	ND*	ND*
42	23/08/2021	89.42	51.36	13.94	30.42	0.64	ND*	ND*
43	26/08/2021	93.56	55.39	11.45	18.45	0.38	ND*	ND*
44	30/08/2021	88.43	53.48	16.86	34.54	0.33	ND*	ND*
45	02/09/2021	92.36	37.60	15.32	25.37	0.82	ND*	ND*
46	06/09/2021	80.35	45.37	19.60	36.35	0.61	ND*	ND*
47	09/09/2021	65.38	28.45	21.56	38.44	0.55	ND*	ND*
48	13/09/2021	78.36	43.42	16.33	34.22	0.47	ND*	ND*
49	16/09/2021	82.47	46.37	17.56	29.48	0.64	ND*	ND*
50	20/09/2021	90.33	48.32	8.64	18.62	0.50	ND*	ND*
51	23/09/2021	86.38	42.42	18.44	37.50	0.30	ND*	ND*
52	27/09/2021	70.31	35.43	22.46	40.33	0.66	ND*	ND*
53	30/09/2021	93.42	40.22	13.37	30.63	0.57	ND*	ND*
<b>LIMIT<sup>#</sup></b>		<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>Not Specified</b>	<b>5</b>
<b>TEST METHOD</b>		IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO <sub>2</sub> )	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

\*Not Detected

#: Industrial, Residential, Rural and other Area Notification Dated 16th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

**H. T. Shah****Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

## **RESULTS OF NOISE LEVEL MONITORING**

### **Result of Noise level monitoring [Day Time]**

SR. NO.	Name of Location	ADANI PORT – TUG BERTH 600 KL PUPM HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	16/04/2021	24/05/2021	23/06/2021	19/07/2021	18/08/2021	17/09/2021
1	6:00-7:00	62.1	60.2	68.8	58.4	68.3	62.9
2	7:00-8:00	68.7	62.5	62.1	63.4	62.1	66.6
3	8:00-9:00	65.2	66.4	69.8	62.3	63.3	61.6
4	9:00-10:00	63.1	68.8	70.4	68.5	68.2	63.6
5	10:00-11:00	69.1	62.4	69.4	65.4	67.5	59.5
6	11:00-12:00	62.8	69.2	73.1	67.1	64.2	69.5
7	12:00-13:00	68.4	69.0	64.5	63.1	61.4	70.1
8	13:00-14:00	63.8	61.7	60.1	60.1	70.6	62.1
9	14:00-15:00	70.4	65.2	62.5	70.4	64.7	71.6
10	15:00-16:00	69.2	70.6	66.1	69.4	61.6	66.1
11	16:00-17:00	72.4	65.8	60.8	73.1	63.5	63.1
12	17:00-18:00	65.1	64.1	63.1	70.1	68.4	69.3
13	18:00-19:00	69.5	60.4	69.5	68.4	64.8	63.5
14	19:00-20:00	66.1	63.4	61.2	61.5	71.4	61.4
15	20:00-21:00	60.2	66.2	62.8	66.5	65.4	66.5
16	21:00-22:00	62.5	68.4	63.8	64.3	60.5	65.4
Day Time Limit*		75 Leq dB(A)					

### **Result of Noise level monitoring [Night Time]**

SR. NO.	Name of Location	ADANI PORT – TUG BERTH 600 KL PUPM HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	16/04/2021	24/05/2021	23/06/2021	19/07/2021	18/08/2021	17/09/2021
1	22:00-23:00	65.5	68.4	63.1	57.4	63.3	64.4
2	23:00-00:00	62.6	63.2	65.8	56.8	66.2	68.4
3	00:00-01:00	60.1	62.4	64.4	61.2	61.4	62.1
4	01:00-02:00	56.8	60.1	60.2	62.8	65.2	63.1
5	02:00-03:00	62.1	62.5	59.8	58.8	63.4	65.8
6	03:00-04:00	63.1	64.8	55.1	63.1	67.1	60.4
7	04:00-05:00	64.8	63.8	62.5	65.4	62.8	63.2
8	05:00-06:00	61.2	65.4	61.5	65.1	63.8	62.6
Night Time Limit*		70 Leq dB(A)					



H. T. Shah

Lab Manager




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Lab Manager (Q)



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**RESULTS OF NOISE LEVEL MONITORING****Result of Noise level monitoring [Day Time]**

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	28/04/2021	03/05/2021	10/06/2021	16/07/2021	25/08/2021	23/09/2021
1	6:00-7:00	67.1	65.2	64.5	63.5	60.1	64.7
2	7:00-8:00	62.4	69.9	60.1	68.2	69.9	64.6
3	8:00-9:00	69.1	72.1	62.4	60.7	66.3	63.3
4	9:00-10:00	62.5	70.6	62.5	64.5	69.4	66.4
5	10:00-11:00	67.4	65.4	65.3	61.2	63.6	68.3
6	11:00-12:00	62.1	61.2	68.4	61.3	61.2	69.1
7	12:00-13:00	63.5	63.5	67.1	60.6	71.5	62.4
8	13:00-14:00	68.1	68.1	66.1	68.3	64.5	62.3
9	14:00-15:00	65.1	61.4	63.5	72.1	65.5	61.8
10	15:00-16:00	64.1	59.4	62.8	69.9	68.6	64.2
11	16:00-17:00	60.2	66.2	61.5	69.3	61.7	62.2
12	17:00-18:00	68.4	69.4	63.1	65.5	62.6	61.3
13	18:00-19:00	63.4	62.8	65.4	61.4	62.8	68.8
14	19:00-20:00	69.4	60.5	63.2	66.2	63.8	64.0
15	20:00-21:00	61	63.4	62.7	62.8	60.8	64.1
16	21:00-22:00	62.8	61.8	65.5	61.9	62.9	60.3
Day Time Limit*		75 Leq dB(A)					

**Result of Noise level monitoring [Night Time]**

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	28/04/2021	03/05/2021	10/06/2021	16/07/2021	25/08/2021	23/09/2021
1	22:00-23:00	62.1	63.5	63.1	54.1	62.2	58.8
2	23:00-00:00	63.4	64.4	60.1	61.3	61.4	62.2
3	00:00-01:00	65.2	60.4	60.2	58.3	58.2	61.5
4	01:00-02:00	62.8	64.1	65.5	59.4	68.4	63.8
5	02:00-03:00	56.2	59.4	57.4	62.5	63.5	62.8
6	03:00-04:00	53.4	65.4	61.5	63.5	59.4	57.5
7	04:00-05:00	68.4	60.2	62.8	53.2	62.4	63.4
8	05:00-06:00	62.4	62.4	59.2	52.4	61.3	61.4
Night Time Limit*		70 Leq dB(A)					

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON**

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Environmental Auditors, Consultants & Analysts  
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**RESULTS OF NOISE LEVEL MONITORING****Result of Noise level monitoring [Day Time]**

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
		07/04/2021	17/05/2021	01/06/2021	05/07/2021	04/08/2021	23/09/2021
1	6:00-7:00	62.4	58.4	65.2	66.4	67.2	64.7
2	7:00-8:00	69.5	62.1	69.9	60.3	64.3	64.6
3	8:00-9:00	66.1	61.8	68.3	69.6	64.4	63.3
4	9:00-10:00	70.1	68.5	65.1	70.5	62.3	66.4
5	10:00-11:00	68.3	65.3	65.4	65.3	69.6	68.3
6	11:00-12:00	66.2	63.2	68.4	68.8	66.4	69.1
7	12:00-13:00	60.4	62.8	69.5	67.5	61.3	62.4
8	13:00-14:00	58.4	64.1	72.1	72.2	69.7	62.3
9	14:00-15:00	63.4	60.1	62.7	65.2	65.1	61.8
10	15:00-16:00	69.4	65.9	60.4	62.6	69.3	64.2
11	16:00-17:00	70.6	69.5	60.1	66.3	65.8	62.2
12	17:00-18:00	68.4	63.3	66.8	59.2	66.5	61.3
13	18:00-19:00	65.1	65.2	63.4	67.4	68	68.8
14	19:00-20:00	62.5	61.4	68.1	68.1	62.8	64.0
15	20:00-21:00	61.5	66.2	62.4	60.5	61.5	64.1
16	21:00-22:00	63.2	68.7	61.7	62.7	68.5	60.3
Day Time Limit*		75 Leq dB(A)					

**Result of Noise level monitoring [Night Time]**

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
		07/04/2021	17/05/2021	01/06/2021	05/07/2021	04/08/2021	07/09/2021
1	22:00-23:00	65.4	65.8	65.1	63.6	64.4	62.3
2	23:00-00:00	60.1	60.2	69.5	53.5	65.3	68.5
3	00:00-01:00	58.4	58.8	62.4	60.2	60.9	66.8
4	01:00-02:00	56.1	57.4	64.1	55.4	66.1	60.8
5	02:00-03:00	60.7	62.4	59.3	57.7	59.4	62.4
6	03:00-04:00	63.5	64.1	68.4	61.4	62.4	61.2
7	04:00-05:00	61.2	59.8	64.5	68.4	61.5	65.6
8	05:00-06:00	68.4	60.9	62.8	58.7	63.2	67.4
Night Time Limit*		70 Leq dB(A)					

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

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**RESULTS OF NOISE LEVEL MONITORING****Result of Noise level monitoring [Day Time]**

SR. NO.	Name of Location	CT-3 RMU - 2					
		Result [LeqdB(A)]					
	Sampling Date & Time	12/04/2021	10/05/2021	04/06/2021	20/07/2021	10/08/2021	27/09/2021
1	6:00-7:00	57.4	56.1	60.4	48.9	58.4	57.4
2	7:00-8:00	62.1	62.4	64.5	55.4	55.1	63.2
3	8:00-9:00	56.1	59.1	68.4	59.7	65.3	60.8
4	9:00-10:00	62.5	65.7	62.1	58.3	70.5	66.0
5	10:00-11:00	65.4	57.4	66.2	53.4	63.1	64.9
6	11:00-12:00	68.4	63.4	67.8	62.5	62.7	66.2
7	12:00-13:00	60.1	66.3	69.4	63.3	62.5	69.4
8	13:00-14:00	63.1	68.5	70.4	56.9	66.2	70.5
9	14:00-15:00	60.2	65.2	69.5	51.8	60.4	69.9
10	15:00-16:00	65.8	62.3	65.2	67.3	63.4	72.8
11	16:00-17:00	61.6	68.4	61.4	69.8	70.7	67.9
12	17:00-18:00	66.2	69.4	60.3	57.8	66.1	63.7
13	18:00-19:00	58.7	64.2	63.5	61.8	62.8	65.1
14	19:00-20:00	64.1	61.5	66.8	63.2	69.8	65.7
15	20:00-21:00	60.8	68.1	62.4	52.7	62.4	68.4
16	21:00-22:00	62.8	60.9	59.4	48.7	61.8	67.4
Day Time Limit*		75LeqdB(A)					

**Result of Noise level monitoring [Night Time]**

SR. NO.	Name of Location	CT-3 RMU - 2					
		Result [LeqdB(A)]					
	Sampling Date & Time	12/04/2021	10/05/2021	04/06/2021	20/07/2021	10/08/2021	27/09/2021
1	22:00-23:00	68.8	62.4	62.1	58.5	57.5	61.6
2	23:00-00:00	62.1	55.4	69.8	59.5	60.3	65.1
3	00:00-01:00	56.1	52.4	62.4	56.4	62.3	64.3
4	01:00-02:00	52.4	60.8	66.1	60.1	64.1	64.2
5	02:00-03:00	59.8	60.4	69.4	61.5	61.2	58.5
6	03:00-04:00	57.1	58.7	63.1	63.3	60.5	58.2
7	04:00-05:00	62.5	59.8	67.4	63.4	63.2	61.8
8	05:00-06:00	65.1	62.7	64.8	64.8	62.8	68.7
Night Time Limit*		70LeqdB(A)					

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

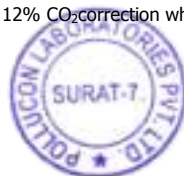
**RESULT OF STACK MONITORING**

SR · N O.	TEST PARAMETERS	UNIT	STD. LIMI T	THERMIC FLUID HEATER (BITUMEN- 01)	THERMIC FLUID HEATER (BITUMEN- 02)	HOT WATER SYSTEM-1	HOT WATER SYSTEM-2	TEST METHOD
<b>APRIL 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	25.43	--	30.46	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	4.43	--	6.76	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	28.54	--	34.65	--	IS:11255 (Part-VII):2005
<b>MAY 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	20.61	--	--	32.56	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	5.72	--	--	7.19	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	32.53	--	--	36.51	IS:11255 (Part-VII):2005
<b>JUNE 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	--	--	26.41	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	--	--	5.56	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	--	--	30.37	--	IS:11255 (Part-VII):2005
<b>JULY 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	25.61	--	33.44	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	6.67	--	7.46	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	29.38	--	33.64	--	IS:11255 (Part-VII):2005
<b>AUGUST 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	23.42	--	--	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	5.52	--	--	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	26.80	--	--	--	IS:11255 (Part-VII):2005
<b>SEPTEMBER 2021</b>								
1	Particulate Matter	mg/Nm <sup>3</sup>	<b>150</b>	--	--	35.42	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	<b>100</b>	--	--	6.12	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	<b>50</b>	--	--	38.50	--	IS:11255 (Part-VII):2005

\*Below detection limit

Results on 11 % O<sub>2</sub> Correction when Oxygen is greater than 11 %. And 12% CO<sub>2</sub> correction when CO<sub>2</sub> is less than 12%  
H. T. Shah

Lab Manager

  
Dr. Arun Bajpai

Lab Manager (Q)

## RESULTS OF D.G. STACK MONITORING

24/09/2021

SR. NO.	TEST PARAMETERS	Unit	South Basin CT-3			GPCB Limit	Test Method
			D.G. Set-1 (1500 KVA)	D.G. Set-2 (1500 KVA)	D.G. Set-3 (1500 KVA)		
1	Particulate Matter	mg/Nm <sup>3</sup>	22.61	26.75	30.41	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	4.48	3.73	6.60	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	30.76	34.54	36.78	50	IS:11255 (Part-VII):2005

\*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O<sub>2</sub> Correction when Oxygen is greater than 15 %

14/07/2021

SR. NO.	TEST PARAMETERS	Unit	South Basin CT-4			GPCB Limit	Test Method
			D.G. Set-1 (1500 KVA)	D.G. Set-2 (1500 KVA)	D.G. Set-3 (1500 KVA)		
1	Particulate Matter	mg/Nm <sup>3</sup>	24.38	28.41	20.84	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	5.57	6.51	4.32	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	31.52	34.54	32.59	50	IS:11255 (Part-VII):2005

\*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O<sub>2</sub> Correction when Oxygen is greater than 15 %



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)



28/08/2021

SR. NO.	TEST PARAMETERS	Unit	Adani Port			GPCB Limit	Test Method
			D.G. Set-1 (500 KVA)	D.G. Set-2 (500 KVA)	D.G. Set-3 (500 KVA)		
1	Particulate Matter	mg/Nm <sup>3</sup>	21.61	24.86	19.41	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	4.68	6.80	5.78	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	31.84	35.44	33.82	50	IS:11255 (Part-VII):2005

28/08/2021

SR. NO.	TEST PARAMETERS	Unit	Adani Port		GPCB Limit	Test Method
			D.G. Set-4 (500 KVA)	D.G. Set-5 (500 KVA)		
1	Particulate Matter	mg/Nm <sup>3</sup>	22.46	25.42	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	7.71	5.44	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	32.86	31.28	50	IS:11255 (Part-VII):2005



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

### Minimum Detection Limit [MDL]

Ambient Air Parameters		
Sr. No.	Test Parameter	MDL
1	Particulate Matter (PM10) ( $\mu\text{g}/\text{m}^3$ )	10
2	Particulate Matter (PM 2.5) ( $\mu\text{g}/\text{m}^3$ )	10
3	Sulphur Dioxide ( $\text{SO}_2$ ) ( $\mu\text{g}/\text{m}^3$ )	5
4	Oxides of Nitrogen ( $\mu\text{g}/\text{m}^3$ )	5
5	Hydrogen Sulphide as $\text{H}_2\text{S}$ ( $\mu\text{g}/\text{m}^3$ )	6

Stack Parameters		
Sr.No.	Test Parameter	MDL
1	Particulate Matter ( $\text{mg}/\text{Nm}^3$ )	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide ( $\text{mg}/\text{Nm}^3$ )	0.1
5	Hydro Carbon NMHC (ppm)	1.0

Sea Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	pH	--	2
2	Temperature	$^{\circ}\text{C}$	2
3	Total Suspended Solids	$\text{mg}/\text{L}$	2
4	BOD (3 Days @ $27^{\circ}\text{C}$ )	$\text{mg}/\text{L}$	1
5	Dissolved Oxygen	$\text{mg}/\text{L}$	0.1
6	Salinity	ppt	1
7	Oil & Grease	$\text{mg}/\text{L}$	2
8	Nitrate as $\text{NO}_3$	$\mu\text{mol}/\text{L}$	0.5
9	Nitrite as $\text{NO}_2$	$\mu\text{mol}/\text{L}$	0.01
10	Ammonical Nitrogen as $\text{NH}_3$	$\mu\text{mol}/\text{L}$	0.2
11	Phosphates as $\text{PO}_4$	$\mu\text{mol}/\text{L}$	0.5
12	Petroleum Hydrocarbon	$\mu\text{g}/\text{L}$	1
13	Total Dissolved Solids	$\text{mg}/\text{L}$	10
14	COD	$\text{mg}/\text{L}$	3
15	Primary productivity	$\text{mgC}/\text{L}/\text{day}$	0.1
16	Chlorophyll	$\text{mg}/\text{m}^3$	0.1
17	Phaeophytin	$\text{mg}/\text{m}^3$	0.1
18	Cell Count	No. $\times 10^3/\text{L}$	1

Sea Sediment Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	Organic Matter	%	0.1
2	Phosphorus as P	$\mu\text{g}/\text{g}$	1
3	Petroleum Hydrocarbon	$\mu\text{g}/\text{g}$	1
4	Aluminum as Al	%	0.1
5	Manganese as Mn	$\mu\text{g}/\text{g}$	1
6	Mercury as Hg	$\mu\text{g}/\text{g}$	0.1



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

STP Water parameter(mg/L)		
Sr. No.	Test parameter	MDL
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

ETP Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	Colour	Co-pt	2
2	pH	--	2
3	Temperature	°C	2
4	Total Suspended Solids	mg/L	2
5	Total Dissolved Solids	mg/L	10
6	COD	mg/L	3
7	BOD (3 Days @ 27 °C)	mg/L	1
8	Chloride as Cl	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate as SO <sub>4</sub>	mg/L	1
11	Ammonical Nitrogen as NH <sub>3</sub>	mg/L	0.2
12	Phenolic Compound	mg/L	0.005
13	Copper as Cu	mg/L	0.01
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.1
16	Cadmium as Cd	mg/L	0.002
17	Fluoride as F	mg/L	0.05



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

# **"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"**

**FOR**



**BORE HOLE WATER  
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED  
TAL: MUNDRA, KUTCH, MUNDRA – 370 421**

**MONITORING PERIOD:  
APRIL 2021 TO SEPTEMBER 2021**

**PREPARED BY:**



**POLLUCON LABORATORIES PVT.LTD.**

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,  
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**TC - 5945**

**ISO 9001:2015**

**ISO 14001:2015**

**ISO45001:2018**

## RESULTS OF BORE HOLE WATER

SR. NO	TEST PARAMETERS	UNIT	RESULTS			TEST METHOD
			PUMP HOUSE-1	PUMP HOUSE-2	PUMP HOUSE-3	
	Sampling Date		22/06/2021	22/06/2021	22/06/2021	
1	pH	--	7.89	8.35	8.01	IS 3025 (Part 5) 2017 Electrometric Method
2	Salinity	ppt	4.69	0.97	0.91	APHA 2520 B
3	Oil & Grease	mg/L	Not Detected	Not Detected	Not Detected	APHA(23rd Edition) 5520 B 2017
4	Hydrocarbon	mg/L	Not Detected	Not Detected	Not Detected	GC/GC-MS
5	Lead as Pb	mg/L	0.037	0.032	0.042	APHA (23rd Edition) 3111 B 2017
6	Arsenic as As	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3114 B 2017
7	Nickel as Ni	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
8	Total Chromium as Cr	mg/L	Not Detected	0.021	0.037	APHA (23rd Edition) 3111 B 2017
9	Cadmium as Cd	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
10	Mercury as Hg	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3112 B 2017
11	Zinc as Zn	mg/L	Not Detected	0.35	0.14	APHA (23rd Edition) 3111 B 2017
12	Copper as Cu	mg/L	Not Detected	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
13	Iron as Fe	mg/L	0.28	2.62	2.76	APHA (23rd Edition) 3500 Fe B 2017
14	Insecticides/Pesticides	mg/L	Absent	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	1.90	2.10	1.95	--

  
H. T. Shah

Lab Manager



  
Dr. Arun Bajpai

Lab Manager (Q)



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SR. NO	TEST PARAMETERS	UNIT	RESULTS		TEST METHOD
			UNLOADING BAYS	NEAR ETP	
	Sampling Date		22/06/2021	22/06/2021	
1	pH	--	7.93	7.94	IS 3025 (Part 5) 2017 Electrometric Method
2	Salinity	ppt	7.44	0.95	APHA 2520 B
3	Oil & Grease	mg/L	Not Detected	Not Detected	APHA(23rd Edition) 5520 B 2017
4	Hydrocarbon	mg/L	Not Detected	Not Detected	GC/GC-MS
5	Lead as Pb	mg/L	0.22	0.016	APHA (23rd Edition) 3111 B 2017
6	Arsenic as As	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3114 B 2017
7	Nickel as Ni	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
8	Total Chromium as Cr	mg/L	Not Detected	0.024	APHA (23rd Edition) 3111 B 2017
9	Cadmium as Cd	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
10	Mercury as Hg	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3112 B 2017
11	Zinc as Zn	mg/L	0.64	0.19	APHA (23rd Edition) 3111 B 2017
12	Copper as Cu	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 3111 B 2017
13	Iron as Fe	mg/L	3.86	2.12	APHA (23rd Edition) 3500 Fe B 2017
14	Insecticides/Pesticides	mg/L	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	2.15	2.0	--

**H. T. Shah****Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

Borehole Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	pH	--	2
2	Salinity	mg/L	0.5
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.01
5	Lead as Pb	mg/L	0.005
6	Arsenic as As	mg/L	0.001
7	Nickel as Ni	mg/L	0.01
8	Total Chromium as Cr	mg/L	0.05
9	Cadmium as Cd	mg/L	0.002
10	Mercury as Hg	mg/L	0.0006
11	Zinc as Zn	mg/L	0.05
12	Copper as Cu	mg/L	0.02
13	Iron as Fe	mg/L	0.05
14	Insecticides/Pesticides	mg/L	0.1



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

# **Annexure – 4**

# ON SITE EMERGENCY PLAN

JULY 2021

— ■ PRODUCER ■ —



**ADANI PORTS AND SEZ LTD**

P.O Box No: 1, Mundra - 370421  
(KUTCHH)

:: COMPILED BY ::

**M.J.PATEL & ASSOCIATES**

**HAPPY ASSOCIATES**

DISH approved Comp.Persons & Safety Proffessionals

6-A, NEW RANGSAGAR SOCIETY, NEAR GOVT. TUBE  
WELL, BOPAL, AHMEDABAD - 380058, MOB: 9825060783

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b>  <b>MUNDRA</b>  <b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: center;"><b>JULY – 2021</b></p>
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## PREFACE

**Adani Port Mundra** is the seamless integration of 3 verticals consisting of Ports, Logistics and Special Economic Zone. APSEZ Mundra with the flagship port in the Gulf of Kachchh, is India's largest commercial port. Adani Port handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc. A corporate agenda for APSEZ is to deliver overarching principle of tipple bottom-line. Adani Ports is striving to become Green Port by managing port operations and services responsibly, creating safe, secure and eco-friendly working environment.

**Adani Port - Mundra** has infrastructure to handle containers pan-India. We have container terminals operational. Deep draft berth facilitate berthing of largest container vessels arriving at the ports and best-in-class infrastructure ensures world class productivity, fast turnaround of vessels and efficient evacuation of containers from the port.

The Port operates two Single Point Mooring (SPM) facilities to evacuate imported crude oil. These SPMs can handle Very Large Crude Carriers (VLCC) and Ultra Large Crude Carriers (ULCC) up to 360,000 DWT. The crude is transported to refineries in North India through cross country pipeline network.

**Adani Port - Mundra** has capabilities and infrastructure to handle liquid cargo at Mundra. Multiple berths are equipped with different types & sizes of pipelines from jetty to tank farm to ensure safe and efficient handling of liquid products in big parcels. The tank farms can store multiple types of liquid cargo including vegetable oil, chemicals & petroleum, oil & lubricants (POL) products. The infrastructure at the Liquid terminal ensures best in class storage, safe and contamination free handling of liquid cargo.

**Adani Port - Mundra** is equipped with adequate infrastructure to handle coal. **Adani Port** handle all types and grades of coal including steam coal, imported coking coal & thermal coal, sourced from domestic sources. It has installed high speed ship unloaders / mobile harbour cranes for faster discharge of coal cargo and mechanized storage yards & integrated conveyor system to handle huge volumes of coal cargo.

**Adani Port - Mundra** is well equipped to handle minerals. Minerals & related cargo including Bauxite, Bentonite, Cement, Clay, Industrial salt, Iron ore fines, Rock phosphate and Gypsum, amongst others are handled here. Dedicated infrastructure, including specially demarcated concrete storage yards ensure zero ground loss. All necessary measures, with regards to equipment & storage are taken to ensure that there is no cargo loss or contamination.

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**Adani Port - Mundra** has excellent capabilities to handle agri- cargo. Agri-commodities handled at the port include Yellow Peas, Chick Peas, Sugar, Wheat, de-oiled cakes, Barley, Sorghums, Maize & Rice, among others. Stringent standards concerning handling of Agri-products are followed at the port. Separate dedicated berths and specialized facilities ensure clean and contamination free handling of Agri-cargo along with abundant storage facilities and labour. Rail connectivity ensures that imported Agri-cargo is transported to distant areas within the country.

**Adani Port - Mundra** has capabilities and infrastructure to handle fertilizers. The fertilizers handled here include all types and grades including Granular Urea, Prilled Urea, DAP, DAP Lite, MOP Red, MOP White, NP, NPK etc. The Port team understands the delicate nature of fertilizer cargo and therefore employs the best method to handle fertilizer cargo, even during the peak season, ensuring full customer satisfaction. Dedicated berths, dedicated fleets of equipments, abundant covered storage facilities and adequate labour are available for handling fertilizer cargo at Mundra has state-of-the-art dedicated mechanized infrastructure for handling fertilizer cargo which is capable of loading ten rakes daily.

**Adani Port - Mundra** can capably handle all types & grades of steel cargo including Plates, Beams, Coils, Pipes, Slabs, Bars, Billets & over dimension Steel Plates / Beams or Pipes, amongst others, requiring specialized operations. The Mundra port has state-of-the-art technology Goliath cranes attached with vacuum lifters for scratch free handling of quality sensitive cargo and a best-in-class steel yard spread across 1.5 lacs sq. mtrs to handle 6 MMT/ year.

**Adani Port - Mundra** has the requisite infrastructure to handle project cargo. We are specialized in handling over-sized and overweight project cargo. The port has loaded / discharged, heavy/oversized machinery / equipment like Boilers, Rail Wagons (of Delhi metro), Heavy Transformers, complete Windmills and Heavy Machineries.

**Adani Port - Mundra** has the perfect infrastructure to handle timber. The port handles timber logs of different kinds for different customers. It has earmarked a storage area capable of 350,000MT timber storage.

Mundra port established the RoRo terminal in 2009 and since then has been serving as a gateway port for automobile companies situated in Delhi NCR, Rajasthan and Gujarat region. Mundra port handles exports of Cars, Buses, and Trucks.

**Adani Port - Mundra** is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.



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In view of presence of various materials handled, hazardous nature of liquids, due to situation of the port, various types of hazards exist in handling, storage and logistic activities. Hence, it is desirable and also statutory to prepare an emergency action plan for any emergency which may affect plant personnel, property as well as neighbouring areas and population.

Therefore, we have prepared this book which incorporates all required matters along with on site emergency plan. Our safety policy dictates that we will take all precautions and preventive steps to see that our workers carry out their job in a safe and healthy working condition. We have taken reasonably practicable preventive measures to avoid any accident. Necessary testing, checking, inspections, maintenance are carried out regularly.

It is also obvious that systematic and methodical action in any emergency would reduce and mitigate risk to life, property not only of the port but also of the surrounding area and environment. This on site emergency plan is prepared to carryout a systematic and methodical action in the event of any emergency. It gives different pre-emergency, emergency time and post emergency actions to be taken in a planned way. Such actions would go a long way in preventing or mitigating risk to life, environmental and property in emergency.

We are responsible to carryout planning and do everything reasonably practicable to comply with requirements of this plan and revise and amend from our experience. This plan will also be circulated to all senior personnel for their knowledge, information and subsequent action.

For **ADANI PORT & SEZ LTD, MUNDRA**

(Auth.Sign)

(This emergency action plan has been prepared for **Adani Port, Mundra** as per the guidelines laid down by the office of Director, Industrial Safety & Health. The source of data regarding Gas Dispersion and other information is based upon the book of Major Hazard Control – published by International Labour Organization).

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## **CHAPTER-1**

### **PRELIMINARY**

### **CONTENTS**

- 1.0 INTRODUCTION OF EMERGENCY PLAN
- 1.1 IDENTIFICATION OF THE FACTORY
- 1.2 MAP OF THE AREA
- 1.3 SOME IMPORTANT DEFINITIONS
- 1.4 ABOUT OBJECTIVES OF THE EMERGNECY PLAN

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (Port Area)</b></p>	<p style="text-align: center;">JULY - 2021</p>
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## 1.0 INTRODUCTION OF THE PLAN

Today in this world many kind of chemicals, oils, minerals & materials are handled & transported in enormous quantities, probably beyond safe manageable levels and that too in many cases with record speed. People working in ports & industries, storing, handling, transporting and using various chemicals & other material are constantly exposed to hazards like fire, explosion, toxic gas releases, spillage of dangerous substances, exposure etc. Disaster means accidents causing catastrophic situation, in which day to-day pattern of life is in many instances, suddenly disrupted and people are plunged into helplessness and suffering, as a result need protection, clothing, shelter, medical and social care and other necessities of life. Disaster may occur by natural phenomena, by man or by mans impact upon the environment.

This emergency action plan has been prepared based upon the specific needs of the site for dealing with those emergencies which, it is foreseen, may still arise despite taking of all reasonably practicable precautions. An emergency element of the plan must be the provision to attempt to make safe the port. Emergency incidents considered are ranging from small event which can be dealt with by port personnel, without the help of outside services to the worst event which involves outside public, emergency services agencies etc. This plan is in two sections, the first section explains basic requirements as below:

- A – Definitions
- B – Objectives
- C – Hazard identification
- D – Risk analysis and environmental impact
- E – Organizational set-up
- F – Communication system
- G – Action on-site
- H – Off-site emergency plan
- I – Training, rehearsal and record aspect

The second section is annexure section. This 33 number annexure are designed to give specific information required during emergency. A considerable time can be saved due to handy information at the time of emergency. This information can also be helpful to the government in preparing district contingency plan.

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## 1.1 IDENTIFICATION OF THE FACTORY

**Adani Port at Mundra** consisting of Ports, Logistics and Special Economic Zone. APSEZ handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc.



Adani Port near mundra is 7 Kms from the town of Mundra which is about 9 km from the Gulf of Kachchh, the ancient Mundra Town is the headquarter of the Mundra Taluka, about 70 km away from the Dist. Headquarter of Bhuj, Dist. Kachchh. Mundra is directly linked to the National Highway NH-8A (ext.), State Highway SH-6 and SH-48. Gandhidham railway station is the nearest passenger rail head 50 km away. Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity. Mundra was a small town with agriculture and minor commerce dominating its socio-economic character about a decade back. Mundra was devastated like other towns and villages in the earthquake that struck Kuchchh on January 26, 2001. With the reconstructive spirit of the people and economic incentive packages given by the Govt. of Gujarat as well as Govt. of India for the Kachchh distt., Mundra is now witnessing a spate of industrial activity. The industrial and entrepreneurial potential of the town started unfolding with the Adani Group setting up its Port on the Mundra sea front in 1998.

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## IDENTIFICATION

Port Commissioned :	1998
Port & APSEZ area:	Mundra SEZ - 18000 ha, Notified SEZ area 8481.2784 ha.
Village :	Mundra
Nearest City:	Bhuj
Nearest Railway station	Bhuj, 6 0 Km
Nearest Airport	APSEZ Private Airstrip

SITE LOCATION		
State		Gujarat State
Nearest Important Town & Distance		Mundra – 10 Kms
Nearest Railway Station & Distance		Gandhidham – 50 Kms
Nearest Port & Distance		Kandla Port Trust - 60 Kms
Nearest Airport & Distance		Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity
Nearest Highway Milestone & Distance		National Highway 8A Extn. & State Highways 6 & 48.
Approach Road		4-Lane Rail-over-Bridge to ensure that two modes of transportation i.e. road & rail, do not impede each other's movement.
GEOGRAPHICAL DATA		
Height above mean sea level		14 meter
Site characteristics (Terrain Type)		Coastal Area
Location of APSEZ		Geographically, located between 22°.4451.73 North latitude and 69°.41.41.60 East Latitude
Seismic Zone		Zone 5, as per IS : 1893 -2002
METEOROLOGICAL DATA		
Climate of Area		Dry, Arid Coastal Climate
Highest Daily maximum Temperature		46.1 °C
Max. dry & wet bulb temperature		37.7 / 26.8 °C
Wind Regime		Summer - SW & W, Monsoon - SW, Winters - N, NW
Annual Rainfall		268.5 mm
Visibility		Good through out of the year
Relative Humidity %		
	Max	80
	Min	22
Wind Velocity Average		32.4 km/hr study period (Dec-05 to Feb 06).



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Wind Velocity	Max	90 Km/ hr
Wind velocity during monsoon		50 KM/hr
<b>WATER SUPPLY</b>		
Source of Water		Well nearby area.

**Adani Port - Mundra** is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.

Annexure – 1 attached in the report gives remaining detail of the port such as name of the occupier, manager, with their residence address and telephone numbers. Persons to be contacted in respective shifts etc. is mentioned. We have for our all the activities made the identification of hazards and relevant actions are taken as stated in Chapter – 2 of this plan.

## 1.2 MAP OF THE AREA

A map of the surrounding area of our Port & SEZ is enclosed marked as Annexure – 2, showing following locations of port such as:

- A.** Exact location of the Port & SEZ
- B.** Surrounding area
- C.** Approach roads
- D.** Off site emergency services
- E.** Company owned Fire Station, Police Station
- F.** North direction

This map is useful to know the surrounding area, location of above facilities in advance and identify the area which could be affected due to an emergency, if turned into off-site emergency and if evacuation of workers and others is necessary. Another map is attached marked as **Annexure – 3, Factory layout** showing all vital detail of the unit such as (1) Hazardous storage & process area (2) Other Process Plants Departments & Machines (3) Location of Assembly points (4) location of Emergency Control Centre (5) location of fire fighting equipments, entry, exit gates etc.

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### 1.3 IMPORTANT DEFINITIONS

All important definitions stated in the guidelines by DISH, are adhered to in preparation of this plan. These definitions are accepted by all the concerned government, semi-government bodies and institutions as mentioned relevant to the emergency planning.

### 1.4 ABOUT OBJECTIVES OF THE EMERGENCY PLAN

An emergency can not always be prevented but controlled within limits and its effects minimized by using the best available resources at the time. Emergency planning is a management function and it should not be considered in isolation. Management should evaluate the activities, operations and process carried out within the works before starting to plan an emergency operation.

A check must be made to ensure that all required steps have already been taken are included in emergency planning. Considering the number of employees, material and process, availability of resources, location of site, size and complexity of the works, we have prepared this plan. In this plan, we have given clear instructions without overlap or confusion for all concerned staff members. The same details are prepared as per annexures.

In spite of various preventive and precautionary measures taken in the plant, the possibility of a mishap cannot be totally ruled out. Hence, the need to prepare a Contingency Plan for dealing with incidences which may still occur and are likely to affect LIFE and PROPERTY both within the plant and in the immediate neighborhood.

Such an emergency could be the result of malfunction of the Plant & Equipment or non-observance of operating instructions. It could, at times, be the consequence of acts outside the control of plant management like severe storm, flooding, or deliberate acts of arson or sabotage.

### OBJECTIVES OF THE PLAN

1. To control the emergency, localize it and if possible eliminate it.
2. To avoid confusion, panic and to handle the emergency with clear cut actions.
3. To minimize loss of life and property to the plant as well as to the neighborhood.
4. To make head count and carry out rescue operations.
5. To treat the injured persons.
6. To preserve records and to take steps to prevent recurrence.

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7. To restore normalcy.

The **On site Emergency Plan (OEP)** explains the code of conduct of all personnel in the plant along with the actions to be carried out in the event of an Emergency. This plan gives the guidelines for employees, contractors, transporters, etc. It not only defines responsibilities but also inform about prompt rescue operations, evacuations, rehabilitation, co-ordination and communication.

## EMERGENCY

An emergency is a situation which may lead to or cause large scale damage or destruction of life, property or environment within or out side the factory. Such an unexpected situation may be too difficult to handle for the normal work-force within the plant.

## NATURE OF EMERGENCY

The emergency specified in the OEP refers to the occurrence of one or more of the following events:

1. Fire/Explosion
2. Major accident such as structural or building collapse, overturning of road tanker containing chemicals.
3. Natural calamities like storm, flood, earth quake, etc.
4. Sabotage act of terrorism, civil commotion, air raid etc.

<b>On Site Emergency Plan (ONLY PORT AREA)</b>	
<b>Adani Ports and Special Economic Zone Limited</b>	
<b>Code for Declaration of Emergency</b>	
<b>Siren for one minute followed by 5 sec gap repeated four times.</b>	
<b>Code for Declaration of All Clear</b>	
<b>Continuous siren for two minute</b>	
<b>Schedule of Siren Testing</b>	
<b>4<sup>th</sup> and 19<sup>th</sup> Every Month – 1000 hours (Port) &amp; 1100 hours (West Basin)</b>	

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**CONTACT IN EMERGENCY (Intercom Numbers):**

**FIRE – 52400 [MPT], 52985 [WB]    QHSE – 52778 [MPT], 52974 [WB]**  
**SECURITY – 52300 [MPT], 52900 [WB]    OHC – 52444 [MPT], 52984 [WB]**  
**ISCR – 52100 [MPT] POC [MPT] – 52442, 52762 [MPT]    CCR [WB] – 52934**

**CONTACT IN EMERGENCY (Landline Numbers): STD CODE – 02838**

**FIRE – 289101 [MPT], 255985 [WB]    QHSE – 255778[MPT], 255974 [WB]**  
**SECURITY – 289322 [MPT], 255900 [WB] OHC – (02838) 289267 [MPT], 255984 [WB]**  
**POC [MPT] – 289371 / 72 CCR WB – 255934**

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## **CHAPTER NO. II**

### **INTRODUCTION OF RISK AND ENVIRONMENTAL IMPACT ASSESSMENT**

#### **CONTENTS**

- 2.00 INTRODUCTION OF RISK AND ENVIRONMENTAL IMPACT ASSESSMENT PLAN
- 2.01 FACTORY LAY-OUT
- 2.02 STORAGE HAZARDS & CONTROLS
- 2.03 IDENTIFICATION OF HAZARD IN STORAGE & CONTROL MEASURES
- 2.04 IDENTIFICATION OF HAZARDS IN PROCESS & CONTROL MEASURES
- 2.05 PROCESS DESCRIPTION
- 2.06 OTHER HAZARDS & CONTROLS
- 2.07 TRADE WASTE DISPOSAL
- 2.08 RECORDS OF PAST INCIDENTS
- 2.09 GAS DISPERSION CONCENTRATION
- 2.10 RISK ASSESSMENT
- 2.11 ENVIRONMENTAL IMPACT ASSESSMENT PLAN



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## 2.00 INTRODUCTION OF RISK & ENVIRONMENTAL IMPACT ASSESSMENT

In this chapter all vital information such as Port installations, machinery, quantum of substance stored – Its storage and handling, loading-unloading practices, Its potential to damage the work place, its potential to create an emergency, its potential to damage the environment and life, nature of process carried out, types of emergency likely to take place, provisions to control such emergencies, are given. Hazard identification is made based upon handling of various substances and relevant steps to avoid probable hazards.

### 2.01 FACTORY LAYOUT

Layout of the port is enclosed as annexure-3, which shows following important locations for emergency planning.

1. Main approach to the port & main gate
2. Liquid Terminal having 97 tanks for storage of different liquid commodities
3. Closed godowns
4. Open storage yards
5. Fertilizer Cargo Complex
6. Steel Yard for handling steel cargo
7. The SPM facility
8. Berths & Jetty for Liquid cargo
9. Docks alongside its berths for handling dry bulk & break bulk cargo
10. Security Cabin / Exit & Entrance routes
11. The container terminals having a combined infrastructure consisting of 2.1 km of quay length
12. Admin buildings, canteens
13. Control buildings,
14. Other various building consists of offices
15. Fire stations,
16. Medical centers & occupational health centers
17. Internal Roads & railway line

The Port layout plan is kept in the Emergency Control Center (ECC) so that proper and immediate actions can be taken by the concerned personnel.

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## 2.02 IDENTIFICATION OF HAZARDS IN STORAGE & CONTROL MEASURES

In **ADANI PORT - Mundra**, huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios.

In addition to observe safe standards for the operation of Port, close attention shall be paid to overall site security arrangements. Highly flammable Substances such as : High Speed Diesel, Vinyl Acetate Monomer, Furnace Oil, Naphtha, De-natured Ethyl Alcohol, Methanol, Low Aromatic White Spirit are stored in giant capacity tanks. Besides above some intermediate compounds & chemicals such as Linear Alkyl Benzene, Acetic Acid, Acetic Anhydride are stored. Other than above chemicals some mineral oils & other oil compounds such as Mineral Turpentine Oil, Alpha Plus, CBFS, Crude Soyabean Oil are stored. All above are very hazardous substances, even while handling in small quantity, safety should be the prime consideration.

As fire is likely in the case of Methanol, Naphtha, VAM, solvents & HSD due to leakage, ignition, spark, vapour dispersal, materials are kept isolated from any source of fire-ignition. Bonding, Earthing & grounding to all pipes, joints, tanks to mitigate static charges. Their handling is strictly monitored.

Hazardous Chemical	Storage Location	Major hazards	Physical Form	Maximum Quantity Stored Onsite kl
Motor spirit	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	15042
Naphtha	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2944
Gasoil	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	461122

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Methanol	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	18000
Toluene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	3000
Acetic acid	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2960
P- Xylene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	6460
Vinyl Acetate Monomer	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion, toxic gas	Liquid	1458

In addition of above raw materials, there are various open & closed godowns, scattered fuel storages for D.G.Sets, Coal Yards.

In spite of all controlling measures, accident can happen due to dangerous physical properties of above substances – Risk of fire, leak of chemical and subsequent toxic atmosphere. Although, the port operations are running since quite a long time without any incidence of fire or leak due to sound handling practices & laid down safety systems.

In Port Operations it is likely that some of the accidents occur due to all following mentioned reasons ::

- **Falls from height** :: can occur whilst carrying out trimming, sheeting and container lashing, securing loads, accessing ships, working on board a ship or working on heavy machinery.
- **Falling Objects** :: Whilst carrying out loading and unloading operations and stacking and stowing goods there is a risk of falling objects. Items may be loose and incorrectly or poorly slung or stacked. Fittings and fixtures used during lashing operations may be dropped. Loads or objects may collapse or fall having become unstable during transport or having been poorly loaded.

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- **Fatigue**:: Dock operations can be prone to unexpected events and delays over which there may be little control. Fatigue can develop slowly and will not always be obvious. It can increase the risk of accidents through poor perception or physical exhaustion.
- **Mooring Hazards** :: Mooring can be a hazardous activity as there is a risk of a person getting caught in a line or a winch. The lines can be very heavy and awkward, particularly if they are wet, and may break and snap back.
- **Lifting Equipments** :: Container Lifting & material loading/unloading are very much dependent on lifting equipments. If proper inspection, maintenance is not followed, these operations may cause severe accidents.
- **Fire/Electrocution** :: All electrical equipment and installations if not designed, constructed, installed, maintained, protected and used properly, it can lead to fire, electrocution accidents.
- **Hazardous or Asphyxiate Substances** :: Workers loading and unloading solid bulk cargoes may be exposed to dust or respiratory sensitizers that can cause asthma. Cargoes may be flammable, toxic, poisonous or corrosive. Some cargoes, for example grain, may have been fumigated. Some solid bulk cargoes in the hold may not be hazardous themselves, for example fishmeal or bark, but may produce gases due to decomposition or bacterial action. Vehicle exhaust emissions in the ship's hold may also give rise to hazardous fumes.
- **Moving Vehicles and Equipment** ::An appropriate traffic management system must be in place and will aid both safety and operational control of the port.
- **Night Work** ::Night work/shift work can contribute to or produce negative biological effects (heart and stomach disorders), psychosocial effects (fatigue, increased accidents, stress) and individual effects (disrupted family life, isolation, stress).
- **Noise**:: Equipment and engines may produce noise which is augmented when they are operated in a ship's hold or a warehouse. As a rule of thumb you may be at risk if you have to shout to be clearly heard by someone 2 metres away, if your ears are still ringing after leaving the workplace or if there are noises due to impacts such as those caused by hammering.
- **Slips and Trips** ::The majority of dock accidents reported to the HSA are due to slips, trips and falls on the same level.

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- **Tidal and Environmental Hazards** :: The weather can have an adverse effect on port and dock operations and can reduce visibility. Cold and wet weather can reduce concentration and make manual work more difficult. Hot weather may result in heat exhaustion, sunburn or sunstroke. Wind, ice and fog can all increase the risk of slips, trips and falls. Tidal movements can affect access and egress to the ships, cause difficulties during loading operations and result in collisions between dockside equipment and a ship.
- **Severe weather and other natural hazards**
  - ✓ Ports may suffer from a variety of natural events. These include:
  - ✓ High winds and severe storms;
  - ✓ Flooding from tides, river water, land water or a combination of both;
  - ✓ Temperature extremes;
  - ✓ Earthquakes;

The ports regularly operate in temperatures over 40°C. Exposure to extremely high is likely to affect the ability of port workers to continue to work safely and without endangering their health. At this Mundra port, large cargo of dangerous chemicals (toxic or flammable) are unloaded from the ships and stored in liquid terminal. Unloaded dangerous chemicals are transferred to the storage tanks through the pipelines. Storage tanks are provided to store finished products which receive from the ship prior to transfer to consumer end for their processing. Huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. Petroleum products, hazardous chemicals are transported to consumer by rail wagons, road tankers and cross country pipelines. The industrial and commercial activities in the area heavily pollute the environment.

## 2.03 IDENTIFICATION OF HAZARDS IN STORAGE / PROCESS & CONTROL MEASURES.

### FIRE HAZARD

- ❖ Flammable substances are stored and handled in large quantity.
- ❖ Static electricity due to weak/loose earthing
- ❖ Slight – intermittent or steady leak causing flammable vapour cloud and any stray ignition.
- ❖ Accidental fire in Combustible materials godowns



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## TOXIC HAZARD

- ❖ Due to toxic physical properties of chemicals handled
- ❖ All above mentioned chemicals are stored and used in relatively sound quantity in storage tank. Transferred mechanically.
- ❖ There are chances of corrosion of pipes, tanks, receiver tanks due to materials as also external corrosive atmosphere.
- ❖ Leakage of toxic-corrosive substance in large amount – dispersion of toxic – corrosive chemical vapour - mist in the surrounding area of the unit.
- ❖ Splash of chemical and/OR its exposure to any working person due to mishandling or by accident

## EXPLOSION HAZARD

- ❖ Sudden outburst of fire, heat or steam, finding inadequate or no escape may cause bursting or explosion.
- ❖ Other Pressure equipments (pneumatic operations, utilities, air receivers containing compressed air & gas in utility may cause such a situation

## 2.4 PROCESS DESCRIPTION

A port is a facility at the edge of an ocean, for receiving ships and transferring cargo to and from them. The term seaport is used for ports that handle ocean-going vessels. Ports have specially-designed equipment to help in the loading and unloading of vessels. In fact, it can be stated that a port is an intermodal node where goods are loaded/unloaded to/from vessels and sent to their destination, be it onshore or offshore.

A port system could be thought of as a complex, often huge, environment where several transport operations are carried out, including not only maritime transport, but also unloading and, of course, storage of goods, along with typical process activities. Ports are normally located near a city, unless they are isolated terminals serving a process plant or a pipeline. Many cities have in fact been founded and have grown around spots that offered shelter for fishing boats, and later, with the growth of commerce and sea-exploration, have become port-cities. Transport includes ships and barges as well as Lorries, trains, and pipelines. Process operations embrace mainly storage, which can be of different types: solid bulks in silos, stacks, warehouses, packages; liquid bulks in tanks; containerized goods of any kind. Bulk carriers, used to transport bulk solids such as (iron) ore, coal, coke, bauxite/alumina, food staples (rice, grain, etc.), cement, sugar,

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quartz, phosphate rock, fertilizers, sulphur, scrap, and similar cargo. They can be recognized by the large box-like hatches on their deck, designed to slide outboard for loading. Bulk carrier's discharge at terminals provided with proper cranes; ore and coal can be stored in heaps. Tankers are usually large ships which carries petroleum products or chemicals in bulk. Apart from pipeline transport, tankers are the only method of transporting large quantities of vegetable oils around the world . Among the chemicals transported by sea, the most important are methanol, ethanol, toluene, acetic acid, caustic soda lye, naphtha, gasoil, motor spirit etc. Land transport activities, which are carried out by lorry, train and pipelines. - Storage, warehouses, container terminals, car parks, bulk solid wharves, etc. Chemical releases from tank farms on site are the most probable. It includes highly flammable and toxic chemicals. The latter is at approximately atmospheric pressure so that even a catastrophic failure should not result in the formation of a large flammable vapor cloud . The causes for overpressure may be overheating due to a neighboring fire, overfilling or rollover. Overfilling is a common phenomenon in storage installations and has one of the highest probabilities of occurrence values. Another possibility is the liquid catching fire due to a local incident or operation, which may lead to stress rupture of the tanks. Severe mechanical damage may occur from impacts from projectiles from disintegration of nearby vessels, aircraft impacts or nearby railway accident due to derailment. The tank farm storing of non-boiling liquids can be affected by pool fires and unconfined vapor cloud explosions. These spills may also result in the direct formation of a flammable vapor cloud. The latent heat required for evaporation has to be provided by the surroundings and the ground. The rate of evaporation will be initially high but decreases rapidly as the available heat from the surroundings is exhausted.

### **Liquid Terminal ::**

Liquid terminal comprises of tank farm area, pump house, and loading bays. Flammable Chemicals / petroleum products receive from the bulk ship carriers and transfer to intermediate storage tank for further distribution to the customer. Tank farm area comprises of finished petroleum products

## **2.5 OTHER HAZARDS AND CONTROLS**

In the plant, in addition to the hazards from storage handling and usage of flammable substances and other substances, there are certain other hazards likely due to failure of machinery and equipments. Such hazards are listed below:

- Machineries and equipments failure
- Structural collapse
- Hazards during maintenance of plant

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- Health hazards & Physical injuries
- Failure of electrical Installations
- Natural calamities (Earthquake, fall of lightening, floods, Tsunami, cyclones, storms) or manmade hazards. Causes of such other hazards, their effects on plant and the surrounding area, their preventive measures etc. are stated in ANNEXURE - 7

## 2.6 TRADE WASTE DISPOSAL

In Port Operations, no production activities are available. No hazardous trade waste is likely to generate in daily basis. Though effluent treatment plant has been provided for some of the identified waste.

In air pollution, the source of emission is from DG stack has been provided at sufficient height. Periodical monitoring of stack is done. Periodical Noise monitoring, ambient air monitoring are carried-out and records maintained.

We are having consolidated consent from the Gujarat Pollution Control Board : which is valid for 5 years. Other detail is furnished in Annexure – 8.

## 2.7 RECORD OF PAST INCIDENTS

So far, no incident has occurred in the past at our Port. However, due to port operations, handling of various hazardous chemicals at liquid terminals, container terminals & at various dry ports certain undesired situations have occurred at other ports in the world. Hence, from those incidents, we have already taken preventive steps, controlling measures. Regular checking, maintenance, tests are carried out to avoid any unwanted situations taking place.

## 2.8 GAS DISPERSION CONCENTRATION

Using Gaussian formula, as there are more chances of ground level release, assuming small leak rate to the worst event i.e. rupture of the tank and release, its down wind concentration is calculated at wind speed 2.0 M/second and Annexure – 10 is compiled. Subsequent to this, Evacuation Table, Annexure-11 is prepared to provide a quick guide to an On Site personnel to take proper actions. Moreover, such data are stated in Risk Assessment, but it is a crude approach and may not be fully appropriate for decision making as change of wind velocity and weather conditions may cause certain variations.

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## 2.9 RISK ASSESSMENT

Identification of hazards constitutes the first step in the task of hazard analysis, which in turn produces a basis for risk assessment.

Points 2.2 to 2.7 give us the hazard identification in the unit. Probability of frequency of such hazards will give risks and analysis, how they could occur and estimation to the extent, magnitude and likelihood of any harmful effects or consequences will give risk analysis. Fire risk shall be calculated considering the worst event which can be used as guideline at the time of an emergency.

The main objective of the Risk Assessment (QRA) is to identify the potential hazardous scenarios and assess the impact of major accident hazards from the liquid terminal as well as from the tanker loading and ship unloading facilities on the Mundra port and property within and outside the battery limit of the facilities. The study was initiated by Mundra Port SEZ Pvt. Ltd to evaluate the potential hazardous situation in the liquid terminal, its consequences and impact over onsite and offsite areas, to investigate and determine the overall risks to health and safety arising from any possible major interactions between existing or proposed installation in the area, where the significant quantities of dangerous substances are stored, handled, and transported including the loading and unloading of such substance to and from vessels, to assess the risks. The Canvey reports were the first significant contribution to industrial port environment QRAs, and they are still relevant today however, it is an attempt at standardizing the process of risk assessment of navigation and unloading operations for a generic port terminal. The focus of entire study was on accidents where a serious loss of containment could result in production of large cloud of flammable or toxic substances. The general method adopted is described as follows: (Courtesy: **The QRA Report data taken from CHILWORTH Global**)

- To identify potentially hazardous materials and establish maximum total inventories and location. This information was gathered through conducting visits to each of the installation involved and holding discussions with site personnel
- To consider the behavior of the dangerous substances on release, on the basis of information on material properties and process/ storage conditions
- To identify ways in which serious losses of containment could occur, presenting a hazard to the local population
- To assess the level of risk and the probable impact to the surroundings for certain port areas
- To assess the probability and consequences of selected failure events Liquid terminal and jetty areas are required to produce a contingency plan for accidental marine hydrocarbon pollution, including a study of the effects of possible spills and of their evolution.

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The QRA results are immense use in developing onsite offsite emergency plan. The study covers liquid terminals, pump house and loading bays. Accidents occurring during the (external) approach of the tankers to the port were not taken into account. Possible sabotage-related scenarios and accidents likely to occur during tanker maintenance operations were excluded from the analysis. Hazardous flammable chemicals, liquid hydrocarbons were considered for the study. Moreover, only bulk transportation and handlings are included within the scope of the study in Mundra port huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminals for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios. The industrial and commercial activities in the Mundra port area heavily pollute the environment. Some chemicals are present for years in these sites, due to enterprising problems. In general, many incidents have occurred in various chemical storage facilities during the past few years with considerable consequences to neighboring populations. The study team identified 49 numbers of Maximum Credible Loss Scenarios (MCLS), DNV- PHASTRISK software has been used for estimating the potential impact to surrounding environment. The types of accident that may take place in the Mundra port are: fire, explosion, release and dispersion of toxic gases/vapors or a combination of these. The thermal/toxic compound doses were first computed . The types of damage investigated were burns of various degrees, acute poisoning, or even death. The types of accident considered in the scenarios of this study are analyzed below

### **Jet fire:**

When pressurized flammable liquids are released from storage tanks or pipelines, the materials discharging through the hole will form a gas jet that entrains and mixes with the ambient air. If the material encounters an ignition sources while it is in the flammable range, a jet fire may occur

### **Pool fire**

The continuous release of a flammable liquid usually results in a pool fire. When the liquid is spilled in a confined space, the pool size is also confined and the amount of air that sustains the fire is limited, because the ventilation is controlled by the vent ducts In this case the type of the fire is characterized as 'confined'. When the liquid is spilled in an open area, it covers a large surface area and the amount of air is unlimited.



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## UCVE

Then the fire is referred to as 'unconfined' Unconfined Vapor Cloud Explosion (UVCE). This type of explosion takes place when a sufficient amount of flammable material (gas or liquid having high vapor pressure) is released and mixed with air to form a flammable cloud, such that the average concentration of the compound in the cloud is higher than the lower limit of explosion. The explosion occurs in an open space and the resulting overpressure affects humans and buildings through a blast wave covering large distances.

## BLEVE

BLEVE (Boiling Liquid Expanding Vapor Explosion) is a phenomenon resulting from the failure of a vessel containing a liquid at a temperature significantly above its boiling point at normal atmospheric pressure. The main hazard posed by BLEVE of a container filled with a flammable volatile liquid is a fireball and the resulting radiation, due to instantaneous ignition of the flammable vapor cloud. Release and dispersion of toxic gases and vapors. During the combustion of a flammable material a lot of chemical compounds are produced and travel large distances downwind, forming a combustion gas cloud. Some of them (CO, NO<sub>x</sub>) are toxic and even fatal to humans at sufficiently high doses. In this way the particles are carried away by these gases traveling some distance into the heavy gas cloud and affect inhabitants before they meet the ground.

## Consequence Analysis Results Summary

In general, it was observed that effect of catastrophic rupture of storage tank in enclosures extends beyond the tolerable range. It is also observed that in these enclosures, only full bore rupture of the pipe lines and catastrophic rupture of the storage tanks are of main concern for high risk. For the catastrophic failure of the storage tank, one of the main causes is escalation of minor events.

**Jet fire** : Jet fires can arise from gas, two-phase, or liquid releases. The worst-case jet fires are likely to be from the pump house and mainly from the maximum credible accident scenarios in the critical pipeline failure in pump house and tanker loading bays. The following jet fire results obtained from the DNV PHAST software are presented below:

Naphtha transfer pump discharge line rupture scenario which results into jet fire flame radiation intensity of 37.5 kW/m<sup>2</sup> to the distance of 127 meter impinges directly to the adjacent pumps in the pump house and associated pipelines carrying hydrocarbons to the loading bays.

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Vinyl Acetate Monomer discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m<sup>2</sup> to the distance of 75 meters, impinges directly to pipelines carrying to the loading bays

Gasoil pump discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m<sup>2</sup> to the distance of 41 meters, impinges directly to pipelines carrying to the loading bays

**Pool fire:** Pool fires can arise from any site that handles liquid hydrocarbons. The worst case is likely to be in the tank farm . Mostly tank farm pool fire is contained within the tank bund itself. Oil spills on ground from the pipelines handling hydrocarbons may results into pool fire and may affect adjacent equipment resulting into domino effects (BLEVE).

Scenario No	MCLS	Radiation intensity kW/m <sup>2</sup>	Distance, m
1	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	12.5	214
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	37.5	408
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	37.5	285
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	37.5	303
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	37.5	226
31	Loss of containment from P-Xylene tanker 30 MT	37.5	126
40	Loss of containment from P- Xylene tanker 20 MT	37.5	117
47	P-Xylene pump P-39 discharge line full bore rupture	37.5	117

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### Vapor cloud explosion:

In general catastrophic gas explosions happen when considerable quantities of flammable material are released and dispersed with air to form an explosive vapor cloud before ignition takes place. A vapor cloud explosion (VCE) occurs if a cloud of flammable gas burns sufficiently quickly to generate high overpressures. The following vapor cloud explosion results obtained from the DNV PHAST software are presented below:

Catastrophic failure of Naphtha storage tank T-01 is a worst case scenario, which results into dispersion of naphtha (flammable mixture) in the atmosphere; it may generate overpressure (0.2608 bar) to the distance of 1235 meter and affecting the adjacent storage tanks as well as to the nearby enclosures

The following vapor cloud explosion results obtained from the DNV PHAST software in which overpressure blast waves affecting the adjacent storage tanks, as well as major impact to adjacent enclosures.

Scenario No	MCLS	Overpressure (bar)	Distance, m
7	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	0.2068	124
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	0.2068	121
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	0.2068	433
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	0.2068	257
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	0.2068	226
22	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	0.2068	465
31	Loss of containment from Naphtha tanker 30 MT	0.2068	147
37	Loss of containment from Naphtha tanker 20 MT	0.2068	126

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46	Naphtha pump P- 01 discharge line full bore rupture	0.2068	257
48	Toluene pump P-122 discharge line full bore rupture	0.2068	93
49	VAM pump P-24 discharge line full bore rupture	0.2068	110

### Toxic Gas Release :

In case of release of toxic gas, when a gas that is heavier than air is released, it initially behaves very differently from a neutrally buoyant gas. The heavy gas will first "slump," or sink, because it is heavier than the surrounding air. As the gas cloud moves downwind, gravity makes it spread; this can cause some of the vapor to travel upwind of its release point. Farther downwind, as the cloud becomes more diluted and its density approaches that of air, it begins behaving like a neutrally buoyant gas. This takes place when the concentration of heavy gas in the surrounding air drops below about 1 percent (1 0,000 parts per million). For many small releases, this will occur in the first few yards (meters). For large releases, this may happen much further downwind. A gas that has a molecular weight greater than that of air will form a heavy gas cloud if enough gas is released. Gases that are lighter than air at room temperature, but that are stored in a cryogenic (low temperature) state, can also form heavy gas clouds. Many substances that are gases under normal pressures and temperatures are stored under pressures high enough to liquefy them. When a tank rupture or broken valve causes a sudden pressure loss in a tank of liquefied gas, the liquid boils violently and the tank contents foam up, filling the tank with a mixture of gas and fine liquid droplets (called aerosol). Flash boiling is the term for that sudden vaporization of a liquid caused by a loss of pressure. When the liquid and gas phases of a chemical escape together from a ruptured tank, the release is called a two-phase flow. When a two-phase mixture escapes from storage, the release rate can be significantly greater than that for a release of pure gas. The two-phase mixture that escapes into the atmosphere may behave like a heavy gas cloud. The cloud is heavy in part because it is initially cold, and therefore denser than it would be at ambient temperatures, and also because it consists of a two-phase mixture. The tiny aerosol droplets mixed into the cloud act to weigh the cloud down and make it denser than a pure gas cloud, and their evaporation cools the cloud. Toxic materials that become airborne are carried by the wind and transported away from the spill site. While being transported downwind, the airborne chemical(s) mix with air and disperse. Gases and two-phase liquid-vapor mixtures are divided into three general classes:

- Positively buoyant
- Neutrally buoyant
- Negatively buoyant.

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (Port Area)</b></p>	<p style="text-align: center;">JULY - 2021</p>
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These classifications are based on the density difference between the released material and its surrounding medium (air). The classifications are influenced by release temperature, molecular weight, presence of aerosols, ambient temperature at release, and relative humidity.

### Ignition Sources :

In order for a fire or explosion to start there must be an ignition source of sufficient heat intensity to cause an ignition. Ignition causes a release of flammable liquid or gas to become a fire (jet fire, flash fire, pool fire etc.) or explosion. There are many possible sources of ignition and those that are most likely will depend on the release scenario. Sources of ignition include electrical sparks, static electricity, naked flames, hot surfaces, impact, friction, etc. The following Ignition sources identified in a QRA under several categories including: **Hot Surfaces**- unlagged surfaces on hot equipment can act as sources of ignition; **Current Electricity**- electrical equipment and cables can act as sources of ignition if sparks are generated at contact points or where wires overheat; e.g. electrical equipment sparking **Static Electricity** - static electricity can build up on any unearthed equipment and generate sparks. Static is commonly found on vehicles, vessels handling particulate solids and manned areas with nonconductive floor or footwear unearthed floors; e.g. electrostatic discharges **Naked Flames** - all naked flames (including cigarettes) are potential sources of ignition; this category also includes welding, flame-cutting and other hot work, fired furnaces and flares; e.g. Open flame heaters (boilers and flame heaters) **Friction** - equipment with moving parts in contact can generate heat through friction if not properly lubricated. This includes all rotating equipment and cold cutting devices such as drills, lathes and saws; Mechanical sparking **Impact** - impact between hard surfaces, particularly metal-to-metal contact, can generate sparks. This includes lifted objects lowered to a metal floor too quickly and the use of hand tools such as hammers; and **Chemical ignition**- some chemicals can spontaneously ignite if exposed to air, while oxidizing agents such as oxygen gas and peroxides can cause flammable materials to ignite at ambient temperatures.

### Meteorology :

Atmospheric stability plays an important role in the dispersion of chemicals. Stability means, its ability to suppress existing turbulence or to resist vertical motion". Variations in thermal and mechanical turbulence and in wind speed are greatest in the atmospheric layer in contact with the surface. These turbulences have been influenced greatly by the air temperature and air temperature decreases with the height. The rate at which the temperature of air decreases with height is called Environment Lapse Rate (ELR). It will vary from time to time and from place to place. The atmosphere is said to be stable, neutral or unstable according to ELR less than, equal to or greater than Dry Adiabatic Lapse Rate (DALR), which is a constant value of 0.98° C per 100 meters.



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### Pasquill Stability Classes :

Pasquill has defined 6 stability classes.

- A Extremely unstable.
- B Moderately unstable
- C Slightly unstable.
- D Neutral
- E Slightly stable.
- F Moderately stable.

Three prime factors that defines Stability

1. Solar radiation
2. Night-time sky over
3. Surface wind

When the atmosphere is unstable and wind speeds are moderate or high or gusty, rapid dispersion of vapors will occur. Under these conditions, air concentrations will be moderate or low and the material will be dispersed rapidly. When the atmosphere is stable and wind speed is low, dispersion of material will be limited and air concentration will be high. Six stability classes from A-F are defined while wind speed can take any one of numerous values.

### Results For Different Weather Conditions:

For the flammable and toxic releases which reaches off-site of the plant, calculations iterated with different weather conditions, since wind speed and stability have a great effect on cloud dispersion. Stable weather gives the greatest effect distances considered for the most stable weather conditions that occur at the site, as well as the most common weather conditions. The key meteorological data required for consequence modeling are wind and temperature. The wind speed and stability define the dispersion of a material, whilst the temperature defines the evaporation rate. The data utilized here for the base case QRA model were a temperature of 35°C.

#### Ambient temperature:

Maximum	Normal/average	Minimum
43 deg C	28 deg C / 30 deg C	17 deg C

Relative humidity%: 65% to 90%

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**CLIMATOLOGICAL TABLE:**

S.No	Month	Maximum wind speed (kmph)	Average wind speed
1.	January	18	3
2.	February	20	5
3.	March	24	6
4.	April	22	7
5.	May	20	1
6.	June	24	1
7.	July	18	8
8.	August	67	7
9.	September	17	5
10.	October	18	3
11.	November	13	2
12.	December	18	2

These wind speed and stability class are used in consequence modeling:

Stability class	F	D	C/D	C/D
Wind speed m/s	2	3	5	9

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	UFL	264	223	189	0.02068	2380	2004	1803
		LFL	757	617	549	0.1379	1312	1045	896
		LFL-50%	1001	837	785	0.2068	1235	980	844
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	848	838	807	0.02068	182	156	134
		LFL	57.79	50.84	40.7	0.1379	99	92	79
		LFL-50%	75	71	60	0.2068	92	87	74
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	457	434	362	0.02068	73	63	46
		LFL	28	21	12	0.1379	41	38	26
		LFL-50%	39	33	26	0.2068	38	36	25
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	UFL	688	688	688	0.02068	NH	NH	NH
		LFL	6.9	6.9	7.57	0.1379	NH	NH	NH
		LFL-50%	15.6	15.7	18.2	0.2068	NH	NH	NH
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	UFL	5.46	5.45	5.39	0.02068	-	-	-
		LFL	5.53	5.53	5.52	0.1379	-	-	-
		LFL-50%	5.55	5.56	5.55	0.2068	-	-	-

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances-Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	UFL	3.43	3.27	3.03	0.02068	-	-	-
		LFL	4.10	4.06	3.96	0.1379	-	-	-
		LFL-50%	4.27	4.26	4.22	0.2068	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	UFL	28	28	30	0.02068	459	448	453
		LFL	44	36	47	0.1379	148	140	145
		LFL-50%	130	62	90	0.2068	124	117	122
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.24	0.23	0.26	0.02068	-	36	-
		LFL	3.46	3.18	3.03	0.1379	-	16	-
		LFL-50%	9.85	10.16	7.88	0.2068	-	15	-
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.13	0.09	0.11	0.02068	-	-	-
		LFL	1.38	1.27	1.25	0.1379	-	-	-
		LFL-50%	3.27	3.38	2.83	0.2068	-	-	-
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	UFL	29	29	31	0.02068	272	268	263
		LFL	52	49	48	0.1379	130	118	112
		LFL-50%	118	110	113	0.2068	121	111	106
11.	Major leak(25 mm) in P-Xylene storage tank T-39 (1460kl)	UFL	4.91	4.95	4.86	0.02068	-	-	-
		LFL	4.94	5.04	4.93	0.1379	-	-	-

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3D	5 C/D		2F	3D	5 C/D
		LFL-50%	5.21	5.05	4.94	0.2068	-	-	-
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	UFL	3.35	3.39	3.08	0.02068	-	-	-
		LFL	3.51	3.97	4.04	0.1379	-	-	-
		LFL-50%	3.53	4.02	4.09	0.2068	-	-	-
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	UFL	33	33	36	0.02068	898	828	802
		LFL	240	212	195	0.1379	463	400	364
		LFL-50%	347	307	295	0.2068	433	372	337
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	UFL	4.77	4.68	4.71	0.02068	32	21	23
		LFL	9.23	7.45	5.53	0.1379	23	13	13
		LFL-50%	23.8	19.5	15.03	0.2068	22	12	12
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	UFL	3.11	2.92	2.69	0.02068	-	-	-
		LFL	4.29	3.94	4.21	0.1379	-	-	-
		LFL-50%	11.8	6.91	4.67	0.2068	-	-	-
16.	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	UFL	80	75	88	0.02068	857	857	937
		LFL	83	78	97	0.1379	290	284	309
		LFL-50%	153	145	261	0.2068	247	240	259



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	UFL	6.07	5.56	4.91	0.02068	-	-	-
		LFL	6.93	7.06	6.95	0.1379	-	-	-
		LFL-50%	9.35	8.20	7.03	0.2068	-	-	-
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	UFL	2.56	2.47	2.36	0.02068	-	-	-
		LFL	4.81	4.78	4.89	0.1379	-	-	-
		LFL-50%	5.32	5.08	5.14	0.2068	-	-	-
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	UFL	57	55	59	0.02068	531	521	575
		LFL	101	87	107	0.1379	232	204	231
		LFL-50%	252	217	224	0.2068	225	193	226
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	UFL	6.31	6.30	6.34	0.02068	-	-	-
		LFL	6.39	6.38	6.58	0.1379	-	-	-
		LFL-50%	6.40	6.40	6.61	0.2068	-	-	-
21.	Minor leak (10 mm) in P-Xylene storage tank T-115 (5000 kl)	UFL	3.7	4.02	3.58	0.02068	-	-	-
		LFL	4.3	4.9	4.8	0.1379	-	-	-
		LFL-50%	4.4	5.03	4.93	0.2068	-	-	-
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	UFL	45	44	46	0.02068	929	855	819
		LFL	260	230	220	0.1379	495	425	387

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	388	355	346	0.2068	465	388	362
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	UFL	5.38	5.35	5.30	0.02068	17.5	17.4	17.7
		LFL	6.68	6.13	5.60	0.1379	11.9	11.9	12.0
		LFL-50%	15.9	13.3	10.1	0.2068	11.51	11.48	11.55
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	UFL	3.8	4.2	3.8	0.02068	-	-	-
		LFL	4.4	4.8	5.04	0.1379	-	-	-
		LFL-50%	7.54	5.73	5.09	0.2068	-	-	-
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	UFL	55	48	47	0.02068	980	985	990
		LFL	110	106	116	0.1379	480	484	490
		LFL-50%	180	178	192	0.2068	185	192	196
26.	Major leak (25 mm) in gasoil storage tank T-101 (15040 kl)	UFL	5.8	5.8	5.8	0.02068	31	31	22
		LFL	8.7	7.6	6.1	0.1379	22	22	13
		LFL-50%	25.5	23.2	17.2	0.2068	22	22	12
27.	Minor leak (10 mm) in gasoil storage tank T-101 (15040 kl)	UFL	3.54	3.38	3.12	0.02068	-	-	-
		LFL	4.3	4.35	4.76	0.1379	-	-	-
		LFL-50%	4.4	4.42	4.81	0.2068	-	-	-

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	UFL	245	232	198	0.02068	1830	1960	1642
		LFL	780	712	708	0.1379	1421	1034	900
		LFL-50%	980	825	812	0.2068	1123	1025	985
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	856	912	901	0.02068	210	195	165
		LFL	63	58	42	0.1379	184	162	114
		LFL-50%	95	92	90	0.2068	94	83	62
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	523	512	498	0.02068	150	148	132
		LFL	38	41	34	0.1379	60	51	38
		LFL-50%	28	24	20	0.2068	38	30	24
31.	Loss of containment from Naphtha tanker 30 MT	UFL	31	28	25	0.02068	363	344	335
		LFL	82	83	86	0.1379	161	152	147
		LFL-50%	101	111	121	0.2068	147	140	136
32.	Loss of containment from Acetic acid tanker 30MT	UFL	465	471	488	0.02068	-	-	-
		LFL	469	476	492	0.1379	-	-	-
		LFL-50%	471	477	494	0.2068	-	-	-
33.	Loss of containment from methanol tanker 30MT	UFL	452	457	474	0.02068	93	90	88
		LFL	55.5	53.3	55.9	0.1379	81	65	74



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances-Flash Fire					Explosion Results				
		Concentration	Distance in meters			Over pressure in bar	Distance in meters				
			2F	3 D	5 C/D		2F	3D	5 C/D		
		LFL-50%	190	134	159	0.2068	81	64	73		
34.	Loss of containment from P-Xylene tanker 30 MT	UFL	354	359	371	0.02068	122	40	NH		
		LFL	76	22	375	0.1379	96	32	NH		
		LFL-50%	131	54	58	0.2068	94	32	NH		
35.	Loss of containment from toluene tanker 30 MT	UFL	330	334	346	0.02068	1029	46	76		
		LFL	28	29	27	0.1379	56	47	43		
		LFL-50%	42	46	52	0.2068	52	46	42		
36.	Loss of containment from VAM tanker 30 MT	UFL	411	416	43	0.02068	150	127	121		
		LFL	33	32	29	0.1379	68	59	54		
		LFL-50%	50	51	51	0.2068	62	55	51		
37.	Loss of containment from Naphtha tanker 20 MT	UFL	26	24	22	0.02068	315	301	292		
		LFL	70	72	74	0.1379	139	132	127		
		LFL-50%	87	97	108	0.2068	126	120	117		
38.	Loss of containment from acetic acid tanker 20 MT	UFL	399	404	417	0.02068	-	-	-		
		LFL	402	408	420	0.1379	-	-	-		
		LFL-50%	404	409	422	0.2068	-	-	-		

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
39.	Loss of containment from methanol tanker 20 MT	UFL	3.87	3.92	4.05	0.02068	79	83	84
		LFL	48.9	54	54	0.1379	64	65	73
		LFL-50%	161	166	128	0.2068	63	64	72
40.	Loss of containment from P- Xylene tanker 20 MT	UFL	3.03	3.07	3.16	0.02068	87	NH	NH
		LFL	58	3.10	14.02	0.1379	74	NH	NH
		LFL-50%	110	45	48	0.2068	73	NH	NH
41.	Loss of containment from Toluene tanker 20 MT	UFL	2.82	2.86	2.94	0.02068	91	72	65
		LFL	23	24	22	0.1379	45	40	34
		LFL-50%	37	37	46	0.2068	42	38	33
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	UFL	3.52	3.57	3.67	0.02068	133	116	104
		LFL	28	27	24	0.1379	59	52	46
		LFL-50%	43	47	44	0.2068	54	47	42
43.	Acetic acid pump P-40 discharge line full bore rupture	UFL	8.12	7.92	7.3	0.02068		15.3	15.4
		LFL	8.2	8.02	7.35	0.1379		11.3	11.4
		LFL-50%	9.83	10.0	10.2	0.2068		11.07	11.4
44.	Gasoil pump P-101 discharge line full bore rupture	UFL	9.2	8.8	9.3	0.02068	111	84	122
		LFL	36	28	40	0.1379	80	51	83



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Hazard Distances-Flash Fire					Explosion Results				
		Concentration	Distance in meters			Over pressure in bar	Distance in meters				
			2F	3 D	5 C/D		2F	3D	5 C/D		
		LFL-50%	77	47	75	0.2068	78	49	80		
45.	Methanol pump P-119 discharge line full bore rupture	UFL	9.12	10.38	10.9	0.02068	80	78	99		
		LFL	24.4	24.3	29.4	0.1379	50	49	70		
		LFL-50%	43.5	40.3	70.9	0.2068	48	47	67		
46.	Naphtla pump P- 01 discharge line full bore rupture	UFL	31	30	32	0.02068	484	480	429		
		LFL	172	158	129	0.1379	238	271	237		
		LFL-50%	221	214	179	0.2068	233	257	222		
47.	P-Xylene pump P-39 discharge line full bore rupture	UFL	8.4	8.2	8.2	0.02068	39	62	48		
		LFL	14	15	13	0.1379	25	45	34		
		LFL-50%	27	45	38	0.2068	23	44	33		
48.	Toluene pump P-122 discharge line full bore rupture	UFL	8.12	8.74	8.07	0.02068	118	146	134		
		LFL	37	46	43	0.1379	87	97	86		
		LFL-50%	58	80	73	0.2068	63	93	82		
49.	VAM pump P-24 discharge line full bore rupture	UFL	8.88	8.74	9.29	0.02068	212	175	158		
		LFL	70	57	50	0.1379	116	104	92		
		LFL-50%	102	87	74	0.2068	110	99	87		

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )		Distance in meters		Radiation Levels (kW/m <sup>2</sup> )		Distance in meters	
		2F	3D	5C/D		2F	3D	5C/D	
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	4	289	290	296	4	-	-	-
		12.5	211	209	214	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	4	29	29	29	4	65	62	59
		12.5	22	23	23	12.5	49	46	43
		37.5	NR	NR	NR	37.5	40	37	34
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	4	20.6	20.6	20.9	4	28	27	25
		12.5	15.7	16	16.9	12.5	21	20	19
		37.5	11.4	12	13.6	37.5	17	16	15
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	4	26	26	29	4	-	-	-
		12.5	15	16	19	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	4	26	27	27	4	17	17	16
		12.5	16	16	17	12.5	14	13	13
		37.5	NR	NR	NR	37.5	NR	NR	NR

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results						Jet Fire Results					
		Radiation Levels (kW/m <sup>2</sup> )		Distance in meters				Radiation Levels (kW/m <sup>2</sup> )		Distance in meters			
				2F	3D	5C/D				2F	3D	5C/D	
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	4		22	22	22		4		-	-	-	
		12.5		13	13	14		12.5		-	-	-	
		37.5		NR	NR	NR		37.5		-	-	-	
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	4		30	30	32		4		-	-	-	
		12.5		20	21	25		12.5		-	-	-	
		37.5		NR	NR	NR		37.5		-	-	-	
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	4		55	59	68		4		28	34	36	
		12.5		40	46	57		12.5		12.5	6.89	19.5	
		37.5		29	34	45		37.5		NR	NR	NR	
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	4		20	23	25		4		4.69	8.90	9.66	
		12.5		14	16	20		12.5		NR	NR	NR	
		37.5		NR	NR	NR		37.5		NR	NR	NR	
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	4		943	948	951		4		-	-	-	
		12.5		593	599	609		12.5		-	-	-	
		37.5		377	390	408		37.5		-	-	-	

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results					Jet Fire Results				
		Radiation Levels (kW/m <sup>2</sup> )		Distance in meters			Radiation Levels (kW/m <sup>2</sup> )		Distance in meters		
				2F	3D	5C/D			2F	3D	5C/D
11.	Major leak (25 mm) in P-Xylene storage tank T-39 (1450 ki)	4		55	56	56	4		17	16	16
		12.5		36	37	38	12.5		13	13	12
		37.5		22	24	26	37.5		11	10	10
12.	Minor leak (10 mm) in P-Xylene storage tank T-39 (1450 ki)	4		54	55	55	4		8.78	8.52	8.17
		12.5		35	36	37	12.5		6.74	6.45	6.12
		37.5		20	23	25	37.5		6.23	5.82	4.54
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 ki)	4		637	639	646	4		-	-	-
		12.5		406	414	424	12.5		-	-	-
		37.5		250	263	285	37.5		-	-	-
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24 (1458 ki)	4		33	33	34	4		33	32	30
		12.5		22	23	24	12.5		26	25	24
		37.5		10	11	11	37.5		21	20	19
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 ki)	4		31	32	33	4		16	15	14
		12.5		20	22	24	12.5		13	12	11
		37.5		9.8	10.1	11	37.5		NR	NR	NR
16.	Catastrophic rupture of methanol storage tank T-	4		602	598	610	4		-	-	-



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results					Jet Fire Results				
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters	2F	3D	5C/D	
			2F	3D	5C/D						
	119 (5000 kl)	12.5	426	429	447	12.5	-	-	-	-	-
		37.5	295	289	303	37.5	-	-	-	-	-
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	4	29	30	30	4	36	34	32		
		12.5	21	22	23	12.5	28	27	26		
		37.5	NR	NR	NR	37.5	NR	NR	NR		
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	4	25	25	26	4	17	16.5	15.4		
		12.5	17	18	19	12.5	NR	NR	NR		
		37.5	NR	NR	NR	37.5	NR	NR	NR		
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	4	1621	1627	1634	4	-	-	-		
		12.5	1028	1036	1053	12.5	-	-	-		
		37.5	666	683	711	37.5	-	-	-		
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	4	21	20	20	4	58	59	59		
		12.5	16	16	15	12.5	39	40	41		
		37.5	13	13	12	37.5	24	26	29		
21.	Minor leak (10 mm) in P-Xylene storage tank T-	4	56	58	58	4	10.8	10.5	10.08		



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results					Jet Fire Results				
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters	2F	3D	5C/D	
			2F	3D	5C/D						
	115 (5000 kl)	12.5	37	38	39	12.5		8.43	8.07	7.58	
		37.5	22	25	27	37.5		7.21	6.7	6.08	
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	4	410	430	463	4		-	-	-	
		12.5	226	225	230	12.5		-	-	-	
		37.5	NR	NR	NR	37.5		-	-	-	
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	4	37	37	39	4		28	27	26	
		12.5	23	25	27	12.5		22	21	20	
		37.5	11	11	11	37.5		19	17	16	
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	4	36	37	38	4		15	15	14	
		12.5	22	24	26	12.5		12	11	10	
		37.5	10	11	11	37.5		9.9	9.4	8.78	
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	4	320	318	291	4		-	-	-	
		12.5	230	229	220	12.5		-	-	-	
		37.5	NR	NR	NR	37.5		-	-	-	
26.	Major leak (25 mm) in gasoil storage tank T-101	4	44	46.5	48.2	4		24	23	23	

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	(3000 kl)	12.5	23	24.8	26.8	12.5	18	18	17
		37.5	NR	NR	NR	37.5	15	14	13
27.	Minor leak (10 mm) in gasoil storage tank T-101 (3000 kl)	4	36	36	38	4	11.8	11.5	11.12
		12.5	22	23	26	12.5	9.16	8.8	8.32
		37.5	12	12	12	37.5	7.4	7	6.5
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	4	295	291	289	4	-	-	-
		12.5	204	201	215	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	4	31	34	30	4	72	68	61
		12.5	26	24	23	12.5	48	43	48
		37.5	NR	NR	NR	37.5	38	37	31
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	4	24	22	19	4	41	43	38
		12.5	18	13	17	12.5	28	26	21
		37.5	NR	NR	NR	37.5	17	19	21
31.	Loss of containment from Naphtha tanker 30 MT	4	20	21	21	4	-	-	-

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	14	14	15	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
		4	101	103	104	4	-	-	-
32.	Loss of containment from Acetic acid tanker 30MT	12.5	64	67	72	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
		4	123	123	124	4	-	-	-
33.	Loss of containment from methanol tanker 30MT	12.5	81	84	87	12.5	-	-	-
		37.5	49	49	49	37.5	-	-	-
		4	330	332	331	4	-	-	-
34.	Loss of containment from P-Xylene tanker 30 MT	12.5	204	207	212	12.5	-	-	-
		37.5	126	133	141	37.5	-	-	-
		4	112	120	130	4	-	-	-
35.	Loss of containment from toluene tanker 30 MT	12.5	47	48	50	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
36.	Loss of containment from VAM tanker 30 MT	4	213	215	217	4	-	-	-

**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	133	137	141	12.5	-	-	-
		37.5	74	80	89	37.5	-	-	-
		4	20	21	21	4	-	-	-
37.	Loss of containment from Naptha tanker 20 MT	12.5	14	14.2	15.6	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
		4	84	85	87	4	-	-	-
38.	Loss of containment from acetic acid tanker 20 MT	12.5	52	56	59	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
		4	102	103	104	4	-	-	-
39.	Loss of containment from methanol tanker 20 MT	12.5	67	70	72	12.5	-	-	-
		37.5	40	40	40	37.5	-	-	-
		4	274	276	276	4	-	-	-
40.	Loss of containment from P- Xylene tanker 20 MT	12.5	170	173	177	12.5	-	-	-
		37.5	104	110	117	37.5	-	-	-
41.	Loss of containment from Toluene tanker 20 MT	4	95	102	111	4	-	-	-



**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	39	40	41	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
42.	Loss of containment from vinyl acetate monomer (NAM) tanker 20 MT	4	178	179	181	4	-	-	-
		12.5	111	115	118	12.5	-	-	-
		37.5	60	65	73	37.5	-	-	-
43.	Acetic acid pump P-40 discharge line full bore rupture	4	93	94	95	4	41	39	40
		12.5	61	64	67	12.5	33	32	32
		37.5	NR	NR	NR	37.5	NR	NR	NR
44.	Gasol pump P-101 discharge line full bore rupture	4	93	98	104	4	66	64	66
		12.5	45	45	47	12.5	51	48	50
		37.5	NR	NR	NR	37.5	41	38	40
45.	Methanol pump P-119 discharge line full bore rupture	4	100	101	103	4	103	104	99
		12.5	69	72	75	12.5	84	86	81
		37.5	45	46	46	37.5	NR	NR	NR
46.	Naphtha pump P-01 discharge line full bore	4	65	67	66	4	211	213	208

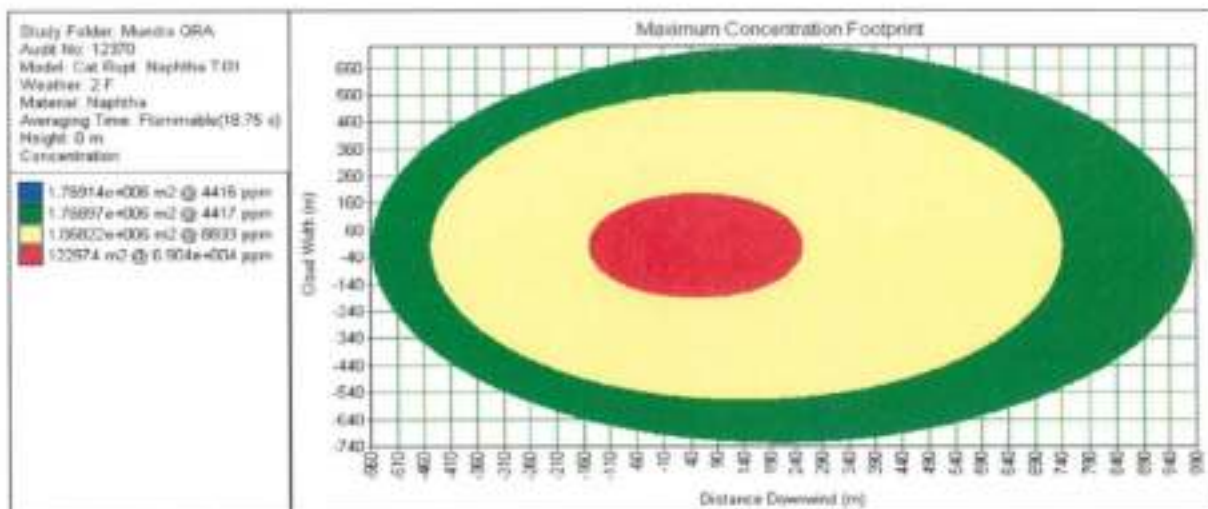


**ON SITE EMERGENCY PLAN (Port Area)**

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m <sup>2</sup> )	Distance in meters			Radiation Levels (kW/m <sup>2</sup> )	Distance in meters		
			2F	3D	50D		2F	3D	50D
	rupture	12.5	43	45	46	12.5	158	158	151
		37.5	NR	NR	NR	37.5	127	125	118
47.	P-Xylene pump P-39 discharge line full bore rupture	4	263	265	264	4	49	51	47
		12.5	166	169	172	12.5	38	39	35
		37.5	105	110	117	37.5	31	32	28
48.	Toluene pump P-122 discharge line full bore rupture	4	97	105	112	4	72	77	75
		12.5	44	45	46	12.5	56	59	56
		37.5	NR	NR	NR	37.5	46	48	45
49.	VAM pump P-24 discharge line full bore rupture	4	177	179	180	4	116	112	112
		12.5	113	117	120	12.5	91	87	86
		37.5	65	70	77	37.5	75	72	71

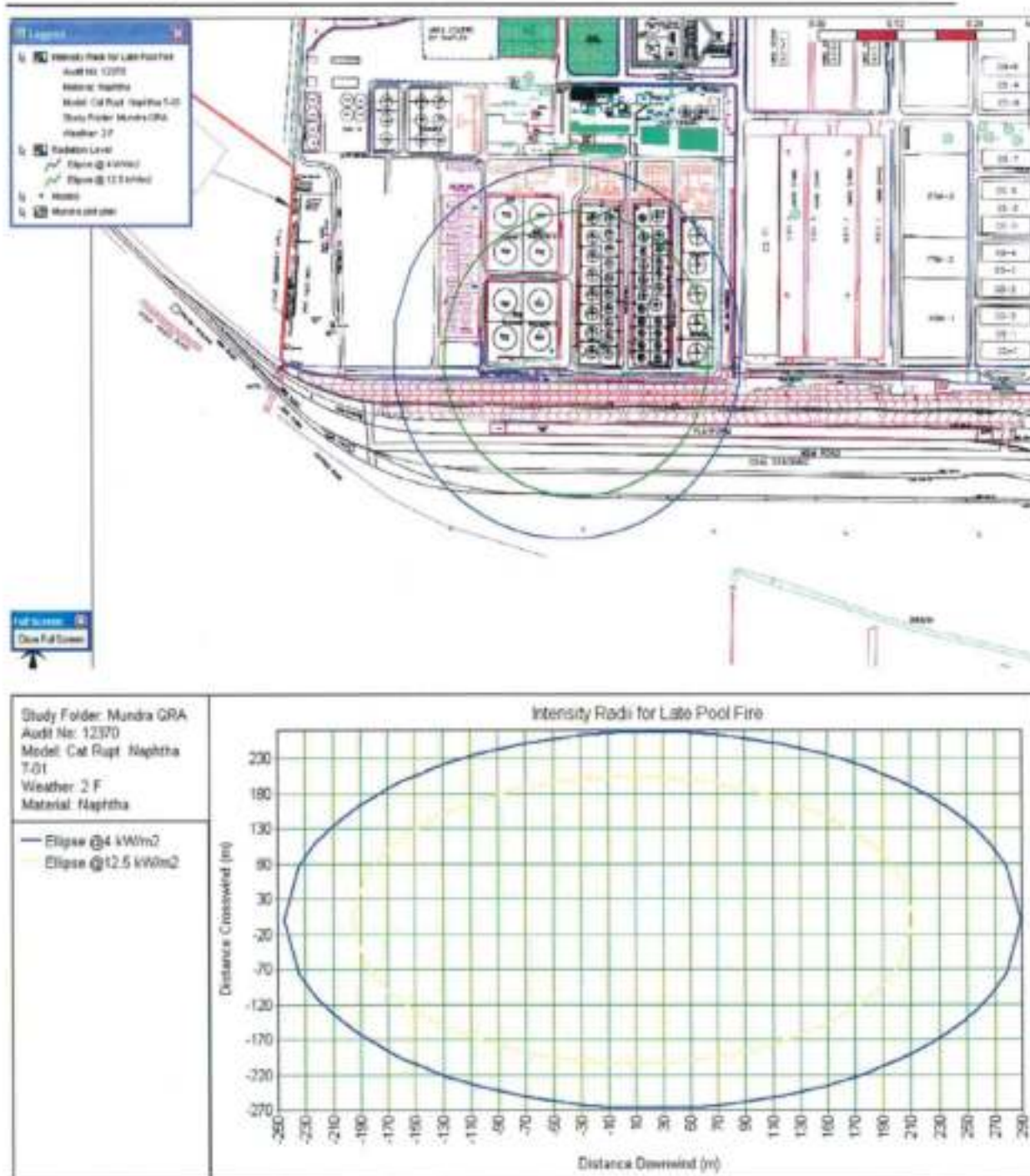
ON SITE EMERGENCY PLAN (Port Area)

Scenario No.:1



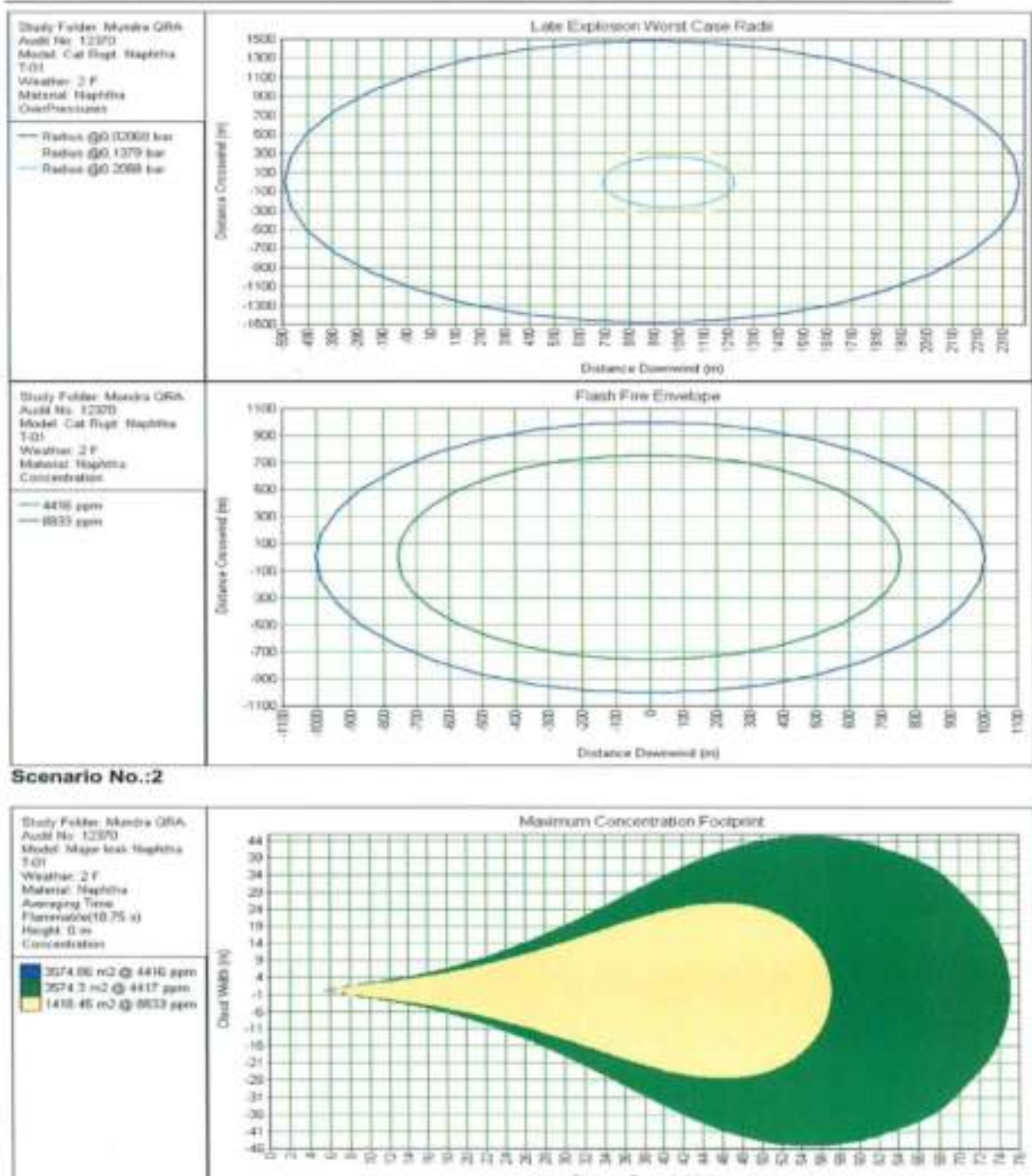
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Mundra QRA Study

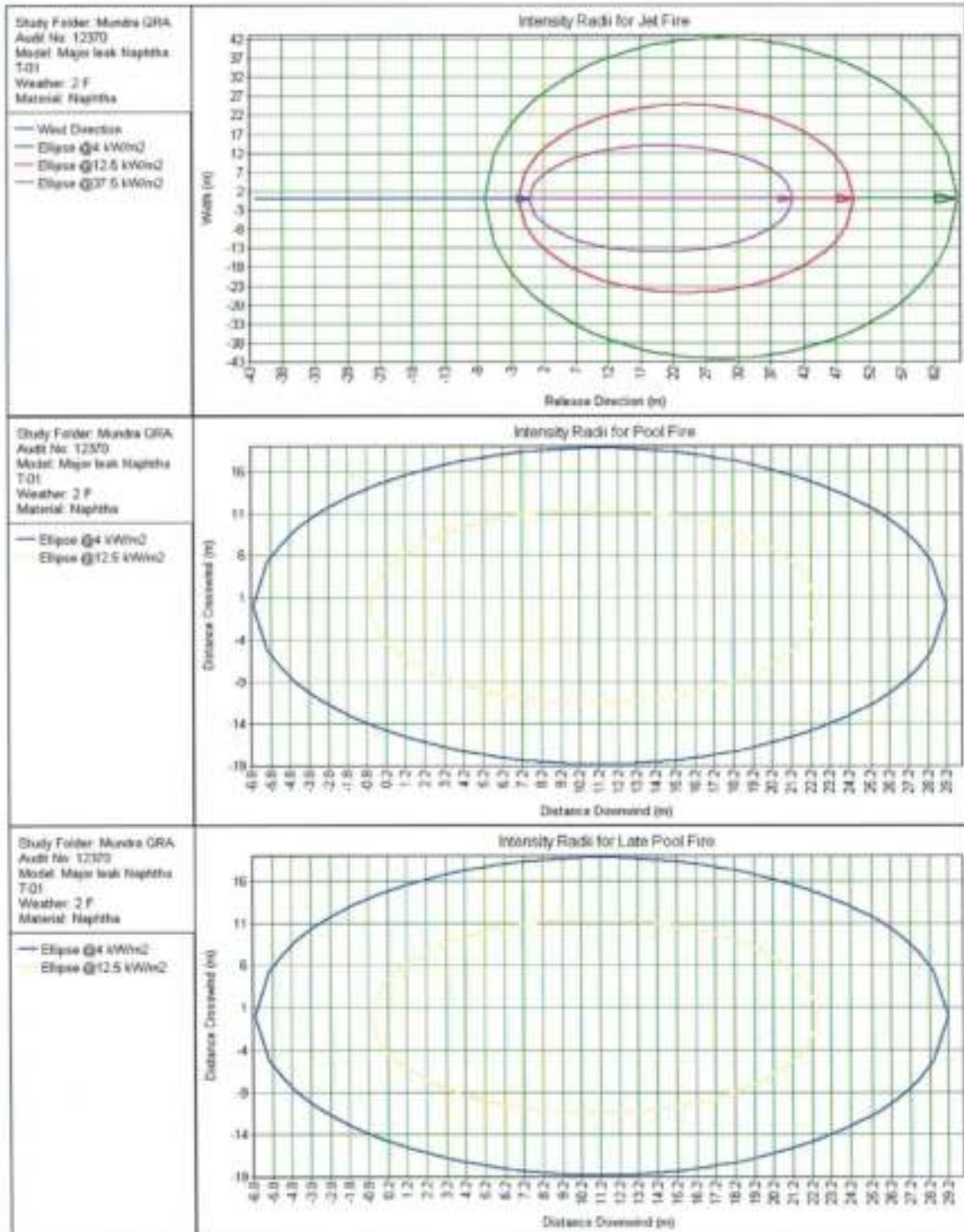




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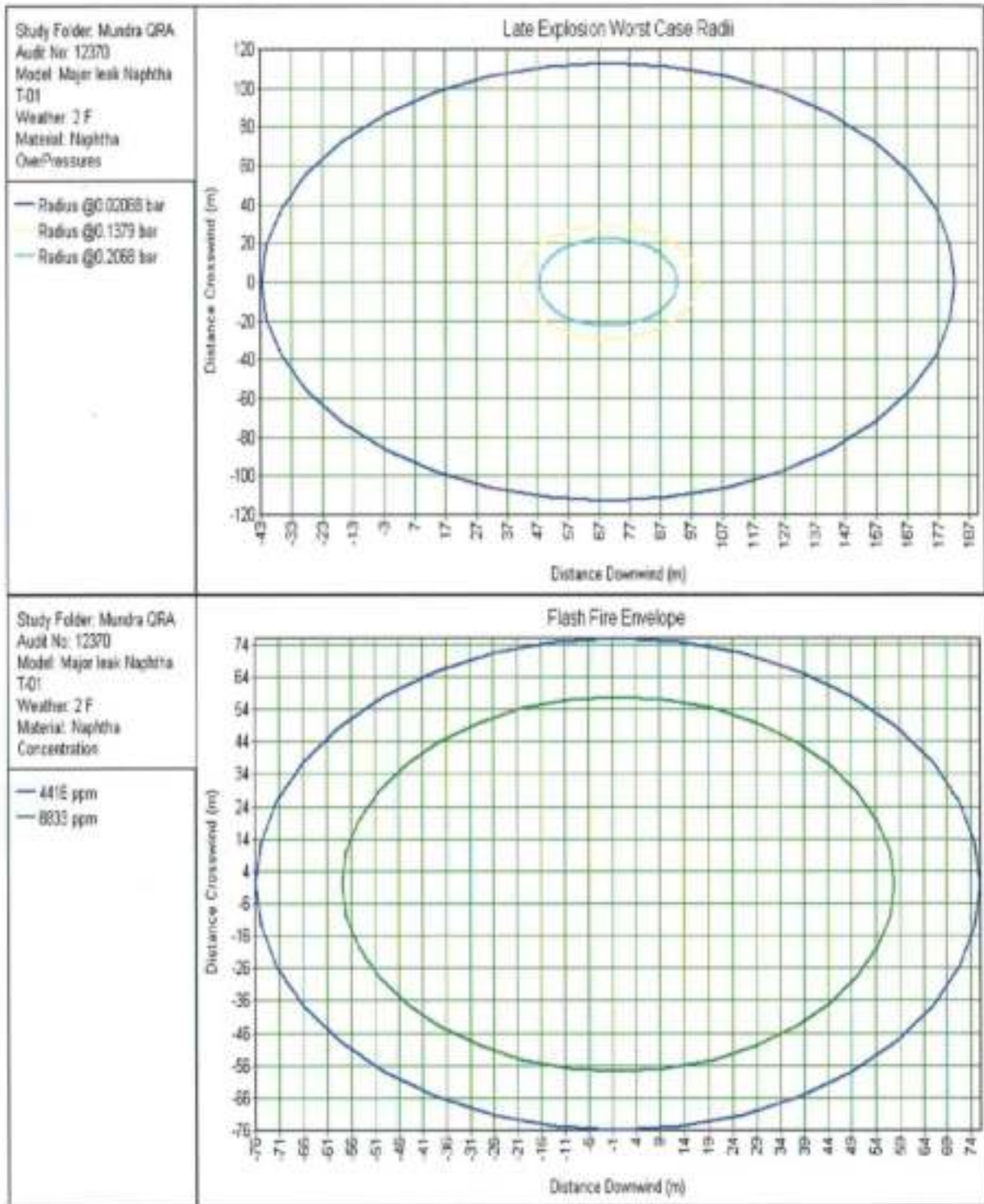


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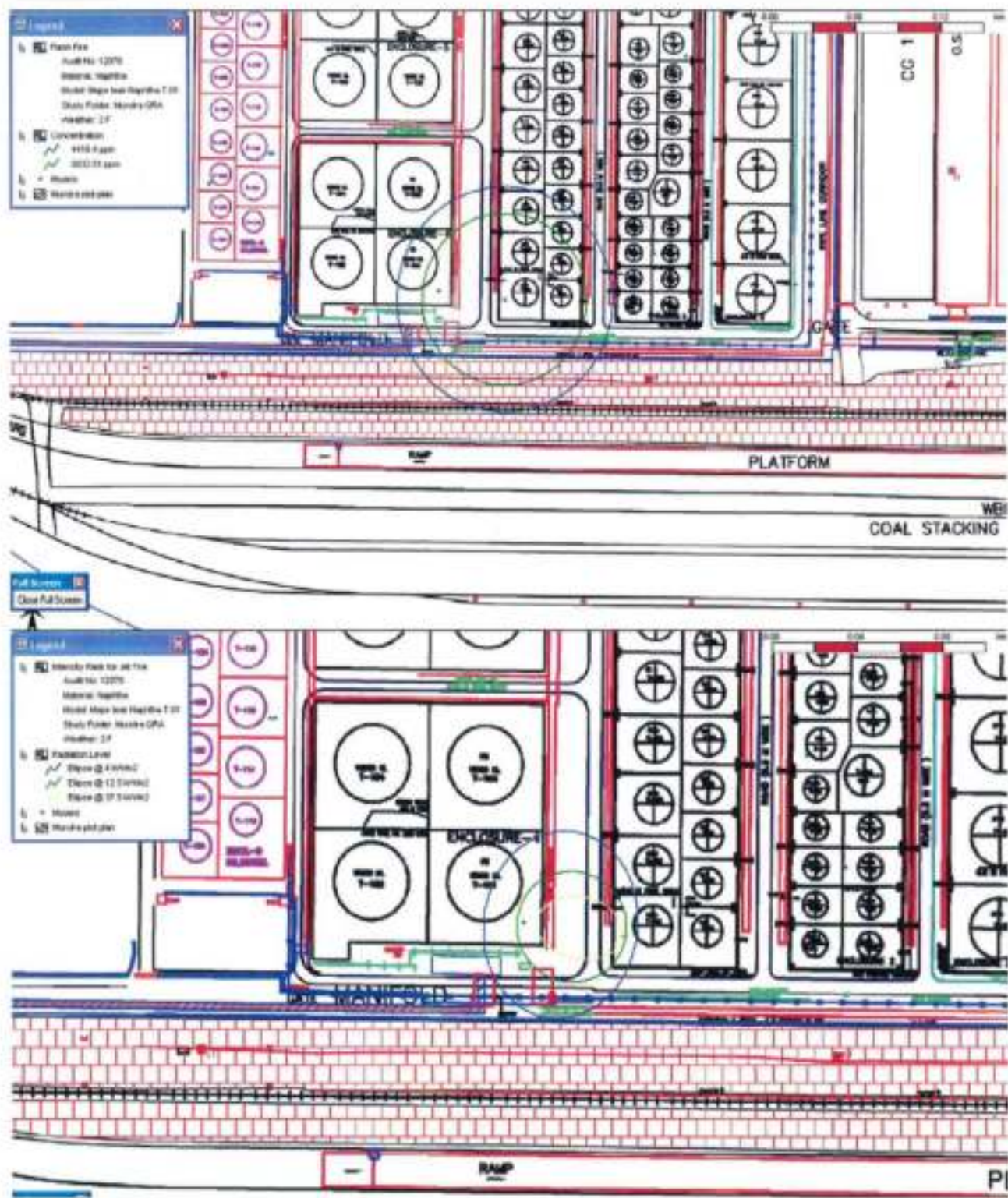




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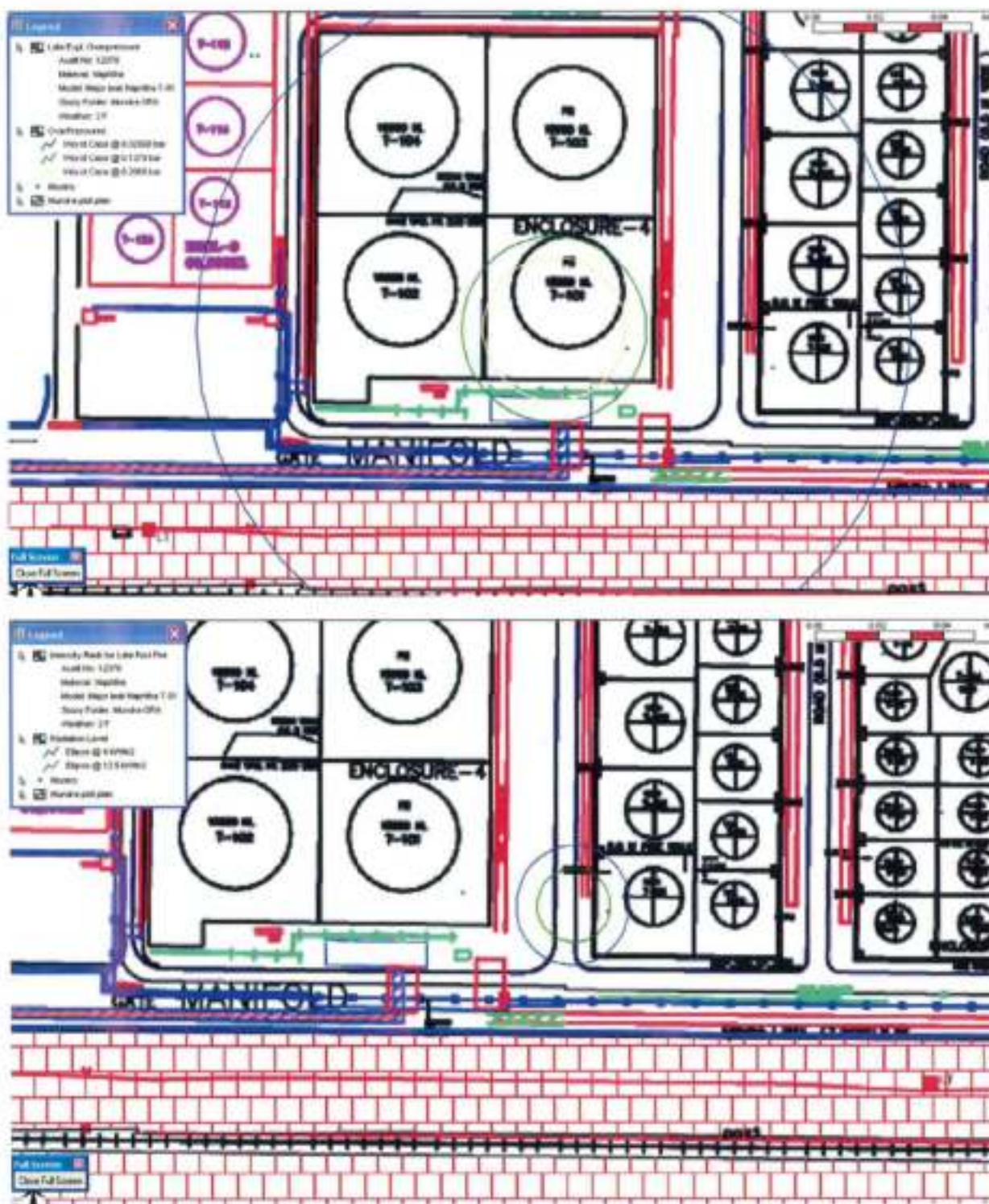


ON SITE EMERGENCY PLAN (Port Area)





## ON SITE EMERGENCY PLAN (Port Area)

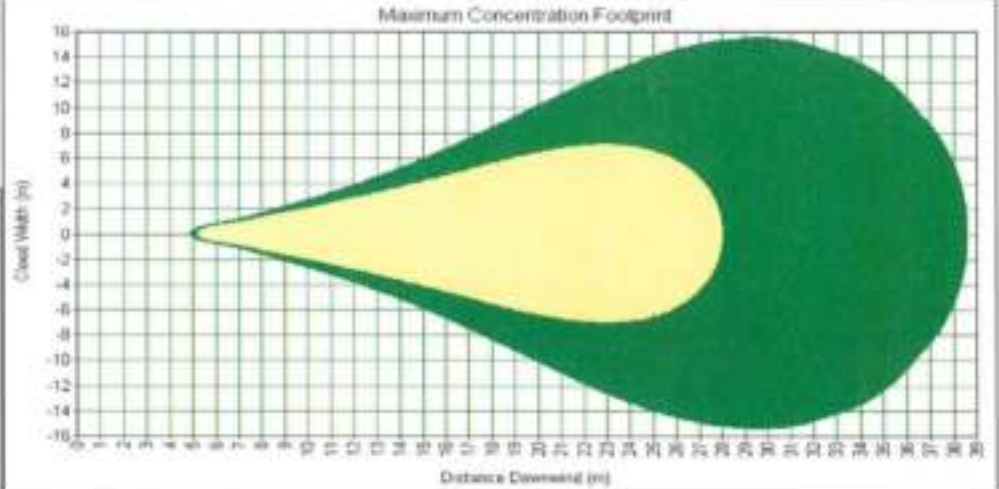


### ON SITE EMERGENCY PLAN (Port Area)

#### Scenario No.:3

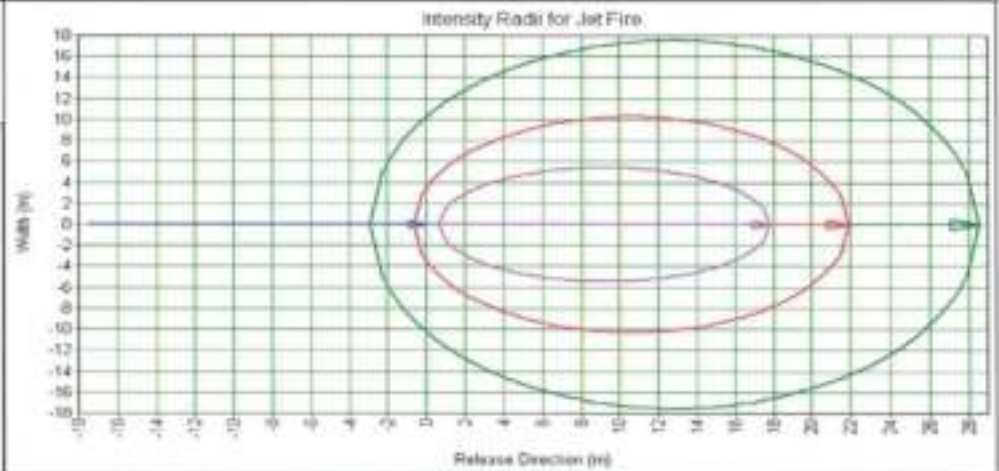
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Audit No: 12370  
Model: Minor leak Naphtha  
T:01  
Weather: 2 F  
Material: Naphtha  
Accumulating Time:  
Flammable(18.75 s)  
Height: 0 m  
Concentration:

617.874 m2 @ 4416 ppm  
617.761 m2 @ 4417 ppm  
192.05 m2 @ 8833 ppm



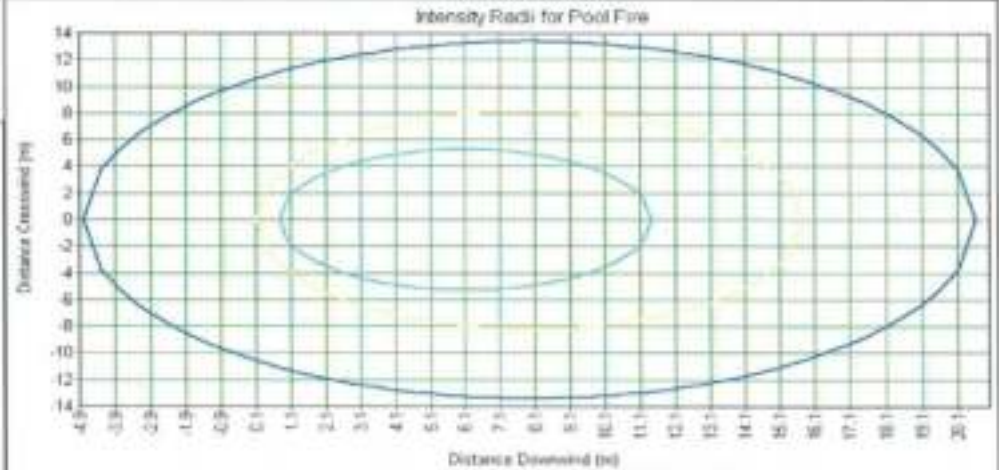
Study Folder: Mundra QRA  
Audit No: 12370  
Model: Minor leak Naphtha  
T:01  
Weather: 2 F  
Material: Naphtha

— Wind Direction  
— Ellipse @4 kW/m2  
— Ellipse @12.5 kW/m2  
— Ellipse @37.5 kW/m2



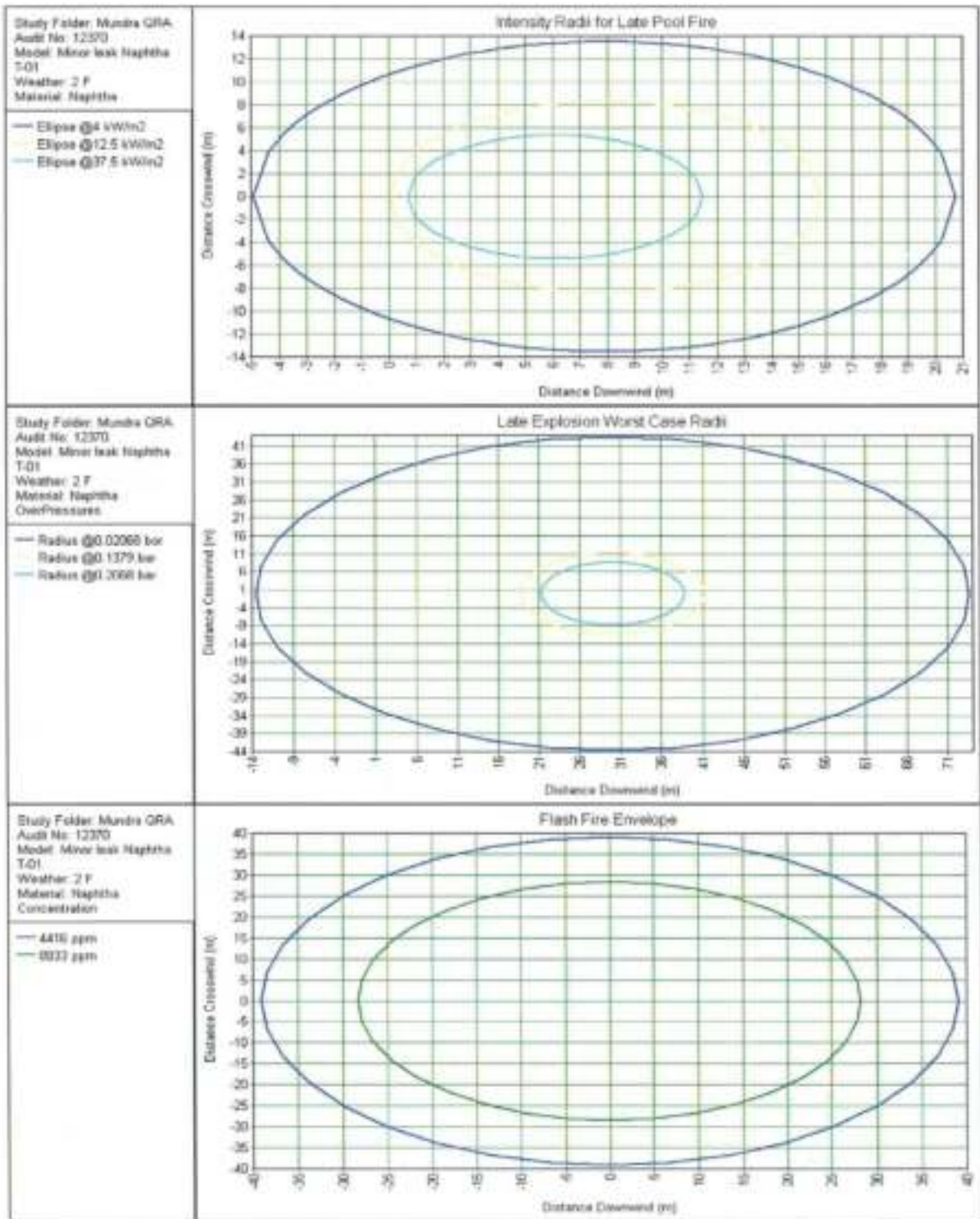
Study Folder: Mundra QRA  
Audit No: 12370  
Model: Minor leak Naphtha  
T:01  
Weather: 2 F  
Material: Naphtha

— Ellipse @4 kW/m2  
— Ellipse @12.5 kW/m2  
— Ellipse @37.5 kW/m2



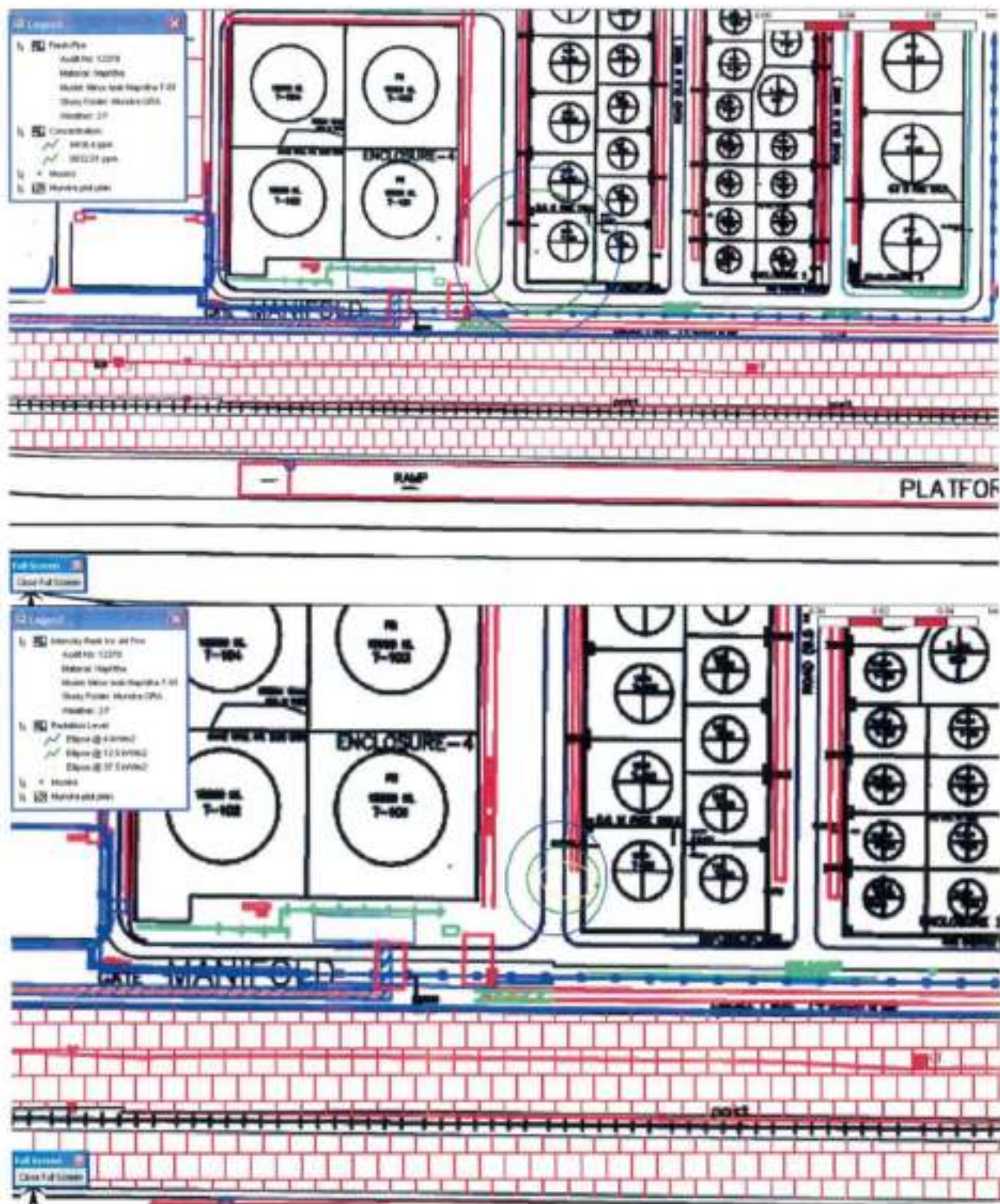


ON SITE EMERGENCY PLAN (Port Area)



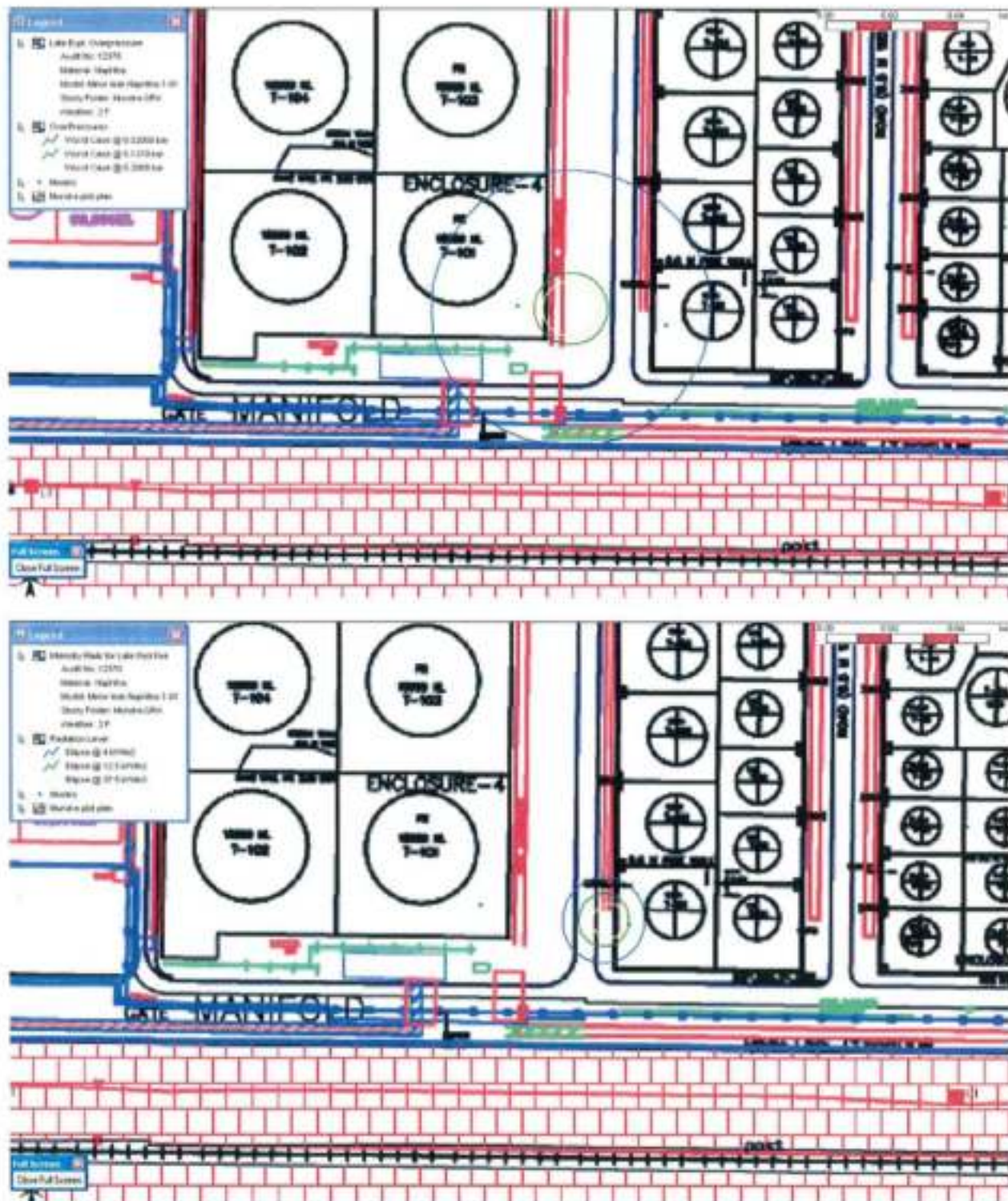


ON SITE EMERGENCY PLAN (Port Area)



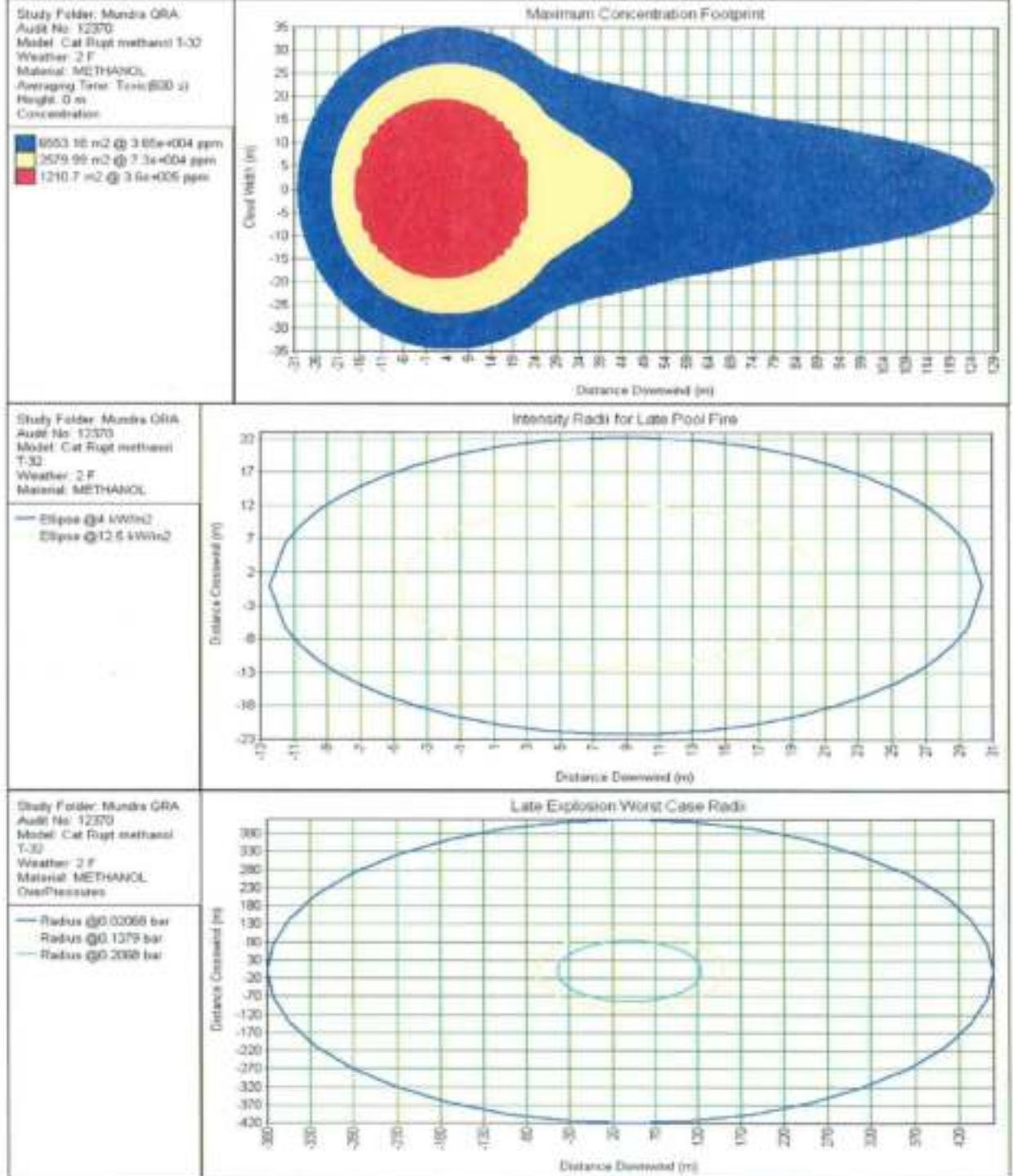


ON SITE EMERGENCY PLAN (Port Area)



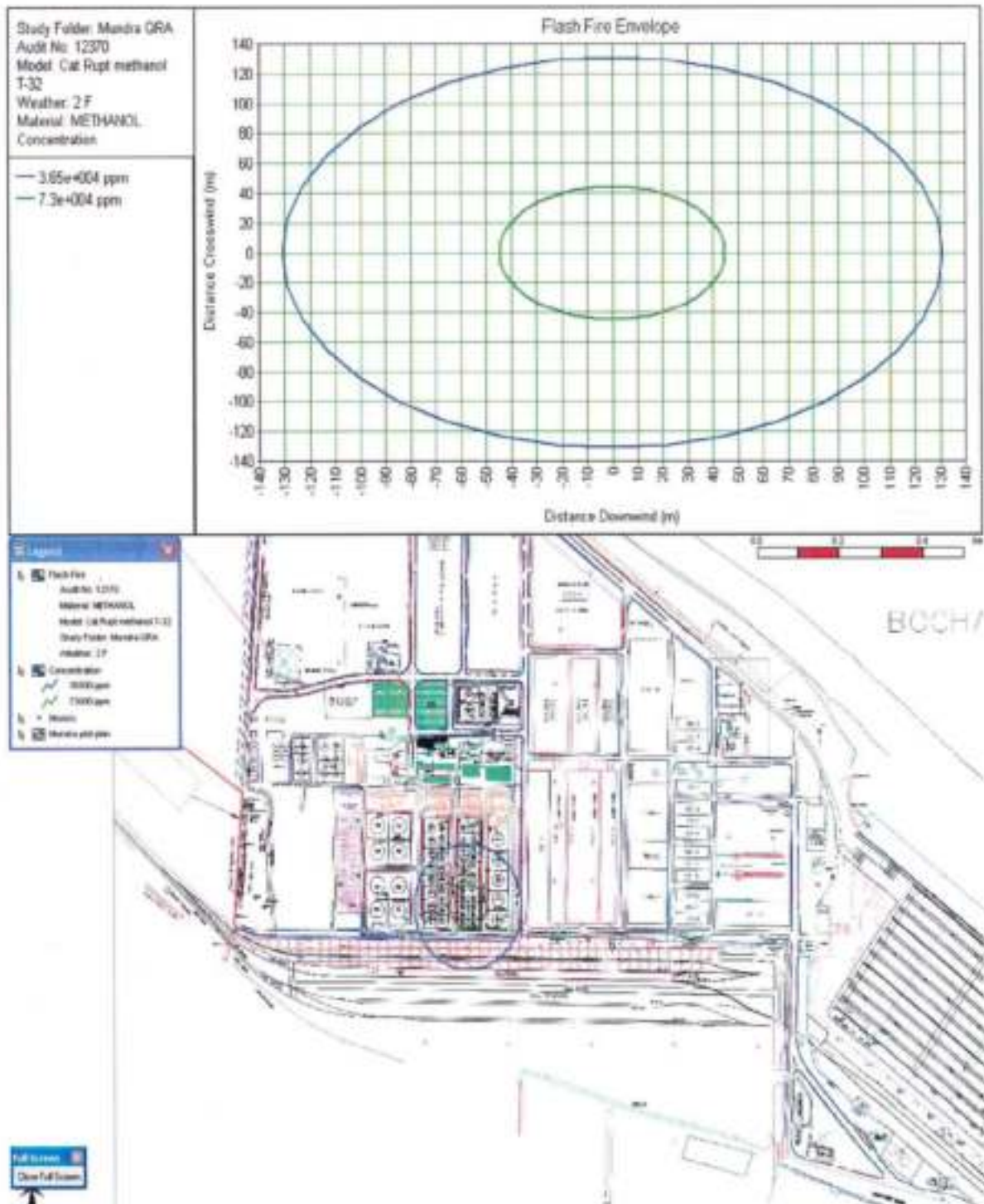
ON SITE EMERGENCY PLAN (Port Area)

Scenario No.:7

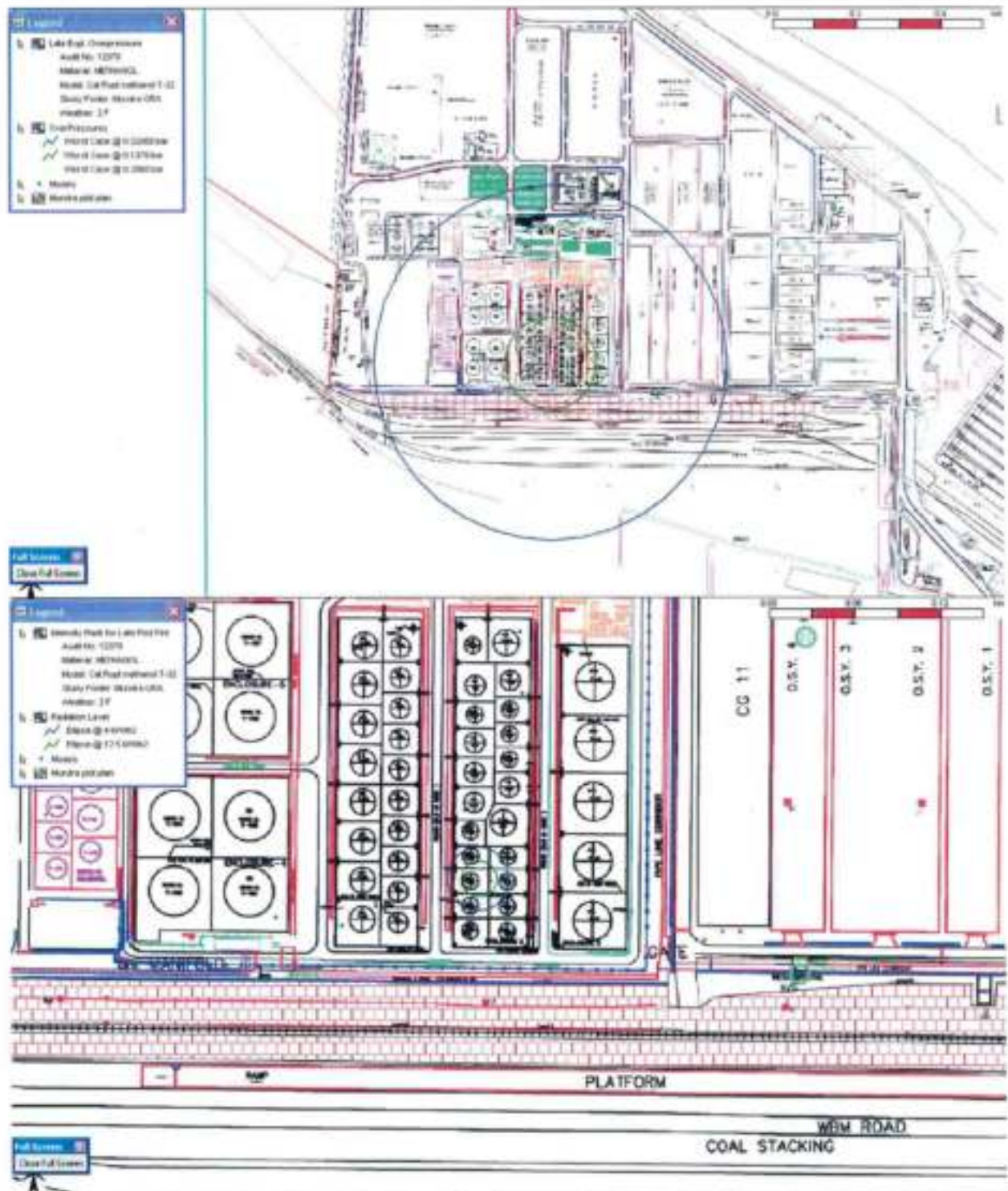




ON SITE EMERGENCY PLAN (Port Area)

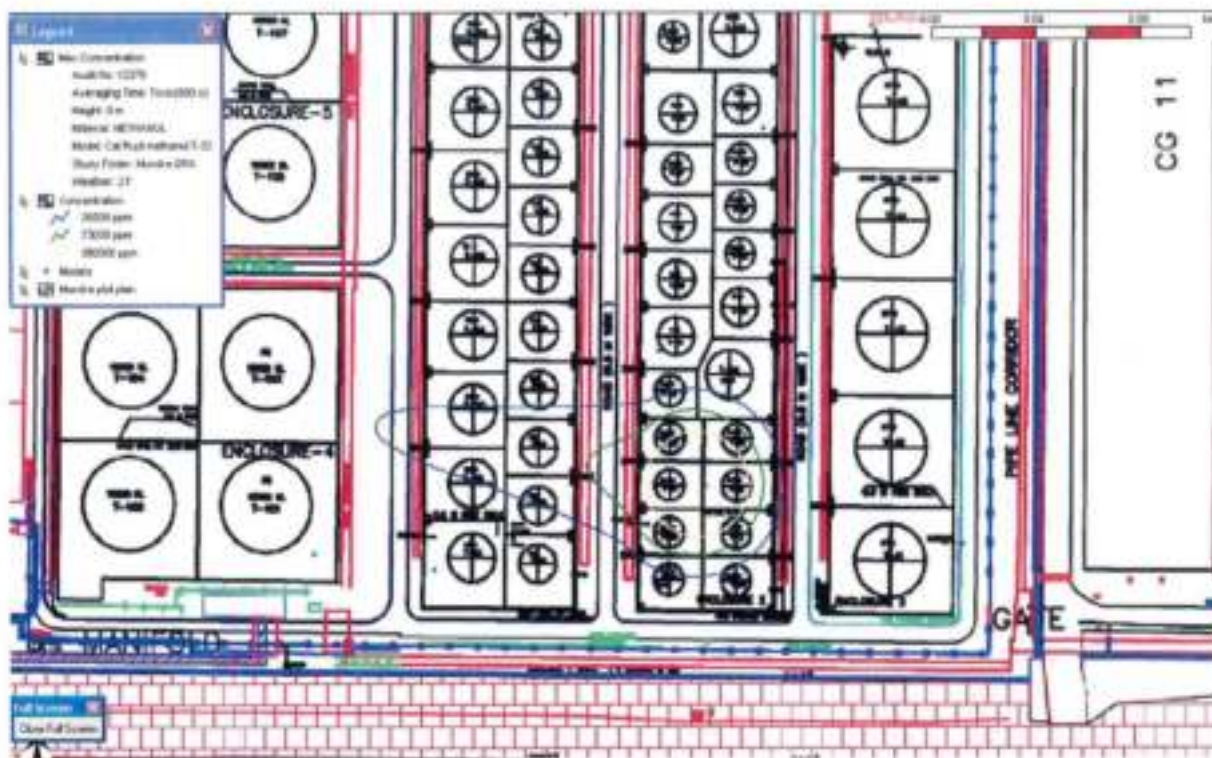


## ON SITE EMERGENCY PLAN (Port Area)

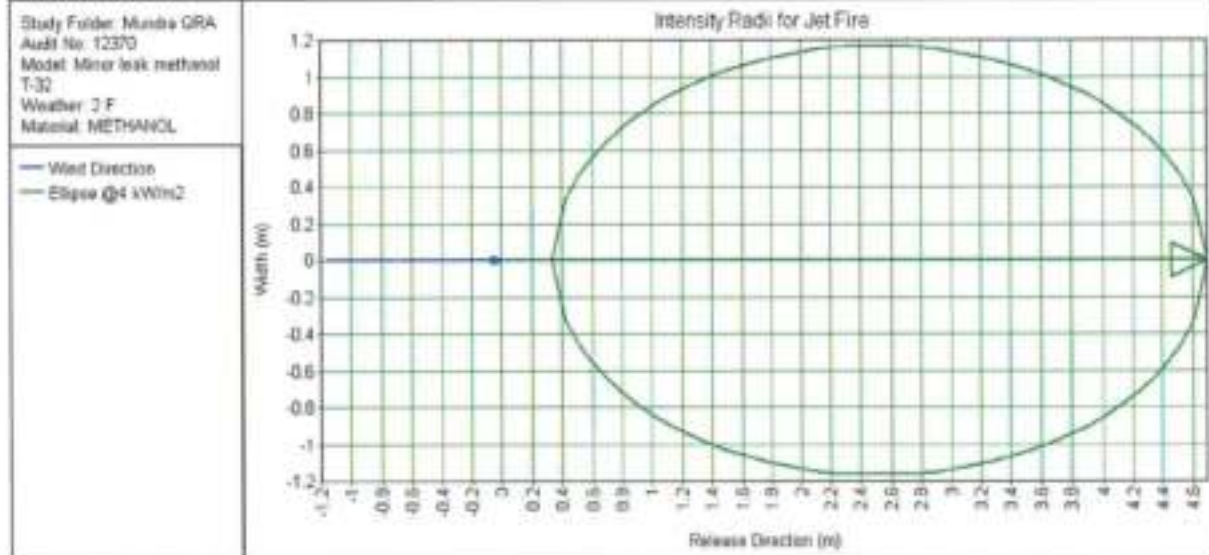




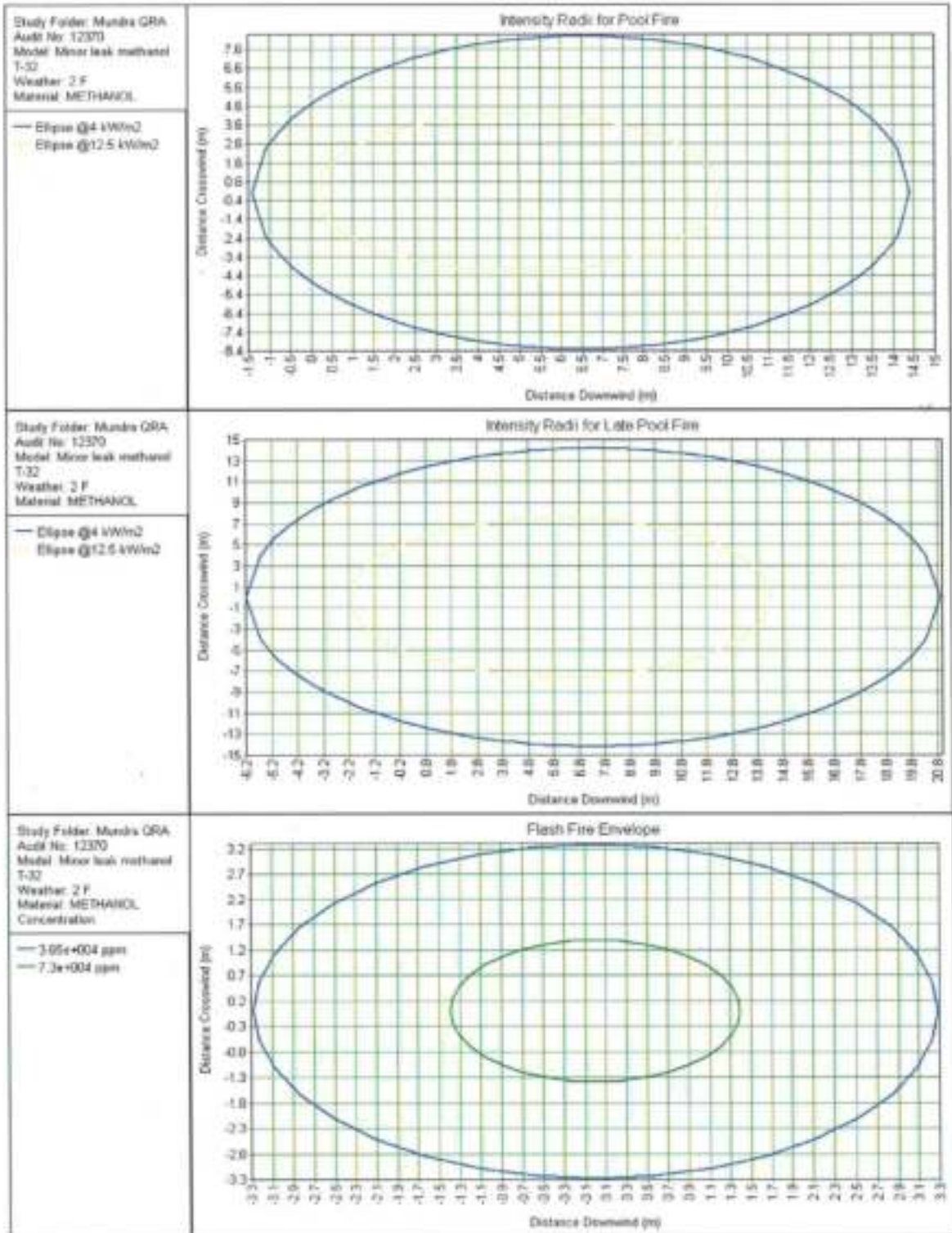
ON SITE EMERGENCY PLAN (Port Area)



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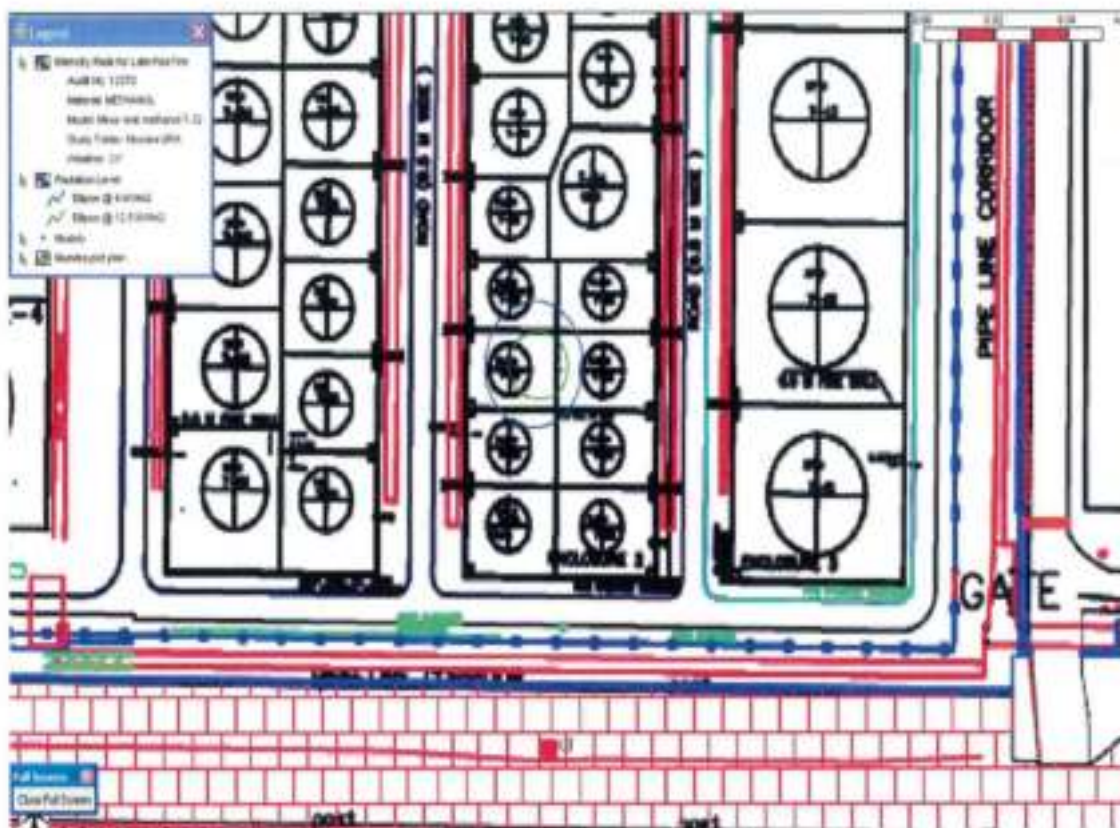


### ON SITE EMERGENCY PLAN (Port Area)

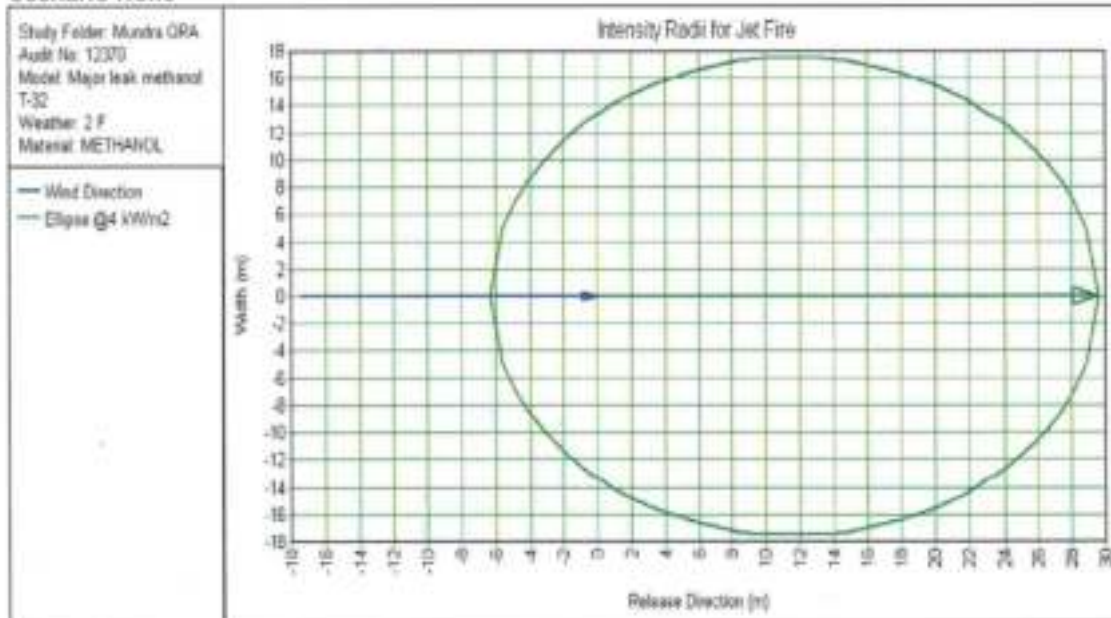




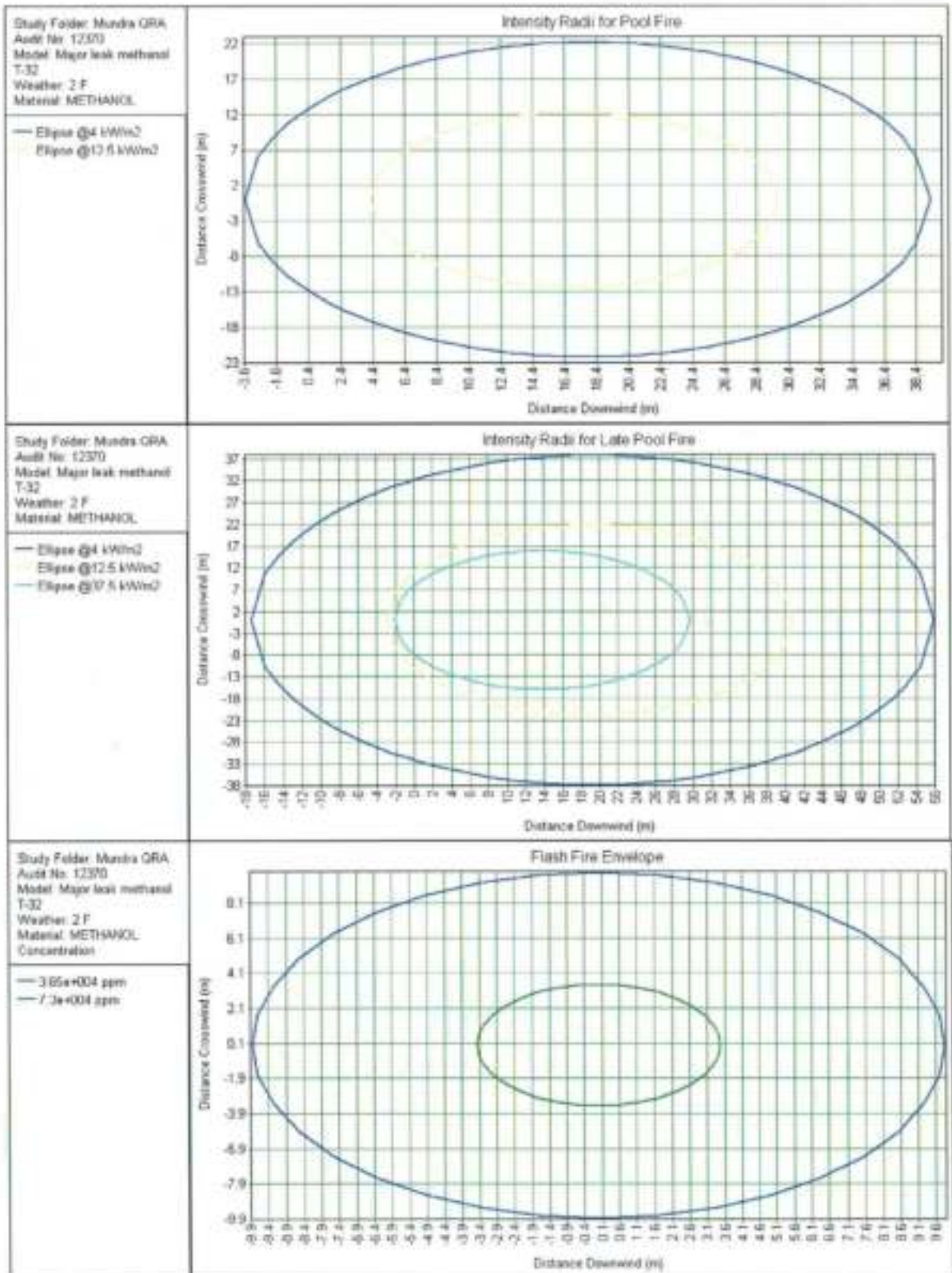
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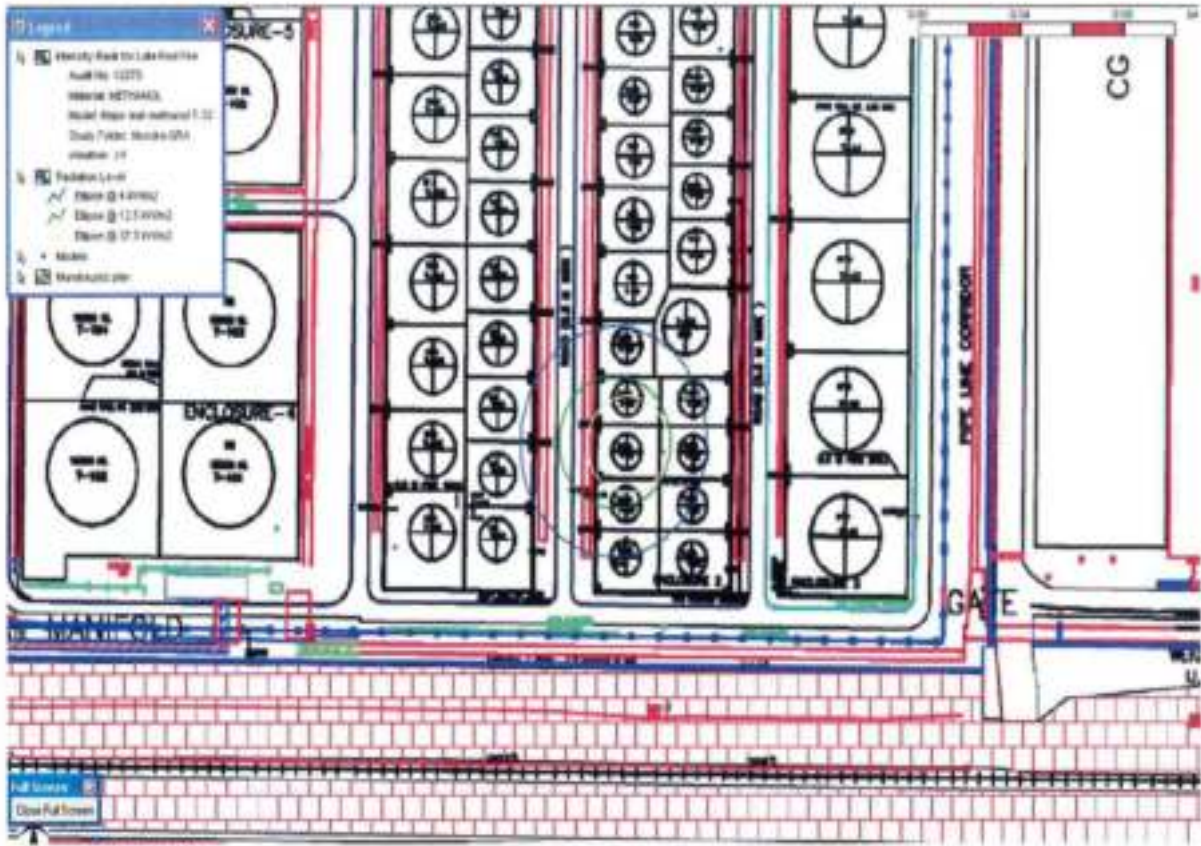


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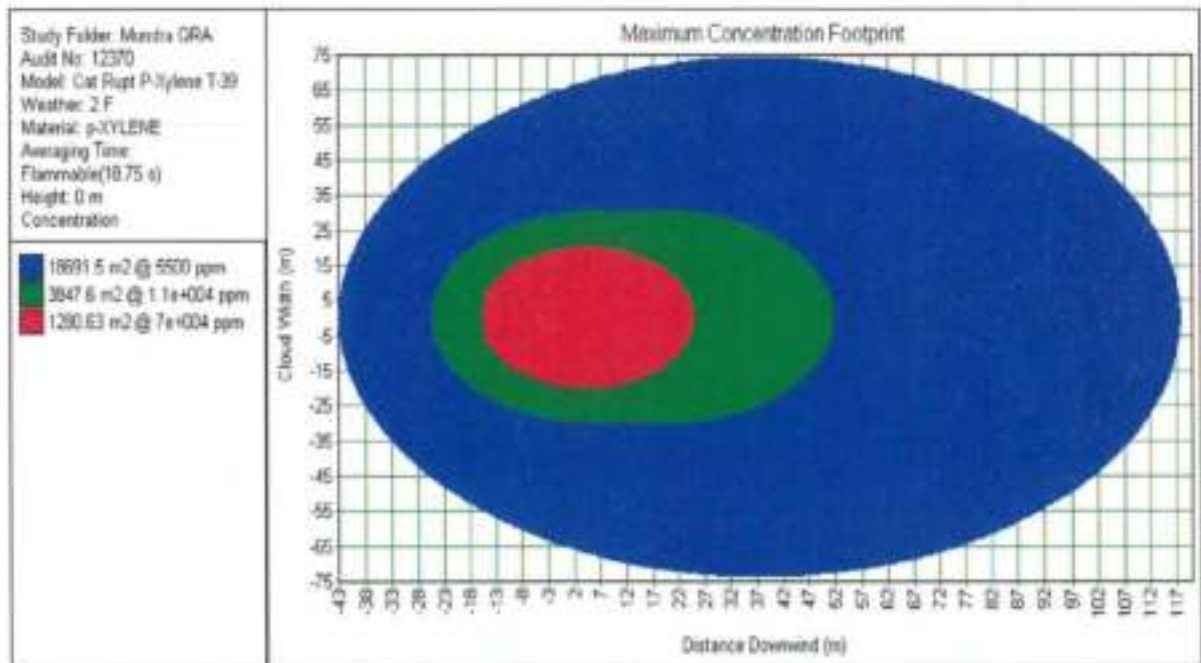




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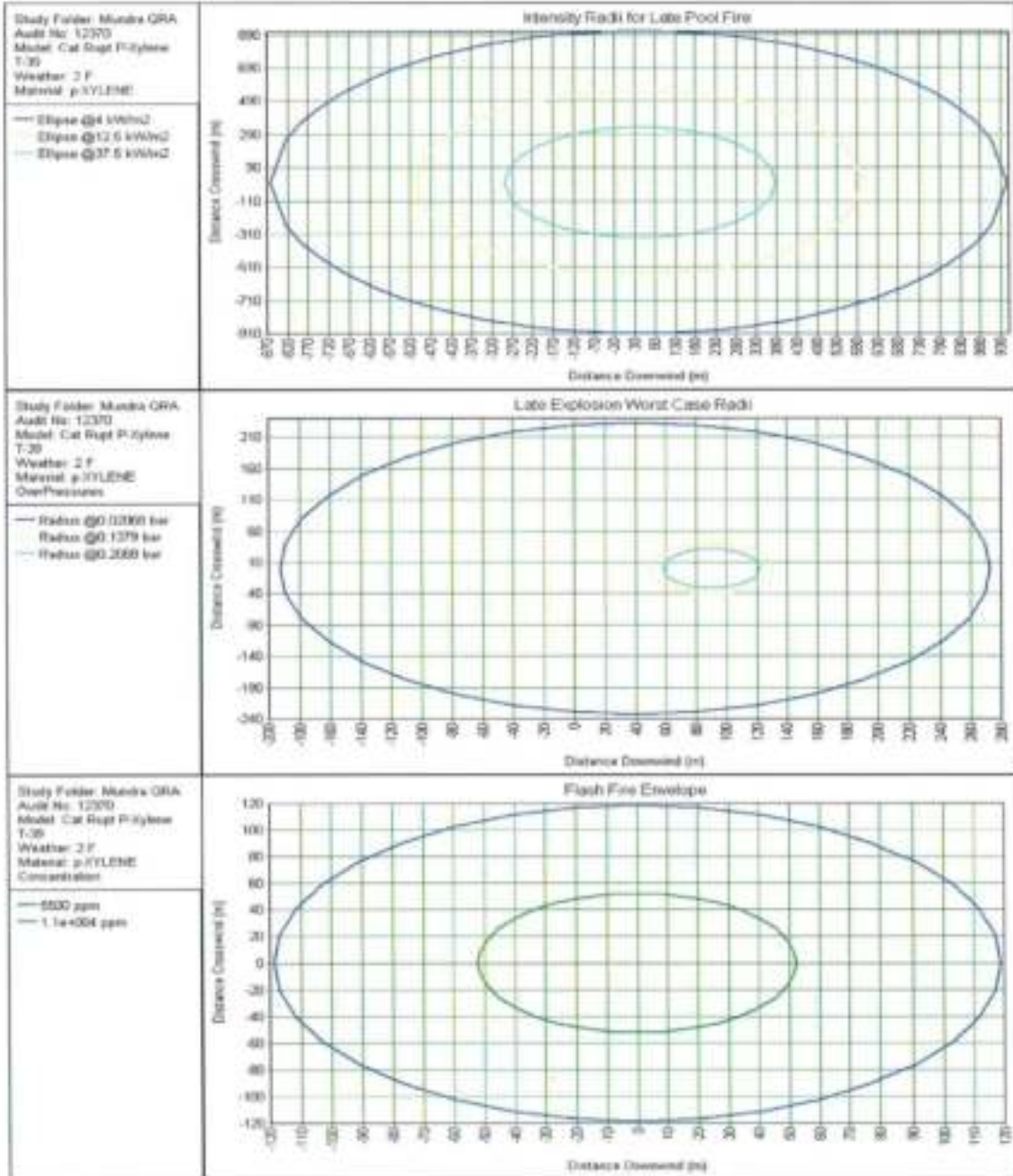


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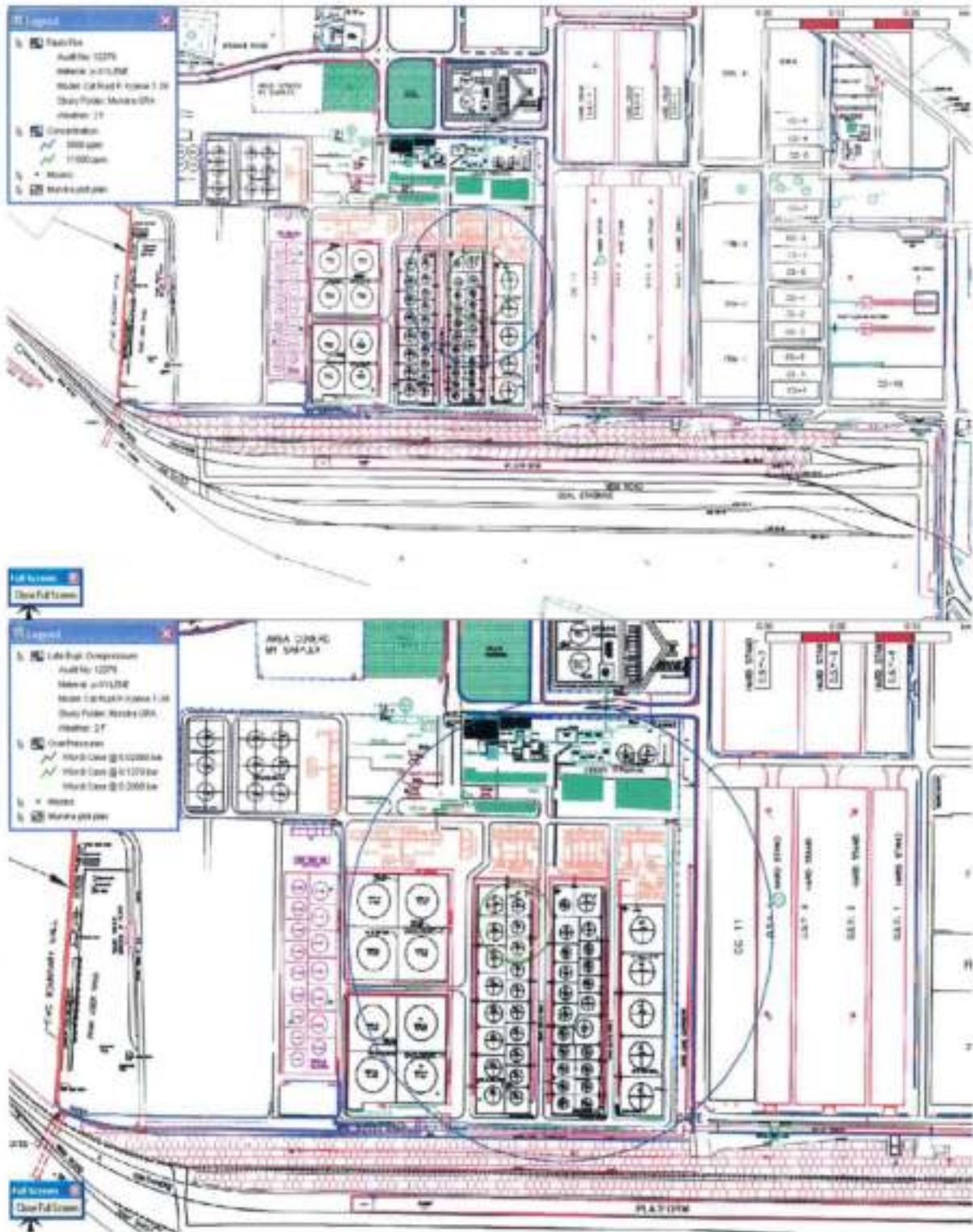




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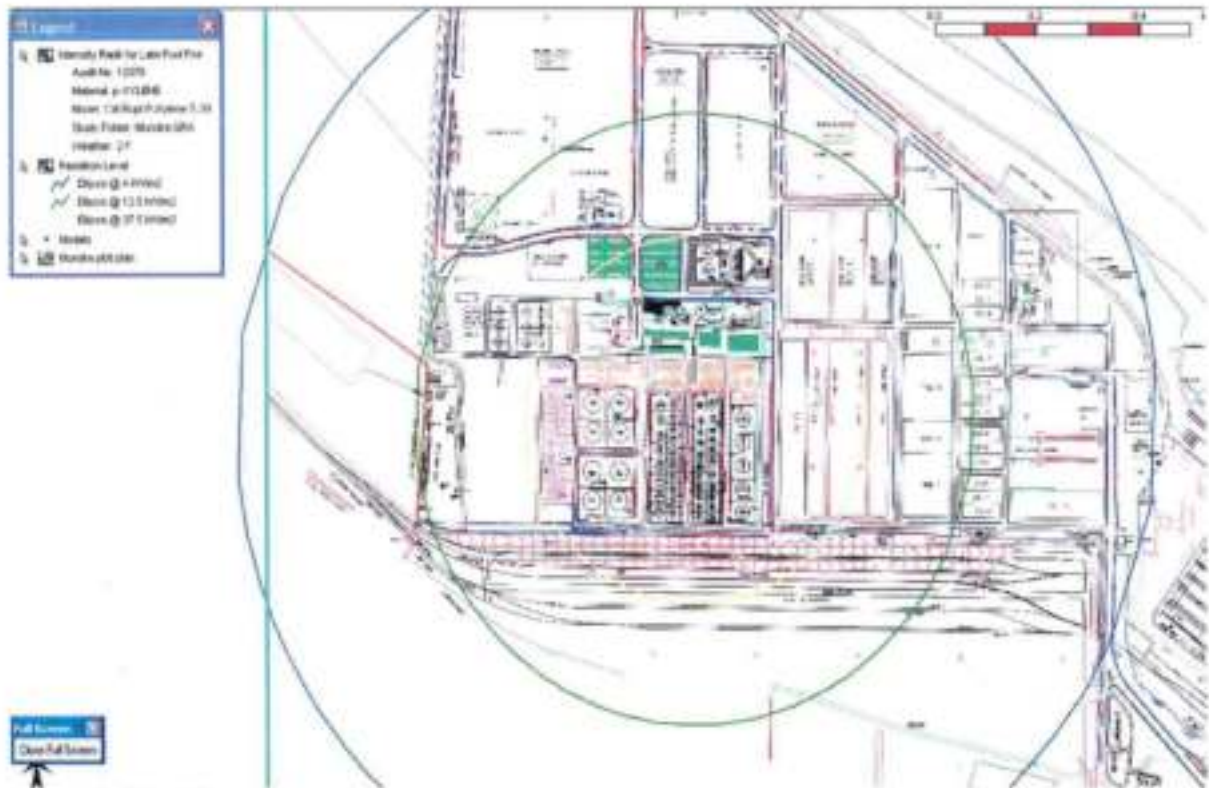


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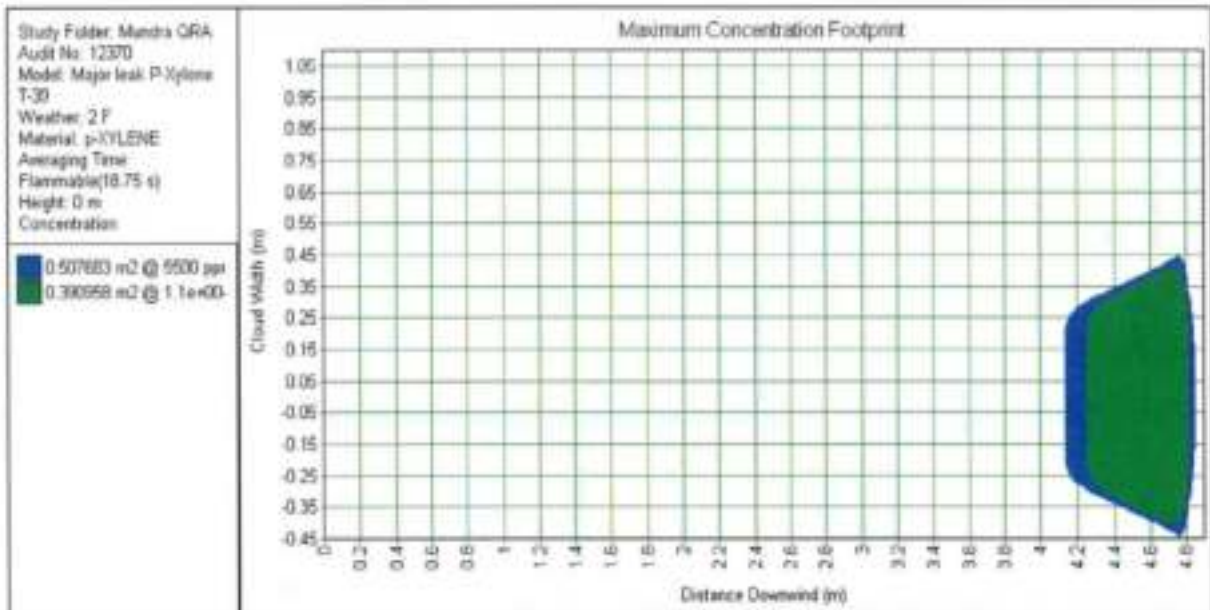




ON SITE EMERGENCY PLAN (Port Area)

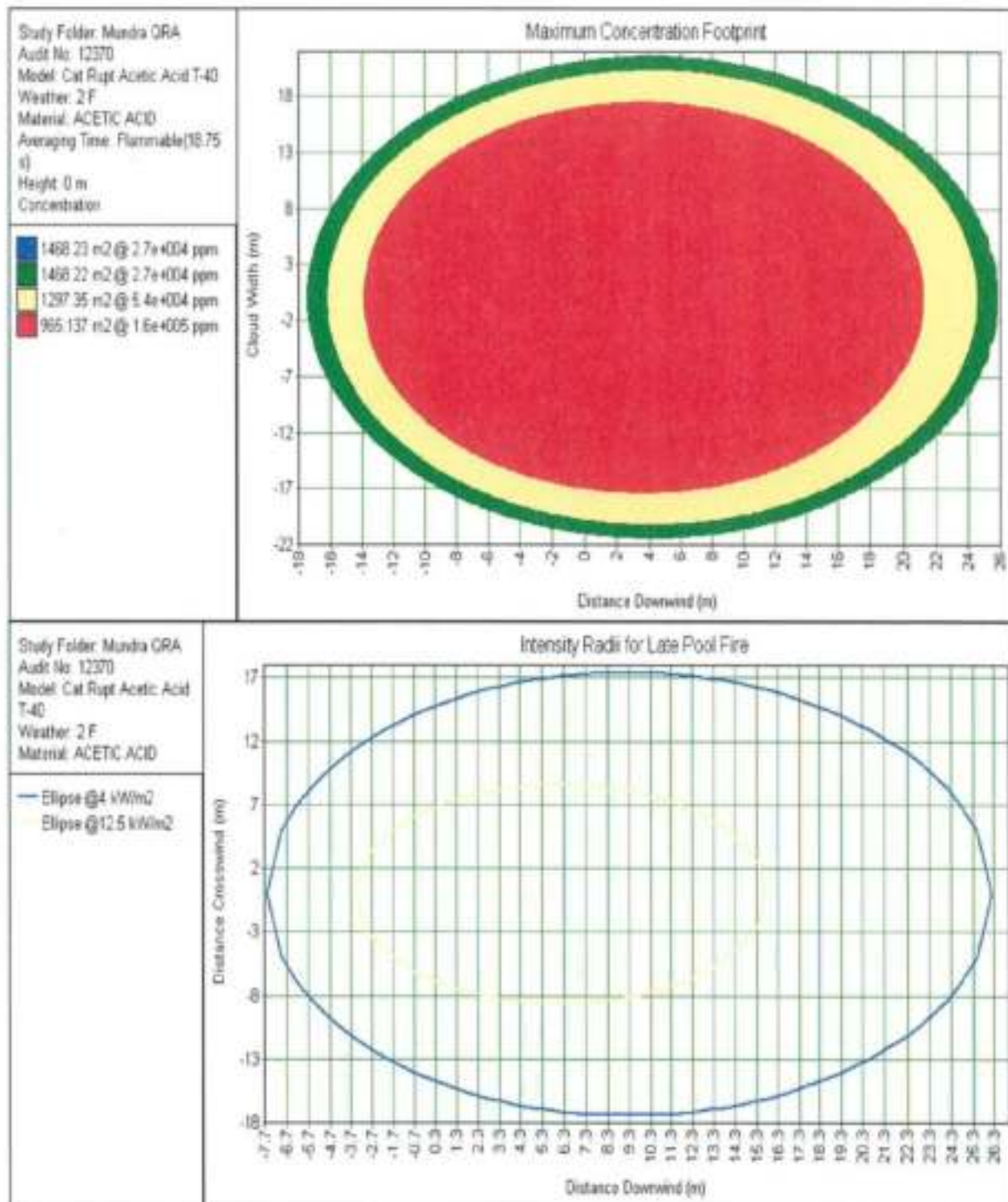


Scenario No.:11



ON SITE EMERGENCY PLAN (Port Area)

Scenario No.: 4



	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b> MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (Port Area)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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## **CHAPTER NO. III**

### **ABOUT EMERGENCY ORGANISATION**

#### **CONTENTS**

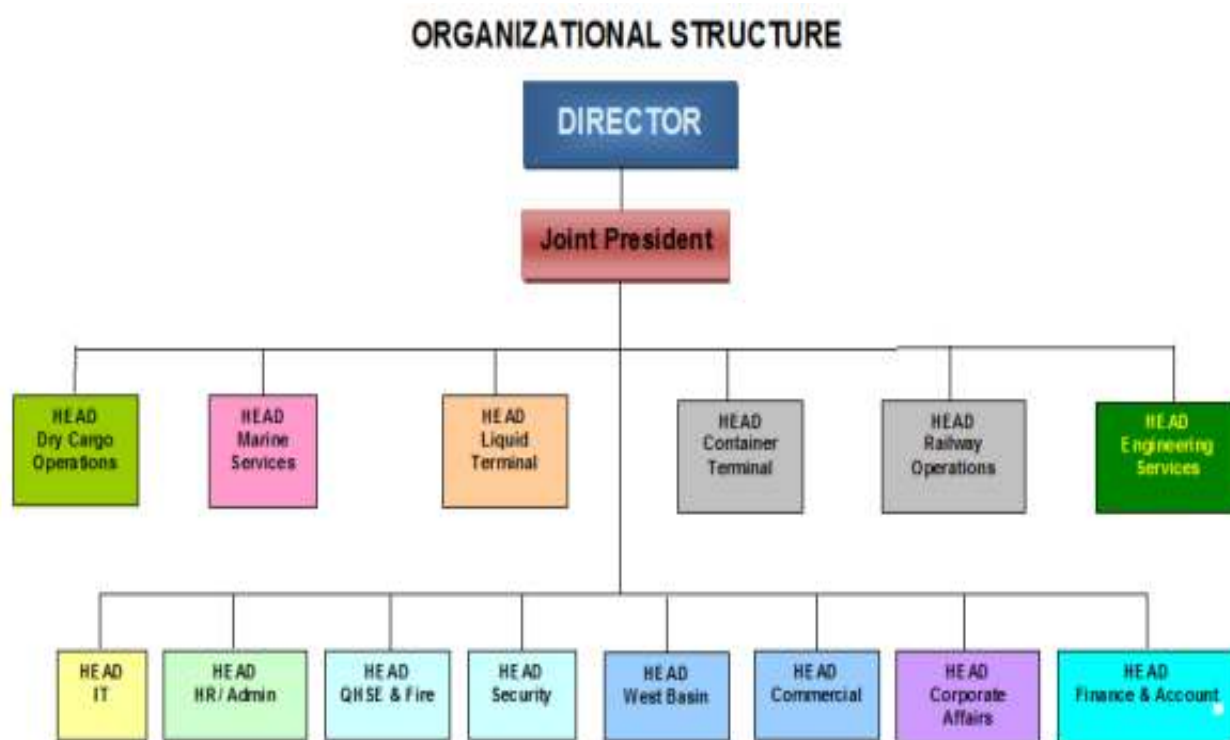
3.00	ABOUT EMERGENCY ORGANIZATION
3.01	SCOPE & PURPOSE
3.02	THE NEED OF DISASTER PLANNING AT APSEZ
3.03	EMERGENCIES - CLASSIFICATION OF EMERGENCES
3.04	EMERGENCY RESPONSE ORGANIZATION
3.05	EMERGENCY REPORTING LINE
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3.12	COMMUNICATION & PUBLIC AFFAIRS
3.13	PUBLIC AFFAIRS



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### 3.0 EMERGENCY ORGANIZATION

Emergency organization is the main aim behind preparing this plan. Due weight is added to select and assign suitable responsibilities to the most appropriate persons of the **Adani Port, Mundra** from respective departments. Care is taken to earmark emergency duties from their day-today responsibilities. The organization shall prove effective if activities are carried-out in a defined way. To get maximum advantage of emergency organization, we have defined the activities of various workers in the following way.



TERMS	DEFINITION
<b>Emergency Control Center</b>	In the event of an emergency, Port Operation Center has been declared as Emergency Control Center (POC). Port Operation Center (POC) is situate at Marine Control, <b>Adani Ports &amp; SEZ Ltd.</b>

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<b>Coordinator</b>	HOD or senior most functionaries in the respective services and other critical personnel available at site at the time of an emergency. They will report at the Emergency Control Center, unless and otherwise instructed by the site main controller.
<b>Plant Key Person</b>	Head of Department of individual process plant(s). {Should assume charge of Site Incident Controller in case of an emergency in their respective plant(s)}.
<b>Non-Essential Personnel</b>	Consists of employees, contractor's employees, visitors etc. (other than emergency response personnel) present at the incident site. In the event of an emergency, these persons shall assemble at the emergency assembly point of the plant/ area and shall respond as instructed by the site incident controller.

### 3.01 SCOPE & PURPOSE

**SCOPE** :: The very purpose of this plan is to activate the emergency response organization smoothly and effectively, once the emergency is declared. The plan details the arrangements for responding to emergency scenarios, covering in details the following aspects:

- ❖ To assess and define emergency including level of risk.
- ❖ To contain the incident and bring it under control.
- ❖ To coordinate with mutual aid members and Government authorities.
- ❖ To minimize damage to lives, property and the environment.
- ❖ To rescue and evacuate workers to safe areas.
- ❖ To provide necessary assistance to casualties.

### PURPOSE :

**The purpose of this plan is to:**

- ❖ Establish & define roles of coordinators, key personnel and other emergency response personnel.

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- ❖ Establish guidelines for effective response to any emergency.
- ❖ Ensure a smooth interface between various emergency procedures and the APSEZ Emergency Action Plan.

**For this plan to be effective, it is necessary that:**

- ❖ Coordinators, key personnel and other emergency response personnel are familiarized with this action plan.
- ❖ On-site resources are mobilized in minimum time.
- ❖ Assistance from outside agencies is readily available.
- ❖ The drills for identified emergencies are regularly exercised.
- ❖ The emergency responses are reviewed and updated based on latest developments, other information and requirements in order to improve effectiveness of the APSEZ – EAP.

### **3.02 THE NEED OF DISASTER PLANNING AT APSEZ (Port Area)**

**Disaster at The Port :** A major emergency in Port is one, which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the port. Sometimes, it would require the assistance of outside emergency services to handle it effectively. Although an emergency may be caused by a number of different factors, viz plant failure, human error, earthquake, Cyclone, flood, vessel collide, vehicle crash, major spillage or sabotage, it will normally manifest itself in three basic forms viz - Fire, Explosion or toxic release.

**Need of Disaster Planning :** In spite of universal acceptance of excellent codes of practices for design and operation of plants and storage, there have been occurrences of a number of losses due to major incidents of varying degree of severity. In fact, no industrial plant or office and no commercial or mercantile organization can be totally immune from disaster. These disasters could be attributed to various causes including failure of adherence to codes of practice. The first few minutes after an emergency situation occurs are generally the most critical. The wrong action or a few seconds delayed action in crises can make all the difference. A quick and effective response at that time can have tremendous significance on whether the situation is controlled with little loss or whether it turns into a disaster. Contingency planning increases thinking accuracy and reduces thinking time in an emergency, which reduces loss. The effectiveness of what we should do if disaster strikes will depend upon how well we have prepared the contingency plans and trained the people who will have to implement them. Even if the plans generated and equipment provided are never used, the very fact that the

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plans have been developed and equipment have been provided creates confidence among employees and from an economic point, may reduce the insurance rates. The Social and legal consequences of —Bhopall Gas Tragedy have sufficiently demonstrated that these considerations alone are important enough to persuade management of hazardous plants to develop suitable plans. Thus disaster is a situation generally arising with little or no warning and causing or threatening death, injury or serious disruption to people and services which cannot be controlled, by fire, police and services operating alone. The incident will require special mobilization and co-operation of other bodies and voluntary organization.

### 3.03 EMERGENCIES - CLASSIFICATION OF EMERGENCES

Different types of emergencies that may arise at the Port can be broadly classified as:

**a) Nature – I (On – Site Emergency)** – It can be further subdivided into two levels:

**Level – I** The emergency is perceived to be a kind of situation arising due to an incident which is confined to a small area and does not pose an immediate threat to life and property and this can be handled with resources available within premises.

**Level – II** The emergency is perceived to be a kind of situation arising due to an incident which poses threat to human lives and/ or property, having potential to affect large area within the factory premises. This kind of situation is beyond the control of internal resources and requires mobilization of additional resources from other sections/ departments and help from outside agencies. The situation requires declaration of On – Site emergency.

**b) Nature – II (Off – Site Emergency)**

The emergency is perceived to be a kind of situation arising out of an incident having potential threat to human lives and property not only within Port but also in surrounding areas and environment. It may not be possible to control such situations with the resources available within APSEZ. The situation may demand prompt response of multiple emergency response groups as have been recognized under the District Emergency plan for Kutch. A similar situation in neighboring industry that may affect The Port Area and also falls under this category.



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## POTENTIAL EMERGENCIES

Sr. No.	Emergencies
1.	Cyclonic Storm/ Hurricane
2.	Earthquake
3.	Tsunami
4.	Flood
5.	Industrial unrest
6.	Bomb Threat
7.	War
8.	Food/ Water Poisoning
9.	Fire , Transportation Incidents involving Hazardous Materials
10.	Major Release of Flammable/ Toxic Chemicals
11.	Major Release of Flammable/ Toxic Gases
12.	Transportation Incidents involving Hazardous Material
13.	Marine Emergency

### 3.04 EMERGENCY RESPONSE ORGANIZATION

For control of an emergency, **Adani Port - Mundra** has established an emergency response organization headed by **COO (alternate – next Sr. Officer In-charge)**, who shall be the Site Main Controller. This emergency response organization will provide the command and control structure to coordinate and direct the response to an emergency, and depending on the circumstances of the emergency will consists of:

<p style="text-align: center;"><u><b>Management Team</b></u></p> <p><b>Director / CEO / COO (Site Main Controller)</b></p> <p><b>QHSE – HOD or senior most functionary of the department</b></p> <p><b>Site Incident Controller – HOD or senior most functionaries available at site</b></p> <p><b>Deputy Site Incident Controller – Section Head</b></p>
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### Primary Support Team

**Coordinators (HOD or senior most functionaries)**

- Fire Services
- QHSE
- Security Services
- Occupational Health Center
- Engineering Services
- Human Resource
- Administration

### Secondary Support Team

**Coordinators (HOD or senior most functionaries)**

- Finance & Accounts
- Commercial
- Administration (Transport Cell)
- Administration (Welfare & Canteen)
- Corporate Communication

Only Site Main controller can activate the emergency response organization. An Emergency Control Center has been established in the office of Site Main Controller (Alternate – Conference Room – POC).

**The primary role of the emergency response organization in an emergency shall be:**

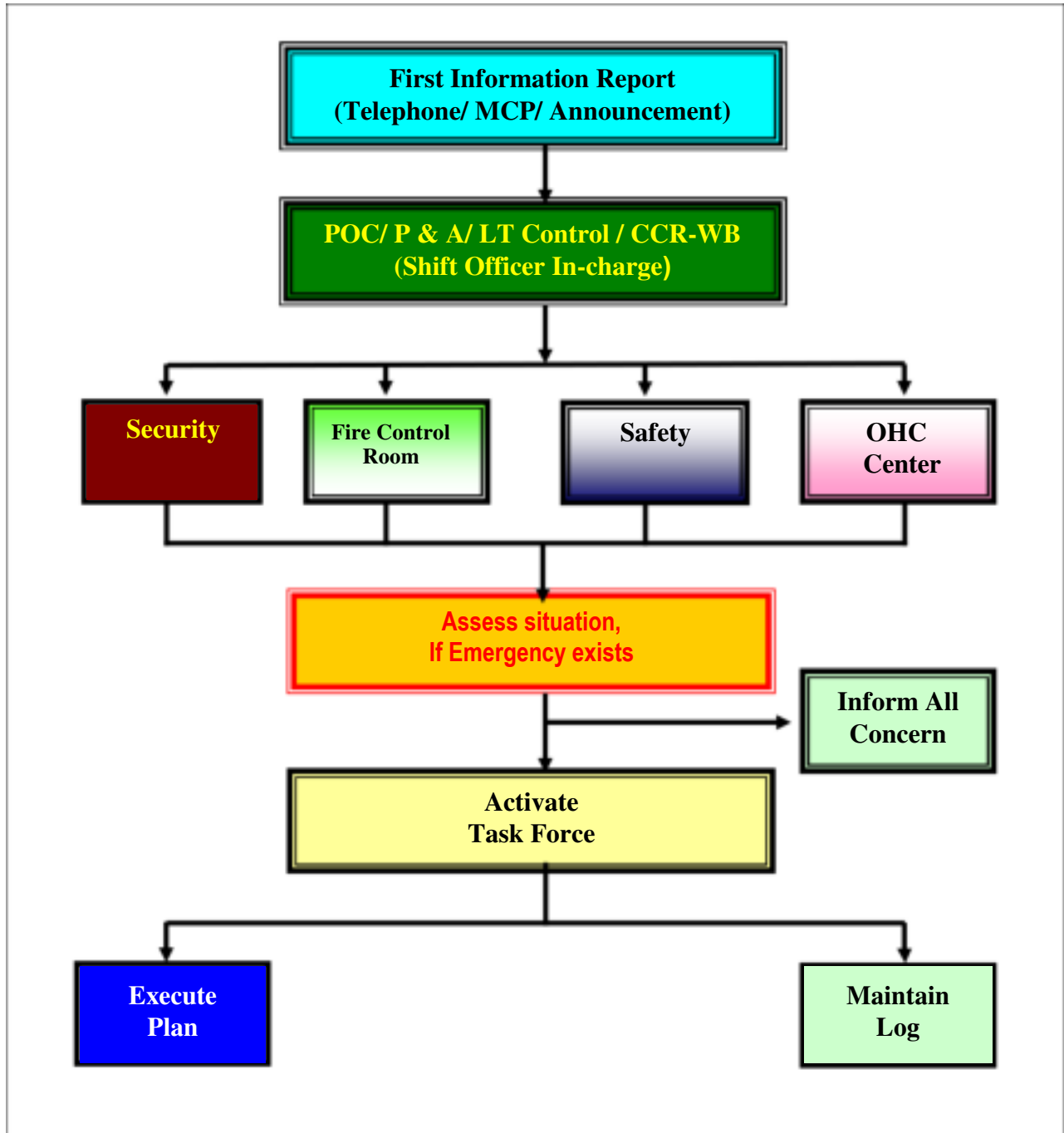
- ❖ Determine the degree to which the emergency response organization shall be activated.
- ❖ Determine extent of actual action required, organize and render assistance to Site Incident Controller.
- ❖ Coordinate with all other concerned.

Emergency Reporting Line is as outlined in **Chart B**.

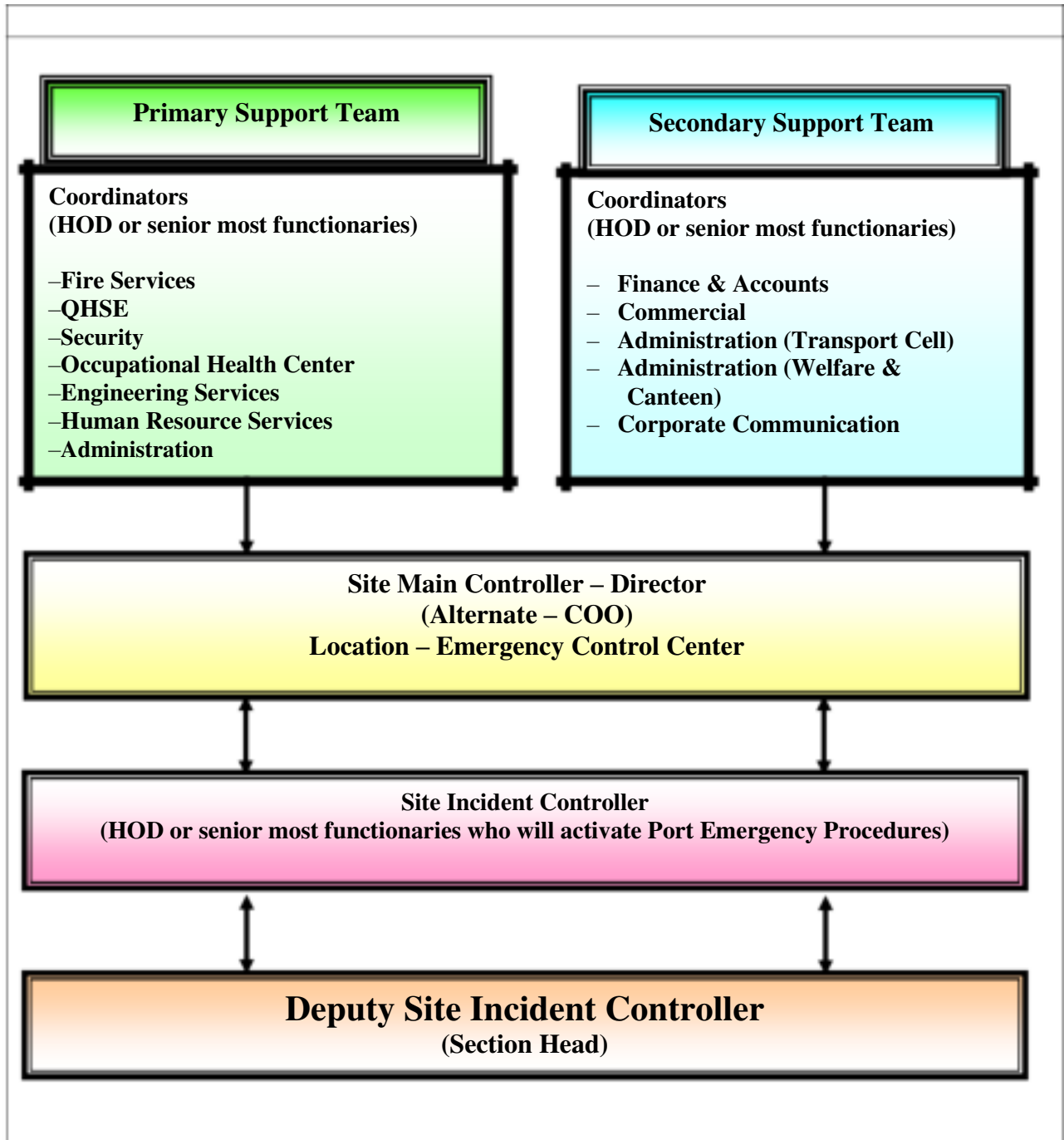
Emergency Task Force is as outlined in **Chart C**.

Emergency Assembly Points are as outlined in **Chart D**.

### 3.05 EMERGENCY REPORTING LINE




## EMERGENCY TASK FORCE



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### 3.06 ASSEMBLY POINTS

ASSEMBLY POINT	
 <b>EMERGENCY ASSEMBLY POINT</b>	
<b>Port Emergency Assembly Points</b>	
PORT AREA	
ZONE	AREA
ZONE – 1	Marine House
ZONE – 2	CG-7
ZONE – 3	Driver Canteen
ZONE – 4	Old Administration Canteen
ZONE – 5	Railway Building (R & D Yard)
ZONE – 6	Terminal – 2 (Security Gate)
ZONE – 7	Container Terminal - 2 (Security Gate)
ZONE – 8	Main Gate
ZONE – 9	Port User Building
ZONE – 10	Adani House
ZONE – 11	Terminal – 03 (Security Gate)
ZONE – 12	South Basin (Security Gate)
WEST BASIN AREA	
ZONE – 1	SS-1
ZONE – 2	PMC Office
ZONE – 3	GIS (Near DG House)
ZONE – 4	Main Gate
ZONE – 5	Approach - 03
ZONE – 6	Amenities Building
<b>Non-essential personnel shall assemble at Emergency Assembly Point as announced by Site Incident Controller.</b>	



### 3.07 CATEGORIES OF EMERGENCIES

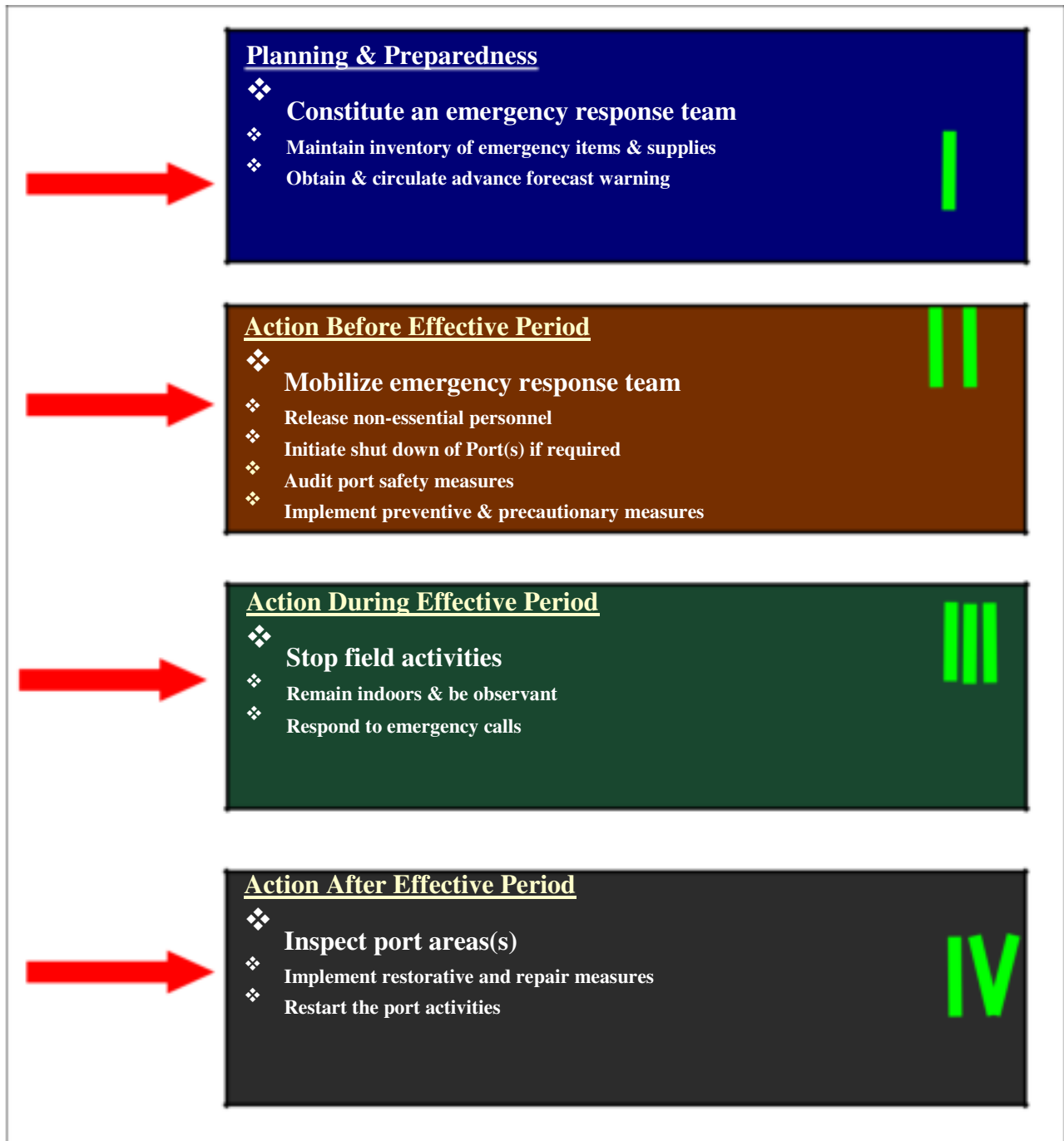
**The general action plan to deal with:**

- Emergencies (Category wise) are as outlined in **Chart –E.**
- Emergencies (Occurrence - with due warning) are as outlined in **Chart –F.**
- Emergencies (Occurrence – sudden) are as outlined in **Chart –G.**

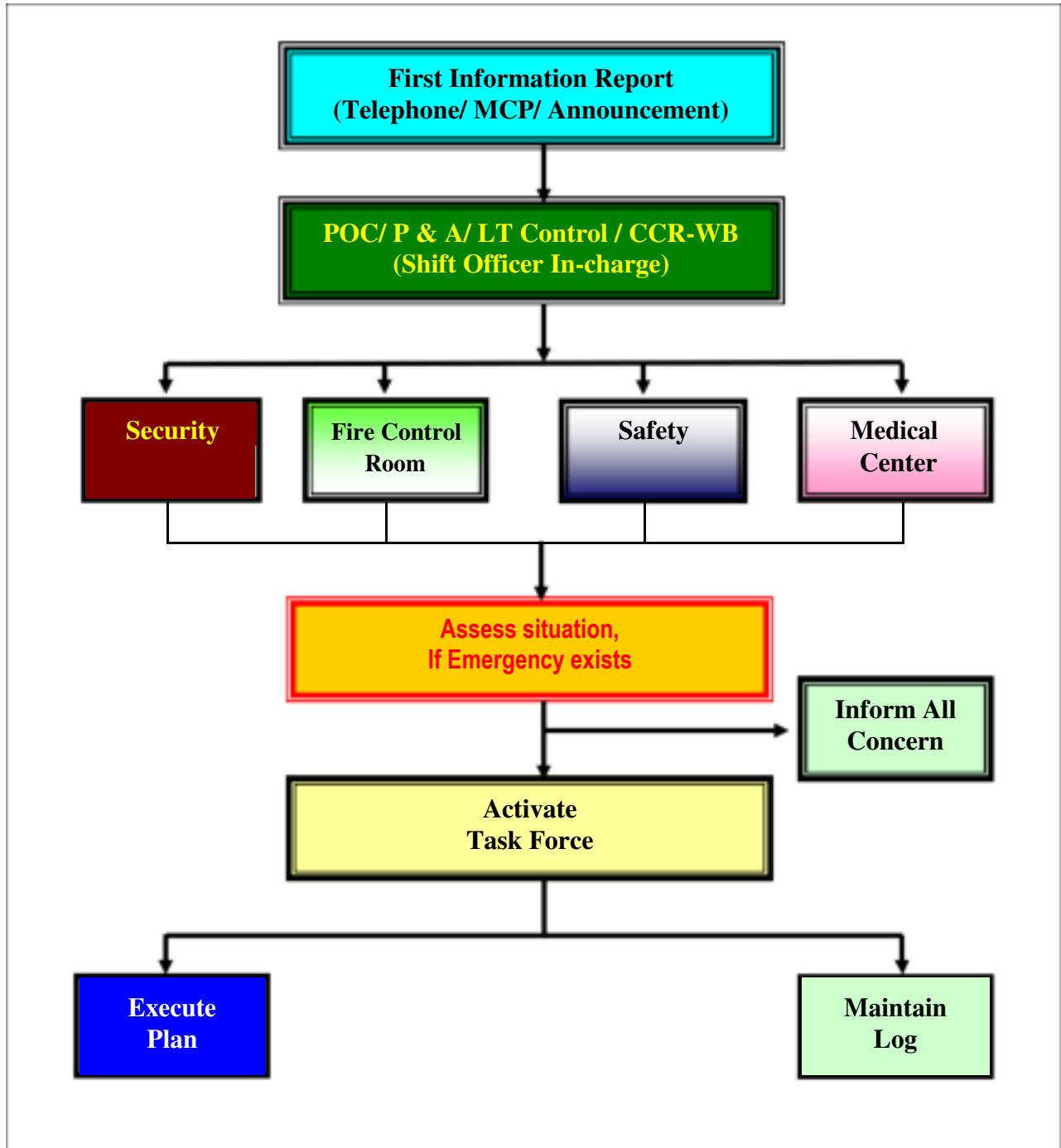
#### EMERGENCIES CATEGORY WISE

<b>Emergencies (Occurrence – with due warning)</b>	<b>Emergencies (Occurrence – without warning)</b>
<div style="background-color: #FFC0CB; padding: 10px;"> <p><b>Cyclonic Storm/ Hurricane</b></p> <ul style="list-style-type: none"> <li>❖ Earthquake</li> <li>❖ Flood</li> <li>❖ Tsunami</li> <li>❖ Industrial Unrest</li> <li>❖ Bomb Threat</li> <li>❖ War</li> </ul> </div>	<div style="background-color: #CCCCFF; padding: 10px;"> <p><b>Food/ Water Poisoning</b></p> <ul style="list-style-type: none"> <li>❖ Fire</li> <li>❖ Major Release of Flammable/ Toxic Chemicals</li> <li>❖ Major Release of Flammable/ Toxic Gases</li> <li>❖ Transportation incidents involving Hazardous Materials</li> <li>❖ Marine Emergency</li> </ul> </div>

**GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITH DUE WARNING)**



**GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITHOUT WARNING / SUDDEN)**



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### 3.08 DUTIES & RESPONSIBILITIES

#### 3.8.1 Site Main Controller :

- Has overall responsibility for the conduct of all emergency operations within the port complex.
- Shall immediately assess the situation plus its consequences, formally declare the level of emergency and order appropriate action.
- Shall direct all emergency operations within the port premises with the following priority:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall ensure all possible assistance to personnel affected for medical attention and hospitalization as appropriate.
- Shall ensure that all local and statutory authorities are kept advised of the facts and status.
- Shall ensure that normalcy is declared only when considered absolutely safe to do so.
- Shall be responsible for making available all possible company resources for emergency operations within Mundra Taluka and Bhuj District, if required/ requested by the appropriate Government Authority or —Mutual Aidll organization.

#### 3.8.2 Site Incident Controller

- Shall immediately assess the scale of emergency and report to Site Main Controller for instructions/ directions.
- Shall be responsible for operations in affected area with priorities as under:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall liaise with other heads of department for their support and assistance.
- Shall ensure continual reporting of situation to Site Main Controller and shall recommend calling for external resources as appropriate.

#### 3.8.3 Emergency Support Officers

- Shall report to Site Incident Controller immediately and assist him as required (all possible portable emergency equipment, resources and personnel to incident location).
- Shall liaise closely with Head- Administration to facilitate the transfer of equipment, resources and personnel to incident location as appropriate.

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#### 3.8.4 Emergency Support Officers (Cont.)

- Shall carefully evaluate the risks, effects and possible consequences of:
  - the incident to his area of responsibility and propose further course of action to the Site Incident Controller with particular concern about safety of personnel, protection of environment and control of operation
- If the emergency situation involves Railways (locomotives, tracks and/or sidings), shall inform the Area Manager of Western Railways for assistance and mobilization of the Railways Emergency Team.

#### 3.8.5 HOS – Administration (Transport Cell, Welfare & Canteen)

- Shall report to Site Incident Controller immediately and assist him as directed.
- Shall coordinate the activities of administration units.
- Shall inform and liaise with local bodies and authorities and police department in respect of the incident/ emergency.
- Shall arrange for transportation of whatever nature for use in the situation.
- Shall ensure that internal and external communication systems are available.
- Arrange for hot drinks/ snacks/ foods as requires at incident location.
- Shall arrange for assistance, if required from the —**Mutual Aid** system if available and as directed by Incident Controller.

#### 3.8.6 HOD – Human Resources

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure Assembly Points are manned and all persons reporting there properly identified.
- Shall arrange to record full details of all persons affected by the incident and to inform next of kin as appropriate.
- Shall arrange for the transfer of all affected persons to suitable places for first aid or further medical attention as appropriate.
- Shall arrange for the evacuation, from the location of incident of all personnel not essential.
- Shall arrange to depute company personnel to each location where affected persons are being treated or are gathered for whatever reasons, to render assistance.
- Shall arrange to keep regularly informed of status and facts pertaining to incident to the families of company personal in its residential area.
- Shall inform to Government Authorities (DISH, GPCB etc.)
- Liaison with Government Authorities (DISH, GPCB etc.)



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#### **3.8.7 HOD – Corporate Affairs**

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall assume the role of Public Relation Officer (PRO) for communication, dissemination of information, status and facts (preparation of communiqués, statements etc.) Shall co-ordinate with business related statutory and Government organization.

#### **3.8.8 HOD – Engineering Services**

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure activation of departmental damage limitation activities.
- Shall ensure immediate electrical isolation of the incident location thereafter; arrange availability of power after ascertaining safety of doing so.
- Shall make available all support that may be possible for the extrication/ evacuation of persons from the affected area.
- Shall liaise with the Engineering Services of organizations in close neighborhood for sourcing of supplemental equipment resources and assistance.
- Shall depute all available personnel to assist administration department.

#### **3.8.9 HOD – Commercial**

- Ensure availability of materials required by the Site Incident Controller.
- Issue materials from central stores round-the-clock (if required).
- Arrange emergency procurements from local dealers/ vendors or from neighboring industries.
- Arrange transportation of materials from central stores to the site of incident in coordination with the Coordinator (Transport Cell).

#### **3.8.10 HOD – Finance & Accounts**

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure availability of funds and cash for all emergent requirements.
- Shall depute all available department personnel to assist HR in their activities.
- Shall ensure that under writers, shareholders, lenders, bankers and other Financial Institutions and statutory bodies are kept advised of the situation as appropriate.

#### **3.8.11 HOD – Security**

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- Close the visitors' gate.
- Instruct the security to occupy pre-determined post for controlling security of installation.
- Call up additional help from Barracks.
- Ensure that unauthorized persons / vehicles do not enter the gate.

### 3.8.12 HOD – Security (Cont.)

- Ensure that unauthorized persons / vehicles do not enter the gate.
- Provide security men for firefighting & rescue.
- Arrange for transport of higher authorities to the terminal.
- Transport vehicles would be provided near emergency control center.
- Depute two security guards for controlling traffic at scene of disaster.
- Produce a list of port staff on duty in co-ordination with time office.
- Ensure availability of security men at gates so that they can lead authorities to disaster site.
- Ensure that non-essential persons do not crowd affected area.

### 3.8.13 HOS – Fire Services

- He will report to Site Incident Controller and has the single motive – concern for safety of personnel during emergency response operations. He will normally function as an advisor to the Site Incident Controller.
- He will not be directing any activity, issuing or relaying orders/ information.

### 3.8.14 HOD/ HOS – Safety

- Report at Emergency Control Center and assist Site Main Controller with necessary information, support and resources.
- Mobilize off-duty personnel for assistance.
- Coordinate with the Coordinator – Commercial to mobilize additional resources, viz. spill containment equipment/ firefighting equipment/ personal protective equipment, spare breathing air cylinders etc., as may be required at the site of incident.

### 3.8.15 HOS – Occupational Health Center

- Contact Site Main Controller. Report at Emergency Control Center or at Occupational Health Center as instructed by the Site Main Controller.
- Organize first aid arrangements for the affected persons at the site of incident (cold zone) as may be necessary.
- Ensure that adequate paramedical staff, equipment and medicines are available at the Occupational Health Center. Mobilize additional resources (if necessary).
- Liaise with the local medical authorities and city hospitals, if the casualties are high and situation demands external medical help.
- Coordinate with the Coordinator - Transport for transporting victims to various hospitals.

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### 3.09 EXTERNAL AID

In case of an emergency, which poses threat to human lives or/ and property, within **Adani Port - Mundra** as well as in the surrounding neighborhood areas, it may not be possible to control such situations with the resources available at APSEZ. In such situations, additional resources are mobilized from other agencies, which include:

- Neighboring Industries (Mutual Aid Members)
- Government Authorities

External Aid Providers are as outlined in **Chart H**.

**Note:** Agreement is under process.

### 3.10 MUTUAL AID MEMBERS

**Adani Port** has entered into an agreement for mutual aid with following units for help/ assistance in the event of an emergency.

- Indian Oil Corporation Limited,
- Hindustan Petroleum Corporation Limited,
- Jindal SAW Ltd. (IBU),
- Adani Power Limited,
- Costal Gujarat Power Limited,
- Hindustan Mittal Energy Limited

The mutual aid members shall:

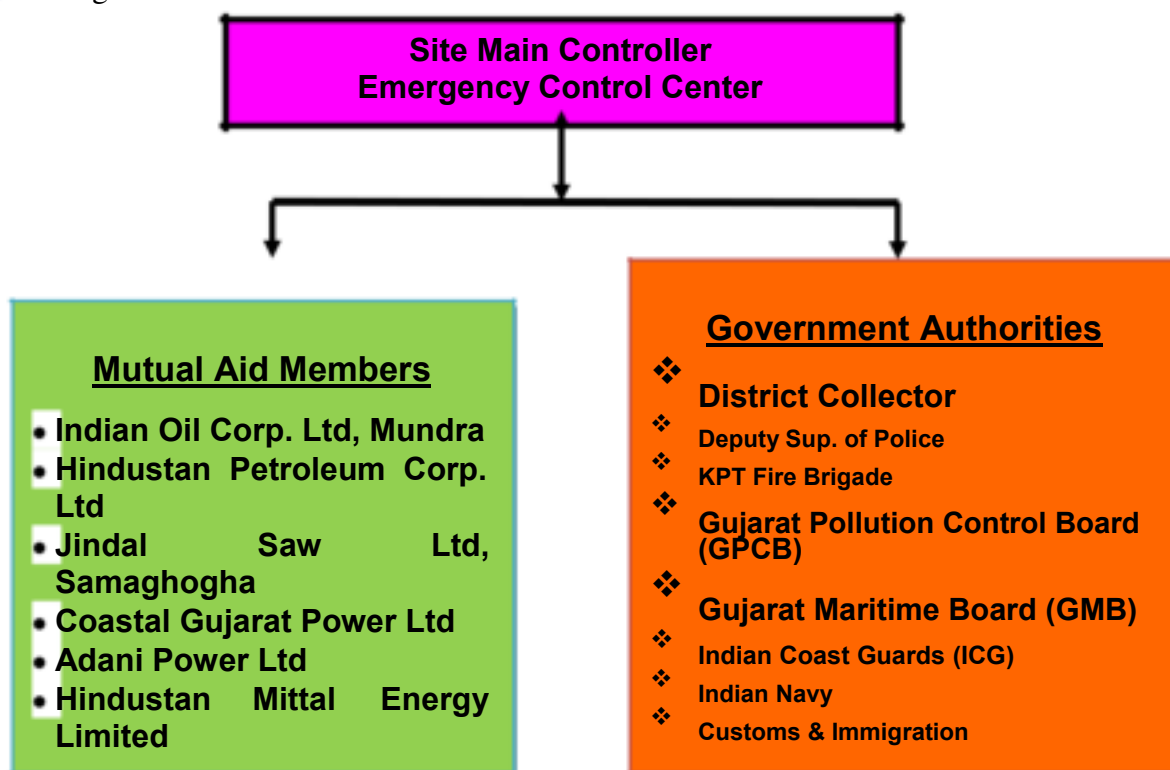
- Respond promptly to the emergency call as and when communicated.
- Send their fire tenders/ crewmembers along with necessary supplies/ materials at the site of incident (as requested) and report at the **Adani Port** Security Gate and get instructions from security personnel on duty. These resources and personnel shall be deployed as directed by Site Incident Controller.
- The crew in-charges of the mutual aid members shall be responsible for safety of their crew engaged in emergency operations.

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### 3.11 GOVERNMENT AUTHORITIES

If the situation demands response from multiple groups/ teams, APSEZ may seek assistance from various Government Authorities as have been recognized under the District Disaster Management Plan. These may include:

- District Collector
- Fire Brigade
- Police Commissioner
- Gujarat Pollution Control Board (GPCB)
- Gujarat Maritime Board (GMB)
- Indian Coast Guards (ICG)
- Indian Navy
- Immigration & Customs



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### 3.12 REPORTING & INVESTIGATION

**REPORTING** :: Any incident (whether minor or major) shall be reported. The main objective of incident reporting is to:

- Provide first-hand information to all the concerned
- Initiate investigation
- Prepare failure analysis report
- Report to the Government authorities (if required)

#### References

- Procedure for Incident Reporting
- Incident Report Format
- Work Injury Report

**INVESTIGATION** : All incidents (whether minor or major) shall be investigated. The main objectives of incident investigation are to:

- Identify the root cause(s) of the incident.
- Take appropriate preventive measures to prevent recurrence.
- To comply with the statutory requirements.

#### References

Incident Investigation Procedure

### 3.13 COMMUNICATION & PUBLIC AFFAIRS

**COMMUNICATION** : Communication, an integral part for handling any emergency, helps in taking quick decisions, efficient & effective control of the emergency. Communication between the Emergency Control Center & the Field Command Post is established by means of:

- ❖ Telephone
- ❖ Mobile
- ❖ Port Announcement System
- ❖ Wireless VHF / UHF Radio
- ❖ E – Mail

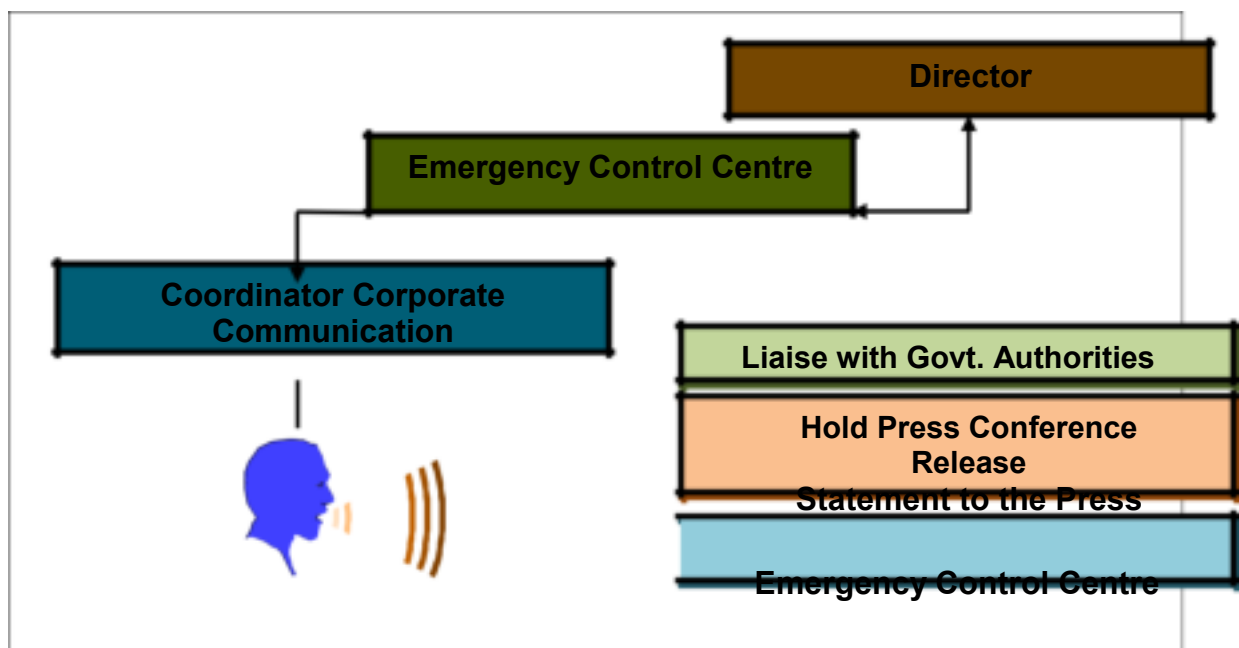


❖ Emergency Vehicle

Communication between the Emergency Control Center and external authorities will be by:

- ❖ Telephone
- ❖ E – Mail
- ❖ Fax
- ❖ Emergency Vehicle

### 3.14 PUBLIC AFFAIRS



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## **CHAPTER - 4**

### **EMERGENCY PLANNING**

- 4.01 DRILLS & TRAINING
- 4.02 TRAINING
- 4.03 EMERGENCY PLANS
  - 4.3.1 CYCLONIC STORMS / HURRICANE
  - 4.3.2 EARTHQUAKE
  - 4.3.3 TSUNAMI
  - 4.3.4 FLOOD
  - 4.3.5 INDUSTRIAL UNREST
  - 4.3.6 BOMB THREAT
  - 4.3.7 WAR
  - 4.3.8 FLOOD/WATER POISONING
  - 4.3.9 FIRE
  - 4.3.10 MAJOR RELEASE OF FLAMMABLE/TOXIC CHEMICALS
  - 4.3.11 MAJOR RELEASE OF FLAMMABLE/TOXIC GASES
  - 4.3.12 TRANSPORTATION INCIDENTS INVOLVING HAZARDOUS MATERIAL
  - 4.3.13 MARINE EMERGENCY

#### 4.01 DRILLS & TRAINING

Emergency response drills are conducted once a month to ensure effective response by not only the staff within **Adani Port** complex but also by external aid members (as required). The participation & actions will depend on the level of emergency drill planned, as per following table:

Drill	Duration	Port Level	Complex Level	District Level	Frequency	Notes
Siren Testing Drill	1 Minute	X	--	--	Twice in a Month	Test communication, check availability of personnel and evaluate response time.
Emergency Response Drill	1 – 2 hours	--	X	--	Monthly	Consists of interactive discussions of a simulated scenario among members of emergency response team but does not involve mobilization of personnel & equipment

#### 4.02 TRAINING

The importance of training to personnel involved in responding to any emergency scenario is recognized and acknowledged. The training to employees at APSEZ is as per following table:

Course	Duration	New Recruit	Existing Staff	Frequency	Notes
Induction Training	4 Days	X	--	On joining the organization	All employees on joining the organization shall undergo the training at Learning Center

#### 4.03 EMERGENCY PLANS

**INDIVIDUAL PLANS ARE REQUIRED TO DEVELOP EMERGENCY PLANS AS PER GUIDELINES PROVIDED IN SAMPLE PLANS**

##### 4.3.1 CYCLONIC STORMS / HURRICANE

Cyclonic storms/ hurricanes are intense depressions, which develop in tropical latitudes and are often the cause of very high winds and seas. The wind blows around the center of a tropical storm in a spiral flow inward, anti-clockwise in Northern Hemisphere and clockwise in Southern Hemispheres. Plan for tackling cyclonic storm/ hurricane can be broadly divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

Port Key Person

- ❑ **Constitute Emergency Response Team(s) comprising of at least:**
  - ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)

##### Note

- Based on total strength of the individual plant, more than one team may be constituted.
- Each member of the team shall have a designated alternate member.

- ❑ **Maintain inventory of emergency items & supplies as necessary, including but not limited to:**
  - ❖ Torches, Ropes, lines, wires, tarpaulins, plastic sheets, Tool kit, duct tapes, assorted gears, First aid box, Sand bags etc.

##### Note

- The list is subject to updating depending on the requirements of the individual plant.
- ❑ **Liaise with HOD – ES for Civil & Mechanical Support (including supply of spares).**
- ❑ **Liaise with HOD – HR for food stock, water, blankets & bedding and medicine.**
- ❑ Liaise with Port Operation Control.

#### CYCLONIC STORMS/HURRICANE (Cont.)

Action By	Activity
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#### ACTION BEFORE EFFECTIVE PERIOD

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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<p>Port Key Person</p>	<ul style="list-style-type: none"> <li>❑ <b>Liaise with Site Main Controller</b></li> <li>❑ <b>Mobilize Emergency Response Team(s).</b></li> <li>Note <ul style="list-style-type: none"> <li>➤ Members to be briefed about the emergency.</li> <li>➤ Members to be informed that they may be required to stay at site during &amp; after the emergency.</li> </ul> </li> <li>❑ <b>Release non-essential personnel.</b></li> <li>Note <ul style="list-style-type: none"> <li>➤ Port key person reserves prerogative on the release of employees.</li> <li>➤ Personnel to be briefed on the possible time of return to work.</li> </ul> </li> <li>❑ <b>Initiate Port shut down based in:</b> <ul style="list-style-type: none"> <li>❖ Consultation with Site Main Controller.</li> </ul> </li> <li>❑ <b><i>Audit Port area(s) for safety measures to ensure that:</i></b> <ul style="list-style-type: none"> <li>❖ <i>Loose items are secured.</i></li> <li>❖ <i>Electric machinery is covered and protected against water ingress.</i></li> <li>❖ <i>Storm water drains are cleared of any obstructions.</i></li> </ul> </li> <li>❑ <b><i>Implement preventive &amp; precautionary measures (including but not limited) to ensure:</i></b> <ul style="list-style-type: none"> <li>❖ <i>Inventory of emergency supplies is maintained.</i></li> <li>❖ <i>Material and equipment that can possibly be damaged by water ingress is elevated.</i></li> <li>❖ <i>Windows &amp; doors are weather tight.</i></li> <li>❖ <i>Roof mounted equipment are braced.</i></li> <li>❖ <i>Material &amp; equipment that cannot be moved are covered.</i></li> <li>❖ <i>Sandbags are placed in doorways where flooding from storm water can occur.</i></li> </ul> </li> <li><b><i>In flood as consequence of Cyclonic Storm/ Hurricane is anticipated, ensure:</i></b> <ul style="list-style-type: none"> <li>❖ <i>Dyke valves of Hydrocarbon storage tanks are open.</i></li> <li>❖ <i>Oil Spill Management Plan is actuated.</i></li> </ul> </li> </ul>
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## CYCLONIC STORMS/HURRICANE (Cont.)





	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b>  <b>MUNDRA</b>  <b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: center;"><b>JULY - 2021</b></p>
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<b>Dry Cargo Department</b>	<ul style="list-style-type: none"> <li>❑ Remove all fine grained cargo stored at open storage yard and store at indoor warehouse.</li> <li>❑ Secure the fine grained cargo stored at open storage yards with Tarpaulin.</li> <li>❑ Stop all stevedoring activities, bring all Mobile Harbour cranes to shore, safely park the cranes and down its booms.</li> <li>❑ Inform all contractors to remove all their equipment from jetty area and safely park at shore, in case of crane down its boom.</li> <li>❑ Arrest all barge / ship loaders, and Mobile truck loading hoppers at its wheel to prevent horizontal movement due to wind and secure from its top by arranging guy ropes.</li> <li>❑ Stop loading / unloading of ship and measure the ship cargo quantities along with clients surveyor and communicate Marine Dept. / shipping agencies to take the ship to anchorage area.</li> </ul>
<b>Marine Department</b>	<ul style="list-style-type: none"> <li>❑ In coordination with dry cargo instruct all ship captains to take the ships anchorage.</li> <li>❑ Stop all activities at jetty area.</li> <li>❑ Ensure the jetty areas are free from loose and unsecured materials / equipment.</li> <li>❑ Update all departments about the latest weather conditions.</li> <li>❑ Ensure TUG's are shored and secured.</li> <li>❑ Stop SPM operation remove pipes connections from the ship and conform to maintain safe distance from SPM.</li> </ul>
<b>Liquid Terminal Department</b>	<ul style="list-style-type: none"> <li>❑ Stop loading / unloading of ship, take ullage with clients surveyor, detach hose connections with the shipping vessels and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area.</li> <li>❑ Remove all loose materials and equipment from jetty area.</li> <li>❑ Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.</li> </ul>

<b>Department Wise Emergency Action Plan for Cyclone</b>	
<b>Container Terminal / RORO Department</b>	<ul style="list-style-type: none"> <li>❑ Stop loading / unloading of ship take stock of containers along with surveyor, and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area.</li> <li>❑ Stop all activities and park the RTGC and RMQC at specified location and secure in all respect to prevent horizontal movement and topping. Ensure crane operators come out of crane after safely parking the cranes.</li> <li>❑ Remove all loose materials and equipment's from Quay area.</li> <li>❑ Ensure the height of container stock piling safe withstand the wind force, if it unsafe restrict the stock pile height.</li> <li>❑ Stop trailer loading and remove all trailer from CT and do not allow any trailer to enter CT.</li> <li>❑ Secure the all cars stationed at buffer yard by putting blocks on all the wheels.</li> </ul>

	<b>ADANI PORTS AND SEZ LTD</b> <b>MUNDRA</b> <b>ON SITE EMERGENCY PLAN (PORT AREA)</b>	<b>JULY - 2021</b>
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<b>Security Department</b>	<ul style="list-style-type: none"> <li>❑ Close the gate and stop allowing visitors and transport trucks either inward or outward.</li> <li>❑ Ensure vehicles are parked at designed parking areas, with wheels are blocked.</li> <li>❑ Instruct all drivers to take shelter at canteens (concrete buildings).</li> </ul>
<b>Fire Department</b>	<ul style="list-style-type: none"> <li>❑ Equip the fire tenders with rescue equipment, safely park the fire tenders and secure its wheel by providing blocks.</li> </ul>
<b>Project Management Cell (PMC)</b>	<ul style="list-style-type: none"> <li>❑ Stop all activities, park the cranes and equipment's at safe location, lower the booms of cranes and secure them.</li> <li>❑ Ensure all erected structures are secured with guy ropes and ties are provided.</li> <li>❑ Remove all loose materials from top of buildings and structures or secure them.</li> <li>❑ Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).</li> <li>❑ Secure the Jetty area piling rigs and cranes by tying with guy ropes.</li> <li>❑ Stop all project vehicle movements and ensure the vehicles are parked at safe location with wheels are blocked.</li> <li>❑ Ensure the barge type floating cranes are off loaded and brought to shore and its boom is downed.</li> <li>❑ Ensure all vehicles and cranes are removed from break water embankments.</li> </ul>

#### 4.3.2 EARTHQUAKE

Earthquake is most likely to occur without pre-warning and so its severity and destructive potential are highly unpredictable. Earthquake can result in collapse of buildings, structures & elevated equipment, heavy casualties apart from fracture of underground pipelines and uprooting of energized wires etc. The plan to deal with earthquake can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

Port Key Person

- ❑ **Constitute Emergency Response Team(s) comprising of at least:**
  - ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)

#### Note

- Based on total strength of the individual plant, more than one team may be constituted.
- Each member of the team shall have a designated alternate member.
- ❖ **Liaise with HOD – HR to identify control centers equipped with:**
  - ❖ Communication facilities.
  - ❖ Emergency vehicles/ equipment.
  - ❖ List of emergency contacts & suppliers.
  - ❖ Medical facilities.

#### ACTION DURING EFFECTIVE PERIOD

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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<b>Individuals</b>	<ul style="list-style-type: none"> <li>❑ Do not panic.</li> <li>❑ Avoid standing near windows, external walls.</li> <li>❑ Stand near columns or duck under sturdy furniture.</li> <li>❑ Assemble at emergency assembly point.</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Site Incident Controller</b>          <b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Take head count. Activate Port emergency plan.</li> <li>❑ Liaise with Site Main Controller for shut down of Port(s) if required.</li> <li>❑ Liaise with HOS – Fire Services to initiate search &amp; rescue.</li> <li>❑ Liaise with – Occupational Health Center Services to provide first aid to the victims and remove casualties (if any).</li> <li>❑ Report at site.</li> <li>❑ Assess damage.</li> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOS –Occupational Health Centre to follow up on casualties.</li> </ul>
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#### 4.3.3 TSUNAMI

Tsunami is Japanese for "harbor wave which is a huge ocean wave that can travel at speeds up to 600 mi/hr (965 km/hr) can have heights of up to 30 m (98 ft), wavelengths of up to 200 km (124 mi) and long periods, usually between 10 and 60 minutes. Sometimes incorrectly called a tidal wave, a tsunami is usually caused by an underwater earthquake or volcanic eruption and often causes extreme destruction when it strikes land. It is a series of waves which travel outward on the ocean surface in all directions in a kind of ripple effect. Since the waves can start out hundreds of miles long and only a few feet high, they would not necessarily be noticeable to a passing ship or a plane flying overhead. The plan to deal with Tsunami can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ <b>Constitute Emergency Response Team(s) comprising of at least:</b></li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01), Marine Control Officer (01), POC Officer (01)</li> <li><b>Note</b></li> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> <li>❖ <b>Liaise with HOD – Marine to identify control centers equipped with:</b></li> <li>❖ Communication facilities.</li> <li>❖ Emergency vehicles/ equipment (tugs, speed/mooring boat).</li> <li>❖ List of emergency contacts (POC, Marine Control, Deputy PFSO, Port Security)</li> <li>❖ Occupational Health Facilities.</li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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<b>Individuals</b>	<ul style="list-style-type: none"> <li>❑ Do not panic.</li> <li>❑ Avoid standing near to sea side.</li> <li>❑ Stand near columns or duck under sturdy furniture.</li> <li>❑ Assemble at emergency assembly point.</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Site Incident Controller</b>          <b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller for shut down of Port(s) if required.</li> <li>❑ Liaise with HOS – Security and HOS – Fire Services to search &amp; rescue.</li> <li>❑ Liaise with HOS – Occupational Health Center to provide first aid to the victims and remove casualties (if any).</li> <li>❑ Report at site.</li> <li>❑ Assess damage.</li> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOD – Human Resources &amp; Administration.</li> </ul>
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#### 4.3.4 FLOOD

An overflowing of water onto land that is normally dry. A flood tide is an abundant flow or outpouring. It is a temporary rise of the water level, as in a river or lake or along a seacoast, resulting in its spilling over and out of its natural or artificial confines onto land that is normally dry. Floods are usually caused by excessive runoff from precipitation or snowmelt, or by coastal storm surges or other tidal phenomena. Floods are sometimes described according to their statistical occurrence. A fifty-year flood is a flood having a magnitude that is reached in a particular location on average once every fifty years. In any given year there is a two percent statistical chance of the occurrence of a fifty-year flood and a one percent chance of a hundred-year flood.

Action By		Activity
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#### PLANNING & PREPAREDNESS

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Constitute Emergency Response Team(s) comprising of at least: <ul style="list-style-type: none"> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> </li> <li><b>Note</b> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> </li> <li>❑ <b>Liaise with HOD – HR to identify control centers equipped with:</b> <ul style="list-style-type: none"> <li>❖ Communication facilities.</li> <li>❖ Emergency vehicles/ equipment.</li> <li>❖ List of emergency contacts &amp; suppliers.</li> <li>❖ Medical facilities.</li> </ul> </li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD



<b>Individuals</b>	<ul style="list-style-type: none"> <li>❑ Do not panic.</li> <li>❑ Avoid standing near to sea side.</li> <li>❑ Stand near columns or duck under sturdy furniture.</li> <li>❑ Assemble at emergency assembly point.</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Site Incident Controller</b>	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller for shut down of Port(s) if required.</li> <li>❑ Liaise with HOS – Security and HOS – Fire Services to search &amp; rescue.</li> <li>❑ Liaise with HOS – Occupational Health Center Services to provide first aid to the victims and remove casualties (if any).</li> <li>❑ Report at site.</li> <li>❑ Assess damage.</li> </ul>
<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOD – Human Resources &amp; Administration.</li> </ul>

#### 4.3.5 INDUSTRIAL UNREST

Industrial relation between personnel and management may deteriorate because of any reason. Problems, which may arise due to industrial unrest, include:

- ❖ Dharna/ Strike/ Hunger strike
- ❖ Unofficial gatherings/ Gate meetings/ Forceful entry
- ❖ Work to rule/ Go slow/ Disobedience
- ❖ Gherao/ Rasta roko
- ❖ Intimidation & Use of force
- ❖ Support from local & criminal elements
- ❖ Sabotage

In such a scenario, to ensure smooth operation of Port, protection of lives and property, well-coordinated effort is needed from all concerned. Plan to deal with industrial unrest can be broadly divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ <b>Constitute Emergency Response Team(s) comprising of at least:</b></li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> <ul style="list-style-type: none"> <li>❑ Plan 8 hours shift.</li> <li>❑ Liaise with HOD – HR for food stock, water, blankets &amp; bedding and medicine.</li> </ul>
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#### INDUSTRIAL UNREST (Cont.)

Action By	Activity
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	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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#### ACTION BEFORE EFFECTIVE PERIOD

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Liaise with Site Main Controller</li> <li><input type="checkbox"/> Liaise with HOD – Security for security &amp; vigilance requirements.</li> <li><input type="checkbox"/> Liaise with HOD – HR for planning of accommodation of additional personnel and transport for additional requirements of vehicle (if any).</li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Liaise with HOD – Security for</b> <ul style="list-style-type: none"> <li>❖ Strengthening security at sensitive points.</li> <li>❖ Ensuring protection of lives &amp; property.</li> <li>❖ Vigilance &amp; patrolling.</li> <li>❖ Maintaining law &amp; order.</li> </ul> </li> <li><input type="checkbox"/> <b>Liaise with Site Main Controller for</b> <ul style="list-style-type: none"> <li>❖ Updates on the situation.</li> </ul> </li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Assess damage (if any).</b></li> <li><input type="checkbox"/> <b>Liaise with Site Main Controller for restoring normalcy.</b></li> </ul>
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#### 4.3.6 BOMB THREAT

Bombs can have devastating effect not only on the Adani Port but also on neighboring areas. Hence, any threat received regarding plantation of the bomb shall be viewed seriously. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Constitute Search Team(s) comprising of at least:</b> <ul style="list-style-type: none"> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> </li> <li><b>Note</b> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> </li> <li><input type="checkbox"/> Increase awareness in the Port personnel regarding threat perception (not to handle suspicious objects, report suspicious movements by unknown persons).</li> </ul>
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#### ACTION BEFORE EFFECTIVE PERIOD

Port Key Person	<ul style="list-style-type: none"> <li>❑ Inform all personnel to provide information regarding unidentified or suspicious objects/ persons.</li> <li>❑ Liaise with Port Operation Centre.</li> <li>❑ Liaise with HOD – Security for</li> <li>❖ Intensifying vigilance &amp; patrolling.</li> <li>Initiating bomb search.</li> <li>❖ Making arrangements to minimize effects.</li> <li>Making arrangements for evacuation.</li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD

PortKey basis. Person	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller for any action to be taken on case to case</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

Port Key Person	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller for restoring normalcy (if bomb recovered/ no untoward incident occurs).</li> </ul> <p style="color: red;">If blast occurs</p> <ul style="list-style-type: none"> <li>❑ Assess damage (if any).</li> <li>❑ Take restorative measures.</li> <li>❑ Liaise with Site Main Controller.</li> </ul>
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#### 4.3.7 WAR

During an outbreak of war, bombarding by enemy planes at Mundra site can have devastating effects. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

Port Key Person	<ul style="list-style-type: none"> <li>❑ Constitute Emergency Response Team(s) comprising of at least:</li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> <p style="color: blue;">Note</p> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> <li>❑ Make arrangements for camouflage the flares.</li> <li>❑ Liaise with HOD – Security to increase awareness in the Port personnel regarding war.</li> </ul>
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#### ACTION BEFORE EFFECTIVE PERIOD

Port Key Person	<ul style="list-style-type: none"> <li>❑ Liaise with Port Operation Centre.</li> <li>❑ Liaise with HOD – Security for</li> <li>❖ Intensifying vigilance &amp; patrolling.</li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller for minimizing light (during night) &amp; obtaining updated information.</li> <li>❑ Liaise with HOD – Security for evacuation of non-essential personnel.</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Assess damage (if any).</li> <li>❑ Liaise with Site Main Controller to restore normalcy.</li> </ul>
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#### 4.3.8 FOOD/WATER POISONING

Plan to deal with food/ water poisoning can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Liaise with HOS – Occupational Health Services:</li> <li>❖ To impart training regarding food/ water poisoning.</li> <li>❖ For supply of medicines, saline water etc.</li> </ul>
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#### ACTION DURING EFFECTIVE PERIOD

<b>Port Key to: Person</b>	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller &amp; HOS – Occupational Health Services</li> <li>❖ Identify the contaminant source.</li> <li>❖ Seize contaminated material.</li> <li>❖ Take preventive measures to avoid recurrence.</li> <li>❖ Inform all concerned.</li> <li>❖ Arrange sample analysis &amp; alternate supplies.</li> <li>❖ Arrange medical assistance to the victims.</li> </ul>
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#### ACTION AFTER EFFECTIVE PERIOD

<b>Port Key Person</b>	<ul style="list-style-type: none"> <li>❑ Liaise with Site Main Controller &amp; HOS – Occupational Health Services to:</li> <li>❖ Conduct epidemiological investigation to identify the cause.</li> <li>❖ Take preventive measures to avoid recurrence.</li> <li>❖ Follow up on casualties.</li> </ul>
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#### 4.3.9 FIRE

Plan to deal with fire can be divided in following stages:

Action By	Activity
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#### PLANNING & PREPAREDNESS

Port Key Person	<ul style="list-style-type: none"> <li>❑ <b>Constitute Emergency Response Team(s) comprising of at least:</b></li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> <p>Note</p> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> <ul style="list-style-type: none"> <li>❑ <b>Liaise with HOS – Fire Services to:</b></li> <li>❖ Maintain adequate fleet of fire tenders &amp; firefighting equipment.</li> <li>❖ Maintain patrolling to eliminate potential sources of fire hazard.</li> <li>❖ Impart regular refresher training to auxiliary fire squad members.</li> </ul>
	<p><b>ACTION DURING EFFECTIVE PERIOD</b></p>
Emergency Response Team	<ul style="list-style-type: none"> <li>❑ Activate alarm. Try &amp; contain fire.</li> <li>❑ Liaise with Site Main Controller, HOS – Fire and HOS – Occupational Health Services to:</li> <li>❖ Evacuate non-essential personnel.</li> <li>❖ Ensure search &amp; rescue</li> <li>❖ Ensure casualties receive attention.</li> <li>❑ Liaise with HOD – Security to restrict movement in affected area.</li> </ul>
	<p><b>ACTION AFTER EFFECTIVE PERIOD</b></p>
Emergency Response Team	<ul style="list-style-type: none"> <li>❑ Assess damage.</li> <li>❑ Implement fire preventive measures.</li> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOS – Occupational Health Services to follow up on casualties.</li> </ul>
<p><b>4.3.10 MAJOR RELEASE OF FLAMMABLE/TOXIC CHEMICALS</b></p> <p>Plan to deal with major release of flammable/ toxic chemicals can be divided in stages:</p>	
Action By	Activity
<p><b>PLANNING &amp; PREPAREDNESS</b></p>	
Port Key Person	<ul style="list-style-type: none"> <li>❑ <b>Constitute Emergency Response Team(s) comprising of at least:</b></li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> </ul> <p>Note</p> <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> <ul style="list-style-type: none"> <li>❑ <b>Maintain under flow baffle, over flow baffle, blocking gates &amp; dykes.</b></li> <li>❑ <b>Liaise with HOD – QHSE for:</b></li> <li>❖ Conducting regular audits.</li> <li>❖ Training of persons regarding various aspects of spillage.</li> <li>❖ Identifying locations to set up blockages.</li> <li>❑ Liaise with HOS – Fire Services for acquiring equipment for recovery.</li> </ul>



ACTION BEFORE EFFECTIVE PERIOD	
Emergency Response Team	<ul style="list-style-type: none"> <li>❑ Control, block or contain flow of spillage.</li> <li>❑ Suspend all hot work in the vicinity &amp; isolate electric powers to affected area(s).</li> <li>❑ Recover or direct spill material to effluent pit.</li> <li>❑ Liaise with HOS – Fire/ Occupational Health Services to:</li> <li>❖ Evacuate non-essential personnel.</li> <li>❖ Administer first aid to victims.</li> <li>❑ Liaise with HOD – Security to restrict movement in the area.</li> <li>❑ Liaise with Site Main Controller for external assistance required (if any).</li> </ul>
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	<ul style="list-style-type: none"> <li>❑ Assess damage.</li> <li>❑ Implement fire preventive measures.</li> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOS – Occupational Health Services to follow up on casualties.</li> </ul>

Onshore Oil Spill Collection Plan		
<b>Onshore Oil spills are classified into three categories</b> <ul style="list-style-type: none"> <li>❑ Leakage within the enclosure and oil spill is retained by the dyke wall.</li> <li>❑ Leakage from the pipe lines.</li> <li>❑ Leakage from the tanker truck carrying the oil.</li> </ul>		
<b>Facilities available</b> <ul style="list-style-type: none"> <li>❑ As the enclosure tanks are stored with various oil products the bund walls are provided to retain the product individually for every tank.</li> <li>❑ For the storage of spilled product, slop tanks are available in each enclosure.</li> <li>❑ 2 nos. Portable pumps of intrinsically safe are available.</li> <li>❑ The tank farm drain point valves are kept closed.</li> <li>❑ Pipe lines are available to transfer the spilled product to slop tank.</li> <li>❑ Spill collection kit is available. (6 nos. Drip trays, 4nos. Empty barrels, 4nos. Carboys, 4nos. Funnels, 2nos. Barrel shifting trolleys and 10nos. Soaking pads, 4 nos. Bonding wire with clamps 20mts long).</li> <li>❑ Emergency response team to collect the spilled oil is available in each shift.</li> <li>❑ PPE's are available.</li> </ul>		
Leakage within the enclosure and oil spill is retained by the dyke wall		
Sr.No.	Corrective Action	Action By
1.	Inform Security and stop all vehicles entering the Liquid Terminal and stop all vehicles inside and remove unwanted workmen from the liquid terminal.	LT Shift Incharge/ Security
2.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
3.	Ensure necessary PPE's are worn by the emergency response team.	LT Shift Incharge
4.	Shift the intrinsically safe portable pump to nearby location to facilitate pumping of the product to slop tank.	LT Shift Incharge

5.	Shift the spill collection kit to the location.	LT Shift Incharge
6.	Inform fire department to perform standby with fire fighting facility.	LT Shift Incharge
7.	Lay the pump suction line foot valve in the pool of spilled liquid.	LT Shift Incharge
8.	Connect the pump discharge line to pipe line network leading to slop tank.	LT Shift Incharge
9.	Ensure jumpers/ bonding is provided if other than wire breaded hose is used or PVC/ Rubber hoses are used (from foot valve to pump & pump to pipe line).	LT Shift Incharge
10.	Give power supply to the pump and run the pump.	LT Shift Incharge
11.	Switch off the pump once the spilled oil level goes below the foot valve and air sucks in.	LT Shift Incharge
12.	Collect the remaining oil with the help of soaking pad, carboys and put it in barrels.	LT Shift Incharge
13.	Pump the oil collected in barrels to slop tank.	LT Shift Incharge

#### Leakage from the pipe lines

Sr.No.	Corrective Action	Action By
1.	Stop the leakage by switching off the pump. Arrest the leakage by closing the valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the pipe line is leaking.	LT Shift Incharge/ Security
3.	Road blockage shall be established at least 200mts away from the leakage point.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radius of leakage point.	Security
6.	Do not allow mobile phones within the radius of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE's are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carboys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge

14.	Take action to permanently arrest the pipe line leakage.	LT Shift Incharge
<b>Leakage from the tanker truck carrying the oil</b>		
1.	Arrest the leakage by closing the particular tanker compartment valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the tanker truck is parked.	LT Shift Incharge/ Security
3.	Road blockage shall be established at least 200mts away from the leakage point.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from the leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radius of leakage point.	Security
6.	Do not allow mobile phones within the radius of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE's are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carboys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge
<ul style="list-style-type: none"> <li>■ In all emergencies LT Shift incharge shall inform QHSE department and QHSE department shall monitor everything is happening as per the action plan and guide where ever required.</li> <li>■ For the purpose of Emergency Response Team HOD Liquid Terminal shall ensure at least two staffs are identified and they are available in each shift. The work force for collecting the spill is arranged by stopping some of the LT activities and also can be obtained from Fire Department.</li> <li>■ Fire department shall spare at least four persons (firemen) for spill collection purpose and they shall work under the guidance of LT shift incharge.</li> <li>■ Fire department shall also perform standby duty with fire fighting arrangements during the entire course of spill collection operation.</li> </ul>		
<b>4.3.11 MAJOR RELEASE OF FLAMMABLE/TOXIC GASES</b>		
Plan to deal with major release of flammable/ toxic gases can be divided in following stages:		
<b>Action By</b>		<b>Activity</b>
<b>PLANNING &amp; PREPAREDNESS</b>		

### Port Key Person

- ❑ **Constitute Emergency Response Team(s) comprising of at least:**
  - ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)
- Note
  - Based on total strength of the individual plant, more than one team may be constituted.
  - Each member of the team shall have a designated alternate member.
- ❑ Maintain pressure relief valves & vents.
- ❑ Identify location to isolate, redirect the lines to flares or re-circulation.
- ❑ Liaise with HOD – QHSE for:
  - ❖ Conducting regular audits.
  - ❖ Training of persons regarding various aspects gas leakage.
- ❑ Liaise with HOS – Fire Services for personnel protective equipment.

### ACTION DURING EFFECTIVE PERIOD

#### Emergency Response Team

- ❑ Control, block or contain leakage.
- ❑ Suspend all hot work in the vicinity & isolate electric powers to affected area(s).
- ❑ Isolate and redirect the lines to flares or re-circulation.
- ❑ Liaise with HOS – Fire/ Occupational Health Services to:
  - ❖ Evacuate non-essential personnel.
  - ❖ Administer first aid to victims.
- ❑ Liaise with HOD – Security to restrict movement in the area.
- ❑ Liaise with Site Main Controller for external assistance required (if any).

### ACTION AFTER EFFECTIVE PERIOD

#### Emergency Response Team

- ❑ Assess damage.
- ❑ Implement fire preventive measures.
- ❑ Undertake restorative measures & repairs.
- ❑ Liaise with Coordinator – Occupational Health Services to follow up on causalities.

### 4.3.12 TRANSPORTATION INCIDENTS INVOLVING HAZARDOUS MATERIAL

Various hazardous materials are normally transported to and from **Adani Port** by tank lorries. These tank lorries have the potential to mechanical failures & road incidents (within and/ or outside the complex) resulting in the possible scenarios viz. spillage, leakage, fire & explosion that might pose an imminent danger to vehicular traffic and surrounding populations [mostly in built-up areas] apart from threat to an environment. The plan to deal with transportation incidents involving hazardous material may be divided in following stages:

Action By	Activity
<b>PLANNING &amp; PREPAREDNESS</b>	

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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<p>Port Key Person</p>	<ul style="list-style-type: none"> <li>❑ <b>Constitute Emergency Response Team(s) comprising of at least:</b></li> <li>❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)</li> <li>Note <ul style="list-style-type: none"> <li>➤ Based on total strength of the individual plant, more than one team may be constituted.</li> <li>➤ Each member of the team shall have a designated alternate member.</li> </ul> </li> <li>❑ Collect information about the product and specification/ design of the tanker for the product.</li> <li>❑ Liaise with HOD – Security for: <ul style="list-style-type: none"> <li>❖ Ensuring safety equipment &amp; fitness certificates are valid.</li> <li>❖ Auditing the tankers.</li> <li>❖ Awareness program for transporters, drivers' etc.</li> </ul> </li> </ul>
<p><b>ACTION DURING EFFECTIVE PERIOD</b></p>	
<p><b>Emergency Response Team</b></p>	<ul style="list-style-type: none"> <li>❑ <b>Liaise with HOD – Security/ Driver/ Transporter to:</b></li> <li>❖ Ascertain extent of damage and impact.</li> <li>❖ Control, block or contain leakage.</li> <li>❖ Inform various agencies.</li> <li>❖ Request for assistance.</li> <li>❖ Restrict movement in the affected area.</li> </ul>
<p><b>ACTION AFTER EFFECTIVE PERIOD</b></p>	
<p><b>Emergency Response Team</b></p>	<ul style="list-style-type: none"> <li>❑ Assess damage.</li> <li>❑ Undertake restorative measures &amp; repairs.</li> <li>❑ Liaise with HOS – Occupational Health Services to follow up on casualties</li> </ul>



### 4.3.13 MARINE EMERGENCY

Shipping fleet operates outside the premises of **Adani Port** and is subject to international, national and local rules. Marine emergencies are classified into:

#### **On-shore Emergency (Nature I & Nature II)**

- ❖ May occur in Jetty/ Shipping Division area.
- ❖ Shall be handled as per the Adani Port Emergency Action Plan.
- ❖ Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).
- ❖ Radio Room shall function as Marine Control Center.

#### **On-site Emergency (Nature I - Level-I or Nature I – Level II)**

- ❖ May occur on board APSEZ vessels (not requiring external help)
- ❖ Master shall assume charge on board vessel
- ❖ Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).

#### **Off-Site Emergency (Nature-II)**

- ❖ Shall be handled as per Contingency Manual & Single Point Mooring Operations Manual.
- ❖ Master shall assume charge on board vessel.
- ❖ Senior most functionaries on shore to take charge as Emergency Coordinator (Site Incident Controller).

**In case of an Oil Spill, the action plan shall be as per “Oil & Chemical Spillage Response Plan”** During any of the above-classified marine emergencies:

#### **MARINE EMERGENCY (Cont.)**

- ❖ During working hours
  - ❑ Key Person or senior most functionary to assume charge of Site Incident Controller
  - ❑ Next senior most functionary to assume charge of Deputy Site Incident Controller
  - ❑ Coordinators to report at Site Shift Managers Office
- ❖ During silent hours
  - ❑ Radio Officer in duty to assume charge of Site Incident Controller
  - ❑ Shift Officer to assume charge of Deputy Site Incident Controller
  - ❑ Coordinators to report at Site Shift Managers Office
- ❖ Oil & Chemical Spillage Response Plan

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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## CHAPTER – 5

### EMERGENCY PREPAREDNESS

#### 5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

5.1.2 LIQUID TERMINAL

5.1.3 DRY CARGO AREA

5.1.4 TERMINAL – 2:

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

5.1.7 TERMINAL – 1:

5.1.8 WEST BASIN:

5.1.9 ADANI HOUSE & PUB :

#### 5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH ADANI PORT

## 5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

Adequate fire fighting systems are provided for protection of berths, buildings and facilities of the port. The fire fighting facilities are based upon TAC and NFPA guidelines.

The pumps and fire water pipe network system are provided to serve hydrants suitably located around the entire premises with Extinguishers, Hydrants, Hose boxes and Monitors. The Fire & Safety staff of the **Adani Port** covers the entire premise and provides suitable fire protection coverage with mobile equipment, personnel, etc. The capacity of the fire water system is sized to fight a fire hazard at the proposed berth. A general guidelines for the fire hydrant system is as given below:

### 5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

The fire fighting systems at all the berths are designed to be combined with foam concentrate systems. 08 Water/Foam Monitors are installed on the four berths, so that the manifold area of the maximum tanker size (including the tanker drift movements) is included in their throw pattern. An additional Jumbo Jet Water Curtain Nozzle installed at berth no. 01 & 02 to isolate the Valve manifold area or the tanker, in case of fire at one or the other.

- Adequate foam storage is provided to ensure firefighting in all areas for a minimum period as in accordance with Indian Standards or NFPA but on no account less than 30 minutes.
- All the firefighting systems is designed in accordance with the Indian and NFPA standards.
- The system follows the minimum design criteria as stipulated in the Guidelines, which are summarized hereunder:
  - In case of fire, the ship will be towed to the open sea and the firewater protection for the ship will be treated as first aid until towing is done.
  - One single largest risk is considered for providing fire protection facilities.
  - Sea water, which is available at the location, will be conveniently used.
  - As port terminals handling ships of size less than 50,000 DWT, one set of firewater pumps are provided this will cater to both monitors as well as hydrant service and water curtains.
  - The firewater pressure system is designed for a minimum residual pressure of 7 kg/m<sup>2</sup> at the hydraulically remotest point of application in the terminal.
  - Fire water flow rate will be the aggregate of the following:
    - Water flow for Water/Foam Monitors for protection of loading arms/piping manifold and ship;
    - Water flow for areas segregation through water curtains between ship and loading arms and hydrant service.
  - The water network laid to ensure multi-directional flow wherever possible. Isolation valves are provided in the network to enable isolation of any section of the network.

**The major components of the firefighting system for the berths are as follows:**

**1. Monitors:**

Two monitors with an adequate capacity with suitable horizontal throw. The positions of the monitors are so designed to cover the entire area of largest tanker berthed at Jetty.

**2. Curtain nozzles:**

These nozzles are provided between unloading arms and the tanker at berth no. 01 & 02 for segregation of the two with a water curtain.

**3. Water hydrants:**

Water hydrants are stand post type and are double headed. One hydrant post is provided for every 30 meters length on the jetty. These are located alongside berths for easy accessibility. 6" hydrant heads with standard twin 63 mm hydrant valves are used.

**4. Mobile Monitor:**

One unit of Mobile Monitor with 800 ltrs foam in tank kept at jetty to reinforce fire fighting system during handling of Chemicals /Hydrocarbons.

**5. Foam-concentrate drums are provided for the foam monitors (with 3% concentrate). A total of 3310 ltrs of AR-AFFF concentrate are stored in easily cartable Jerry cans of 20-ltrs and 200 ltrs capacity drum kept at Marine Terminal.**

**6. Firewater network ring main is of 300 mm diameter.**

### 5.1.2 LIQUID TERMINAL

Presently there are 97 tanks at Liquid Terminal and the area of the tank farm is divided in three zones. They are CTF (61 fixed roof tanks), POL (8 tanks including two floating roof tank), EOL (25 fixed roof tanks) and Bitumen Terminal (3 fixed roof tanks) The Fire fighting systems at the Liquid Terminal area is fully approved by the TAC. It is designed to meet the demand of two major fires at distinct locations. The essence of the systems is quick knock down of fire at the earliest instance. The fire fighting systems consists of six electric pumps, four diesel pumps and two Jockey pump and ring main of 300/250 mm dia. each tank of CTF, POL and Bitumen Terminal is protected with devoted foam and water protection system. All the loading bays and enclosure are suitably covered with Water Monitors and Hydrants.

**The major components of the fire fighting system for the Liquid Terminal is as follows:**

	<p style="text-align: center;"><b>ADANI PORTS AND SEZ LTD</b></p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;"><b>ON SITE EMERGENCY PLAN (PORT AREA)</b></p>	<p style="text-align: right;">JULY - 2021</p>
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**a. Foam Pourers:**

All the fixed roof & floating roof tanks of CTF, POL & Bitumen Terminal are covered by Foam Pourer System. The Foam could be operated by quick opening type butterfly valve positioned near each tank. In case of bitumen tanks foam have to feed in the line from external source.

**b. Water Spray Rings:**

All the tanks of CTF and EOL are protected by medium velocity water spray system all around the tanks. The discharge rate of water spray is 3 lpm/m<sup>2</sup> for the effective cooling against radiation heat. The water sprays are also operated by quick opening type butterfly valves.

**c. Water Monitors:**

All the Loading Bays, Tank enclosures are adequately covered by the Water Monitors. The water monitors are strategically positioned to cover maximum area. the monitors are manually operated by the valves placed with each monitor.

**d. Hydrants:**

Double headed Hydrants are evenly positioned all over the Terminal area in accordance with TAC and NFPA guidelines

### 5.1.3 DRY CARGO AREA

The Dry Cargo area is the zone of moderate risk hence only fully pressurized Hydrant system is provided. The well designed Single and Double outlet type hydrant posts are located all around the open storage yards and the covered godowns.

**a. Hydrants:**

All the open and covered type of storage areas are covered by Single or double type Hydrant posts. The hydrant system is kept fully pressurized at 7 Kg/cm<sup>2</sup> with a minimum operating pressure of 6 Kg/cm<sup>2</sup> at any point in the system.

### ■ FIRE STATION

The Fire station is the nerve center of the Fire concerned matters. The Fire Station Control Room is continuously 24 hours a day, 365 days a year. The control room is equipped with modern communication gadgets like, Wireless set, internal telephone & Mobile phones. Apart from the communication systems, the Fire fighting vehicle Foam Tender and Fire Engine are also stationed there. All sorts of firefighting equipment and appliances are stowed in the Fire Station.



The below given is the list of some of the equipments stowed at Fire Station.

- Spare fire extinguishers and foam compound drums
- Delivery Hose pipe
- Different types of Branch Pipes & Foam making equipment.
- First aid Firefighting extinguishers
- Mobile Foam Monitors
- Foam Mobile Units
- Fire suits
- First aid kit
- Safety belts
- Ropes
- Cutting tools
- SCBA
- Safety helmets

PPEs - goggles, Apron, shoes, gloves, nose mask, gumboots

#### 5.1.4 TERMINAL – 2:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren
- Fire Control Plan : As Mentioned Below

**Fire Pump:** 273 m<sup>3</sup>/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m<sup>3</sup>/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 2 and back-up yard.

**Fixed Fire Fighting System:** 14 no. of Double Headed Fire Hydrant at jetties, 18 nos. of Single Headed Fire Hydrants at Terminal – 2 back-up yard and 10 nos. of Delivery Hose kept at pump house for fire prevention.

#### **Fire Extinguishers:**

Dry Chemical Powder Fire Extinguishers : 03 no. of 50 kg., 20 no. of 10 kg., 10 no. of 2 kg  
CO2 Fire Extinguishers: 15 no. of 4.5 kg.

#### 5.1.5 CONTAINER TERMINAL – 2 [ADANI MUNDRA CONTAINER TERMINAL]:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren

- Fire Control Plan : As Mentioned Below

**Fire Pump:** 273 m<sup>3</sup>/hr discharge X 1 no. of Vertical Turbine Electric Driven Main Pump and 273 m<sup>3</sup>/hr discharge X 01 no. of Vertical Turbine Diesel Driven Pump and 25 m<sup>3</sup>/hr discharge X 1 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at AMCT.

**Fixed Fire Fighting System:** 33 no. of Single Headed Fire Hydrant, 10 no. of Water Monitors and 20 nos. of Delivery Hose with Hose Station for fire prevention.

**Fire Extinguishers:**

DCP Fire Extinguishers: 40 Nos. (2 kg), 10 Nos. (9 kg), 5 Nos. (10 kg), 3 Nos. (50 kg) CO2 Fire Extinguishers 70 no. (4.5 kg), 24 (3.5 kg) for QC, RTG, Other Area.

#### 5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

- Fire Control Room : Fire Station
- Fire Control Plan : As Mentioned Below

**Fire Extinguishers:** for for QC, RTG and other area CT 3.

CO2 Fire Extinguishers: 65 Nos (2 kg), 45 Nos (4.5 Kg) for for QC, RTG and other area CT 3.

DCP Fire Extinguishers: 40 Nos (2 kg), 13 Nos (5 Kg), 10 Nos (10 Kg)

**Fire Tender: Multipurpose Fire Tender**

#### 5.1.7 TERMINAL – 1:

- Fire Control Room : Fire Station
- Emergency Siren : 5 km range manually operated siren
- Fire Control Plan : As Mentioned Below

**Fire Pump:** 273 m<sup>3</sup>/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m<sup>3</sup>/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 1.

**Fixed Fire Fighting System:**

33 no. of Double Headed Fire Hydrant at jetties, at Terminal – 1 and 70 nos. of Delivery Hose kept at pump house for fire prevention. 8 no. of Water / Foam Monitor.

**Fire Extinguishers:**

DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)

CO2 fire extinguishers: 12 no (4.5 kg)

**5.1.8 WEST BASIN:**

- Fire Control Room : Porta Cabin, Fire Station
- Emergency Siren : 1 at SS – 1 Building [Range 1.6 km],  
Manual Siren [Range 1.6 km] at Fire Station
- Fire Control Plan : As Mentioned Below

**Fire Pump:** 273 m<sup>3</sup>/hr discharge X 2 no. of Horizontal end suction type Electric Driven Main Pump and 273 m<sup>3</sup>/hr discharge X 01 no. of Horizontal end suction type Diesel Driven Pump and 10.8 m<sup>3</sup>/hr discharge X 1 no. of Back pull out type Electric Driven Jockey Pump for fire prevention at West Basin.

**Fixed Fire Fighting System:** 122 no. of Single Headed Fire Hydrant, 99 no. of Water Monitors and 250 no. of Delivery Hose for fire prevention.

**Fire Extinguishers:**

DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)

CO2 fire extinguishers: 12 no (4.5 kg)

**Fire Tender:**

- Water Tank capacity (in built) - 6000 liters
  - Pump discharge - 2250 LPM
  - Aluminized Suit - 01 no.
  - Water Jel Blanket - 01 no.
  - Delivery Hose - 20 nos.
  - 35l Aluminium Extension Ladder - 01 no.
  - Self-contained Breathing Apparatus Set - 03 no.
- Other firefighting related equipment.

**5.1.9 ADANI HOUSE & PUB :**

- Fire Control Room : Fire Station
- Emergency Siren : Adani house & PUB

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■ Fire Control Plan :

**Fire Pump:**

96.10 m<sup>3</sup>/hr discharge X 01 no. of Electric Driven Main Pump,

10.8 m<sup>3</sup>/hr discharge X 01 no. of Electric Driven Jockey Pump for fire prevention.

**Fixed Fire Fighting System:**

- **Adani House:** 9 nos of Single Headed Fire Hydrant, 5 nos of Hose Reel Hose, 18 nos of Delivery Hose kept at Adani House.
- **PUB:** 19 nos of Single Headed Fire Hydrant, 15 nos of Hose Reel Hose, 38 nos of Delivery Hose.

**Fire Extinguishers:**

- DCP Fire Extinguishers: 22 nos of 10 kg
- CO2 Fire Extinguishers: 40 nos of 4.5 kg, 8 nos of 9 kg, 2 nos of 22.5kg

**Auto Flooding System:** NAF S125 Flooding System at IT Server Room and UPS Room connected with Fire Detection System to protect from fire.

**Fire Detection System:**

- Smoke Detector System in Entire Adani House.
- Separate Fire Alarm System for PUB buildings

## 5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH APSEZ

<b>HAZARD KIT</b>
The following items of hazard kits are under procurement/have been procured.
<b>Protective Clothing</b>

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- Chemical protective suits
- Proximity suit
- Neoprene 14" gloves
- Natural rubber gloves
- Surgical gloves
- High voltage lineman's gloves
- Overalls
- Goggles (polycarbonate lens)
- Hardhats with headband suspensions
- Face shield (full) 10-x19-x.060
- Boots (neoprene, steel toe and modsole)
- Safety harness
- Ear Muffs

#### **Breathing Apparatus**

- Emergency Oxygen Bottles.
- Positive pressure self contained breathing apparatus
- Spare cylinders
- Full-face cartridge type respirators

#### **Leak Control Equipment**

- Drums
- Epoxy kit
- Patch Kit
- Wooden plug kit
- Rubber plug kit
- Mastic

#### **First Aid Equipment**

- Extinguishers capable for handling Class A, B, C and D fires.
- First aid kit (36 units)
- Resuscitator (B.W.S. CPR Portable with aspirator P/N 900 0 002 - 111 - 01 woolen fire blankets.

#### **Miscellaneous**



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- Teflon thread tape
- Electrical tape
- Pipe pieces, assorted.
- Pipe union, assorted.
- Pipe caps, assorted Hose clamps, assorted.
- Saddle clamps, assorted.
- Couplings (galvanized), assorted.
- Hand cleaner (waterless)
- Flashlight (NS)
- Reflective triangles
- Quick setting cement
- Frontier barriers & safety cones.

#### **Absorbents and Containers**

- Absorbent pads
- Plastic can liners / bags
- Recovery drum sets
- Diatomaceous earth bag
- Sponges

#### **Monitoring Equipment**

- Combustible gas detector (Explosive meter, Range:0-100 LEL & 0-5ppm)
- Oxygen detector (0-25% oxygen, PAC III, Drage make)
- Organic vapour detector (PAC III, Drager make)
- pH paper (0-14) (Ydrin, 1/2 x 50 with dispenser)
- Indication wind system AC-DC recording cup & vane anemometer with meter telescoping mast.

#### **Miscellaneous**

- Portable flood lights (4 Nos.)
- Emergency suits (2 Nos.)
- SCBA - 4 Nos.
- Loud Hailer (battery operated)
- Portable DCP extinguisher
- Emergency Rescue Cage

#### **Tools and hardware**

**ON SITE EMERGENCY PLAN (PORT AREA)**

- Drill (electrical)
- Drill set, assorted sizes (short length)
- Drill set, assorted sizes (length)
- Punch set, assorted sizes
- Wire brush
- Paint brushes
- Tape measure steel tape
- Foot ruler (metal)
- Welding kit
- Pipe cutters
- Drum trolleys
- Chemical buckets
- Dust pans
- Hacksaw
- Hacksaw blades

**Oxygen Trauma, First-Aid & Emergency Box Kit (Medical)**

- Oxygen Cylinder
- Water Jel Blankets
- Rescue Blankets
- Oxygen breathing kit
- Instant Glucose
- Paramedic Scissors
- Forceps
- Gloves
- Ring cutter
- Cervical collar
- Eye pads
- Tourniquets
- Multi-trauma dressings
- Adaptec dressing
- Flexible Bandages
- Pocket Masks - Eyewash bottle
- Bag mask resuscitator
- Portable respirator
- Portable lamps / torches
- Mouth-to-mask
- Blood pressure Equipment

**Adequate number of fire tender**

- There are three nos of fire tenders one is Foam Tender with water, foam, DCP and CO<sub>2</sub> facility having a centrifugal fire pump. Pump is of gunmetal and stainless steel also with 60 mtrs. long hose and nozzle provided above the pump panel.
- CO<sub>2</sub> gas cylinders of sufficient capacity are mounted for expelling the 75 kg DCP extinguishers. The foam tender also carry 6 x 22.5 kg. nos. of CO<sub>2</sub> Cylinder.
- Water Tender of 12000 ltrs water capacity with adequate numbers of fire fighting equipment and rear mounted portable pump of 450 ltr / pmt capacity

#### Neutralising Agents

- Acid neutralizing agent (neutrasorb 100 = box)
- Neutrasol two
- 2-1/2 gallon container / carton)
- Neutralizer Neutrality
- Clorox

### 5.03 ABOUT ON-SITE EMERGENCY PLAN

Following three stage activities are planned to perform, as these activities are co-related, provide better ideas for emergency preparedness, and emergency actions with subsequent follow-ups.

- a) Pre-emergency activities
- b) Emergency time activities
- c) Post emergency activities

In Pre Emergency Activities : Following activities are carried-out :: Internal Safety Surveys, Mock Drills & Training : Joint Mock Drills are performed engaging Mutual Aid Units. Arrangement is made to acquire emergency aid in the form of First Aid, chemical leak control, Evacuation, Vehicle for Transportation of affected. Moreover, from Fire Brigade is liaised with. (if the emergency is uncontrollable by the internal resources at the unit).

### 5.04 ABOUT POST EMERGENCY ACTIVITIES

- A) collection of records
- B) Making insurance claim
- C) Conducting inquiries and taking preventive measures
- D) Rehabilitation of affected persons within and outside plant
- E) Restart of plant

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## **CHAPTER NO.VI**

### **OFF-SITE EMERGENCY PLAN**

### **CONTENTS**

- 6.01 THE NEED OF OFF-SITE EMERGENCY
- 6.02 THE STRUCTURE OF OFF-SITE EMERGENCY
- 6.03 THE ROLE OF MANAGEMENT
- 6.04 THE ROLE OF POLICE AND EVACUATION AUTHORITY
- 6.05 THE ROLE OF MUTUAL AID AGENCIES

## 6.00 ABOUT OFF-SITE EMERGENCY PLAN

Ours is a **PORT**, Importing and exporting various goods including liquid chemicals, petroleum products.. Various substances, chemicals are stored at the terminals. Leak of chemicals, fire may lead to a serious off site emergency. In view of this, it is necessary to prepare an off-site emergency plan to deal with any emergency methodically and systematically to control and reduce its effects. In this connection, we have formed a EMERGENCY ORGANIZATION as per Chapter - 3

Incident controllers, Deputy Incident Controllers, Site Main Controllers are appointed and their emergency duties are determined. Arrangements are made for communication with external authorities. Safe assembly points and Emergency Control Centers are determined. Pre-emergency, emergency time and post emergency activities are formulated. A list of all important telephone numbers is prepared. Arrangement is made to get / provide emergency help with mutual aid units. Special knowledge, advise, experts will be available. Liaison will be made with off-site emergency authorities.

## 6.01 STRUCTURE OF OFF-SITE EMERGENCY

### BASIC ACTIONS IN EMERGENCIES

#### Immediate Actions

Immediate action is the most important factor in emergency control because the first few seconds count, as a fire develops and spreads very quickly unless prompt and efficient actions are taken. In the event of fire in the Port/terminal, the following actions shall be taken as quickly as possible.

- Take immediate steps to stop leakage/fire and raise alarm simultaneously.
- Initiate action as per FIRE ORGANIZATION PLAN or Disaster Management Plan, based on gravity of the emergency.
- Stop all operations and ensure closure of all valves and isolation valves
- All out efforts should be made to contain the spread of leakage/fire.
- Saving of human life shall get priority in comparison to stocks/assets.
- Plant personnel without specific duties should assemble at the nominated place
- All vehicles except those required for emergency use should be moved away from the operating area, in an orderly manner at pre-nominated route.
- Electrical system except for control supplies, utilities, lighting and fire fighting system should be isolated.
- If the feed to the fire cannot be cut off, the fire must be controlled and not extinguished.
- Start water spray system at areas involved in or exposed to fire risks.
- In case of leakage of chemicals without fire and inability to stop the flow, take all precautions to avoid source of ignition.
- Block all roads in the adjacent area and enlist Police support for the purpose if warranted.



## Fire Fighting Operations

- Enlist support of local fire brigade and neighboring industries.
- If escaping vapor cannot be stopped, jets of water should be directed at the point of leakage to asset controlled release of vapor and in between water fog should be used for dilution and rapid dispersion of vapor cloud.
- Fire fighting personnel working in or close to un-ignited vapor clouds or close to fire must wear protective clothing and equipment including safety harness and manned life line. They must be protected continuously by water sprays. Water protection for fire fighters should never be shut off even though the flames appear to have been extinguished until all personnel are safely out of the danger area.
- Exercise care to ensure that static charge is not generated in vapor cloud. For this purpose, solid jets of water must be avoided, instead for nozzles should be used.
- Fire fighters should advance towards a fire down – wind if possible.
- Cylinder fire should be approached using proper barricades / protection to avoid direct hit from flying cylinders.
- If the only valve that can be used to stop the leakage is surrounded by fire, it may not be possible to close it manually. The attempt should be directed by trained persons only. The person attempting the closure should be continuously protected by means of water spraying (through fog nozzles), fire entry suit, water jet blanket or any other approved equipment. The person must be equipped with a safety harness and manned life line.
- Any rapid increase in pressure or noise level of product discharged through safety relief valve of the vessel/pipeline should be treated as a warning of over pressurization. In such cases all personnel should be evacuated immediately
- As in case of any emergency situation, it is of paramount importance to avoid endangering human life in the event of fire involving or seriously exposing equipment containing chemicals or serious leakage of chemicals without the fire.

## Action in the event of chemical leakage without fire

- Take basic action as detailed in (1) above
- If escaping is not on fire, close any valve which will stop the flow.

## Action in the event of fire

- ❖ Take basic action as detailed in (1) above.
- ❖ Extinguish Fires – A small fire at the point of leakage should be extinguished by enveloping with a water spray. However, it is against, stressed that fire should not, except in special circumstances explained earlier, be extinguished until the escape of product has been stopped.
- ❖ Fire fighting procedure – Fire fighting procedures would vary depending upon various factors such as nature, sources sizes, location etc of fire. Basic fire fighting techniques have been explained earlier in section (2). However, for the purpose of guidelines, fire fighting techniques for few common cases are as follows:
- ❖ Cylinder Fire If a cylinder is involved in fire, internal pressure may start rising and if not relieved the built up pressure could rise and ultimately rupture the container. Ignition of the escaping gas would aggravate the fire but the release of pressure would reduce the possibility of rupture of the container. No attempt should be made to extinguish the burning gas. But the container and other containers in the vicinity should be kept cool by water sprays until the

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contents of the container have burnt away. If the gas leakage does not ignite, the container should be approached from upwind (if in the open air) and be removed to a place of safety remote from sources of ignition.

- ❖ Cylinders not directly involved in the fire should be moved away from heat exposure, while applying cooling water sprays on cylinder directly involved.
- ❖ Fire on storage vessel: If a pressure vessel is exposed to radiant heat from external fire, it should be kept cool by water sprays to prevent excessive pressure rise in the vessel. Cooling water sprays must be applied without delay in the heat affected areas using fixed water sprinkler system or equivalent spray water coverage, through fixed monitors or other equipment. Cooling the vessel with water sprays reduces the heat input to the vessel and thereby reduces the pressure, thus reducing the rate of discharge from the relief valves.

### Fire Fighting Organization Plan

A plan of action for use in the event of a major leakage of with a fire or risk of fire is essential. Such a plan must be carefully prepared for each area. It should be fully understood by all the Port supervisory personnel and other personnel's responsibilities for action as per plan. It shall be based on the following:

- Port personnel shall be fully trained for specialized techniques necessary for combating leakages and fires.
- If leakage and / or fire occurs, all personnel should use the equipment provided and to carry out their allotted tasks as detailed in the fire fighting organization plan.
- Personnel should be conversant with fire control equipment and also its location.
- Port personnel should be familiar with the standard recognition markings of the control, first-aid and all safety equipment, must know the location of emergency exits, and they should know the location of water points/monitors and must be familiar with the sound of the emergency (fire) alarm.
- The fire fighting organization plan together with layout of fire fighting and safety devices shall be displayed at prominent places and explained to all personnel. It shall include the following functions, expanded to suit the location facilities / equipment:
  - Sounding the emergency (fire) alarm.
  - Shutting off the supply to any leakage point / fire.
  - Summoning the fire brigade / police
  - Fire control, with first-aid, fire fighting equipment
  - Closing down all operations in the area pertaining to emergency
  - Preventing all sources of ignition in case flammable substance' leak occurs
  - Evacuation of vehicles
  - Evacuation and mustering of personnel
  - Establishing an emergency fire-control center
  - Traffic control
  - Stations and duties of all personnel
  - Policing of affected areas
  - Any other specialized duties
  - Display of fire brigade, ambulance, Police telephone numbers etc.
  - All clear signal by competent person.

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### Liaison with local Fire Brigade

Close co-operation with the local fire authorities is essential and shall take the following form:

- Fire brigade other than of Port should be made familiar with layout of plant and the location of important equipment / facilities provided, and their method of use. Mock fire drills / exercise jointly by plant personnel and outside fire brigades shall be planned.
- Fire fighting equipment at the plant shall be compatible with the outside fire brigade equipment, otherwise adopters shall be kept ready for hoses,
- The outside fire brigade shall be aware of the ports fire fighting organization plan and the views held at the plan regarding the most effective fire control method. (Water insoluble)
- In the event of an emergency / fire, the Port manager and / or his representative shall advise the Fire Officer about particular or potential hazards that may be present at that particular point of time.

### Fire Drills & Training

- ❖ Drills for all plant personnel, making use of the Fire Fighting Organization plan and practicing the specialized techniques required for fighting fires or dispensing / diluting vapor shall be held minimum once in a month.
- ❖ The drills should cover various types of incidents, e.g. Major spillage, leak / fire, cylinder fire etc.
- ❖ Extinguishers due for recharging due for hydro testing shall be discharged during drills and replenished subsequently 50% (Min.) stock of refills as replenishment for Fire Extinguishers should be maintained.
- ❖ The fire pump should be run, sprinkler system activated, emergency systems tested, water hoses run out and spray / set techniques practiced during drills.
- ❖ Fire alarm shall be sounded / tested / neighbouring areas and the fire brigade shall be warned in advance of this test).
- ❖ Protective clothing, mask and any other specialized safety equipment available shall be tried out during drills to train all concerned in their application.
- ❖ The local fire brigade should be encouraged to participate in fire drills periodically.
- ❖ Any shortcoming, noticed during the drill shall be rectified.

### ON-SITE EMERGENCY PLAN (DISASTER MANAGEMENT PLAN)

It is basically a pre-plan to handle any emergency situation of a higher magnitude arising out of factors listed below:

- ✓ Major fire / explosions
- ✓ Lighting
- ✓ Heavy floods
- ✓ Earthquakes
- ✓ Sabotage/ terrorist outrage
- ✓ War situation

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Due to varying risk potentials and also varying hazards at / around each location \_ON SITE EMERGENCY PLAN\_ for each location shall be drawn up individually based on the outline given below:

- Identify disaster scenario i.e. the situations under which the plan would become operational. Plan for the worst possible scenario.
- Identify resources required from each of the outside agencies.
- Establish outside agencies, role of each agency and obtain their commitment for rendering the assistance in crises situation as per the agreed plan.
- Establish organogram for ON SITE EMERGENCY PLAN based on available manpower in various groups and identify the leader and alternative leader for each of the groups and the role to be played by each team in various likely crises situations.
- Identify Disaster Control room / group.
- Furnish detailed data and drawings relevant for the crises management.
- Mock drills to be conducted minimum once a year.
- Modify the plan based on the experience gained through mock drills and try out the modified plan through subsequent mock drills.
- The plan shall be updated as and when the changes recorded in the plan occur and communication sent to all concerned.

### Communication organogram

As a part of ON SITE EMERGENCY PLAN, communication organogram shall be drawn up giving flow of communication from the originating location to various local agencies and also to Statutory Authorities and upwards within the organization to mobilize support and to consider alternatives for maintaining essential supplies. **(As mentioned in Chapter 3.13 & 3.14 Communication & Public Affairs)**

### MANAGER (SITE MAIN CONTROLLER)

1. Rush to the port on receiving the message of the incident
2. Call other persons if required.
3. Inform hospitals, doctor, police, dist.authorities, Director, Industrial Safety & Health
4. Arrange for roll call of workers and find if anyone missing
5. Arrange for first aid of injured and hospitalization
6. Arrange food / water for persons controlling the emergency
7. Arrange for money
8. Assess situation & determine area likely to be affected

### OCCUPIER

1. Prepare a statement for press & public release and take responsibilities of press and public relationship
2. Plan out rehabilitation / post emergency activities

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## 6.02 ROLE OF MANAGEMENT

A copy of this on-site emergency to be submitted in duplicate to Deputy Director, Industrial Safety & Health, District Authority.


## 6.03 ROLE OF POLICE AND EVACUTION AUTHORITY

Police may be required for maintaining law and order outside the factory and on the approach road.


## 6.04 ROLE OF MUTUAL AID UNITS

Agreement with nearby units is to be made for providing help, aid, assistance, vehicle, expert to overcome the situation.




	<b>ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED</b>	
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	Authorized by: AGM (QHSE) Rev : 08 Issue No. : 03	Date: 15 <sup>th</sup> July 2021


Annexure – 1																																	
IDENTIFICATION OF FACTORY																																	
Full Name & Address of factory			<b>ADANI PORTS and SEZ LIMITED</b> <b>P.O. Box 1, Mundra – 370 421</b> <b>(KUTCH)</b> <b>Gujarat, India.</b>																														
Phone	02838-289248		Office																														
Fax No.	02838-226301		E-mail	<a href="mailto:info@mundraport.com">info@mundraport.com</a>																													
Full Name & Address of the Occupier			<b>DR. MALAY MAHADEVIA</b> C/O. ADANI PORTS & S.E.Z. LIMITED NAVINAL ISLAND, MUNDRA.																														
Phone No.			Office	Residence																													
			--	--																													
Full Name & Address of the Manager			<b>CEO. DOUGLAS CHARLES SMITH</b> C/O. ADANI PORTS & S.E.Z. LTD., NAVINAL ISLAND, MUNDRA																														
Phone No.			Office	Residence																													
			02838- 255726	--																													
Manufacturing Process			Handling of Dry and Liquid Cargo in Bulk																														
<table border="1" style="width: 100%;"> <tr> <th rowspan="2">Name of the Shift</th> <th colspan="3">Maximum Worker at a time</th> <th rowspan="7">In “Workers” include all Employees, Contract Workers, Trainees ,Apprentices, etc.</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Total</th> </tr> <tr> <td>General Shift – G</td> <td>1187</td> <td>42</td> <td>1229</td> </tr> <tr> <td>Shift – A</td> <td>402</td> <td></td> <td>402</td> </tr> <tr> <td>Shift – B</td> <td>402</td> <td></td> <td>402</td> </tr> <tr> <td>Shift – C</td> <td>380</td> <td></td> <td>380</td> </tr> <tr> <td>Total Shifts:</td> <td>2371</td> <td>42</td> <td>2413</td> </tr> </table>						Name of the Shift	Maximum Worker at a time			In “Workers” include all Employees, Contract Workers, Trainees ,Apprentices, etc.	Male	Female	Total	General Shift – G	1187	42	1229	Shift – A	402		402	Shift – B	402		402	Shift – C	380		380	Total Shifts:	2371	42	2413
Name of the Shift	Maximum Worker at a time			In “Workers” include all Employees, Contract Workers, Trainees ,Apprentices, etc.																													
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General Shift – G	1187	42	1229																														
Shift – A	402		402																														
Shift – B	402		402																														
Shift – C	380		380																														
Total Shifts:	2371	42	2413																														
First Person to be contacted in case of emergency :																																	
Name of the shift	Name & Designation	Place of Availability	Phone No.																														
			Mobile	In Factory	Residence																												
(A),(B),(C) shifts	Port Operation Center	POC office	9825000949	02838-255762 02838-255781	-																												
Any Other information, if any : Any of the persons will be available round the clock :																																	

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Annexure – 4									
STORAGE HAZARDS & CONTROL									
Name of the hazardous substance (Mention concentration if any)	Sr. No. of the MSDS enclosed	Quantity		Place of its storage	Operating pressure & Temp.	Type of Hazards possible (Fire, explosion, Toxic release, Spill etc.)	Control Measures Provided	In charge Person	
		Maximum That can be stored	Actually stored (Including in process & handling)					Name & Designation	Phone No.
1	2	3	4	5	6	7	8	9	10
A. <u>Raw Materials:</u>	Available	Storage of Liquid 2.80 Lac KL	50692.398 MT as on 28.09.08	Liquid Storage Tanks	Ambient Temperature and Pressure	Fire, explosion, Toxic Release, Spill	Water Sprinkler, Foam Pourer, Hydrant System	Mr. Anand R. Marathe (Head – LT)	9099005225
B. Finished Product:	--	--	--	--	--	--	--	--	--
C. Intermediates	--	--	--	--	--	--	--	--	--
D. Bye-Products :	--	--	--	--	--	--	--	--	--
E. Other: (E.g. Catalysts, inhibitors etc.)	--	--	--	--	--	--	--	--	--
<b>Note:</b> There is no process or manufacturing activity only storage handling of dry and liquid cargo in bulk.									

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Annexure – 6									
PROCESS & VESSEL HAZARDS AND CONTROLS									
Sr. No.	Name of the Plant, Department or place	Name of the hazardous process and operation	Materials in the process/ operation with their quantity	Name of the vessel and its location	Operating parameters: (Pressure, Temp. etc)	Type of hazards possible (exothermic, run away, pressure release, toxic release, fire, explosion etc)	Control Measures provided	In charge Person	
								Name	Tele. No.
1	2	3	4	5	6	7	8	9	10
1	Air compressor (LT workshop)	Air compression	Compressed Air	Air driers & Air Receivers	Pressure	High Pressure release	Safety Valve,	Mr. Anand R. Marathe (Head – LT)	9099005225
2	Nitrogen compressor (LT workshop)	Nitrogen compression	Nitrogen	Nitrogen Receiver	Pressure	Nitrogen release with high pressure	Safety valve		


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Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
1.	Used/Spent Oil	300.0 MT	All the departments	Reception, Collection, Storage, Transportation & Disposal by selling out to registered recycler/ reprocessor	Send to authorized recycler	-----	Disposal by selling out to registered recycler/ reprocessor	Mr. Ashok Sharma, Central Store 8980015147 (M)
2.	ETP Sludge	1.095 MT	Liquid Terminal	Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)


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Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
3.	Sludge & Filters contaminated with oil	5.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Ashok Sharma, Central Store 8980015147 (M)




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Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
4.	Waste Residue Containing Oil	100.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Sanghi Cement / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Bhagwat Swaroop Sharma Environment 7622947676 (M)
5.	Bottom sludge	Whatever quantity generated	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)

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Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
6.	Pig Waste	24.0 MT	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Anand Marathe Liquid Terminal 9099005225 (M)


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**Annexure – 13  
WEATHER CONDITIONS**

Sr. No.	Period of the year	Wind Velocity, M/Sec.	Wind Direction	Weather conditions	Pasquill classification A to F
	Month				
1	2	3	4	5	6
1	JANUARY	5-7	NNE / NE	CALM	D
2	FEBRUARY	5-7	NNE / NE	CALM	D
3	MARCH	7-9	SSW / SW	CALM	D
4	APRIL	9-10	SSW / SW	CALM	D
5	MAY	10-12	WSW / SW	SLIGHT	D
6	JUNE	10-12	WSW / SW	MODERATE / ROUGH	D
7	JULY	12-15	WSW / SW	ROUGH	D
8	AUGUST	12-15	WSW / SW	ROUGH / MODERATE	D
9	SEPTEMBER	8-10	WSW / SW	SLIGHT	D
10	OCTOBER	8-9	WSW / SW	CALM	D
11	NOVEMBER	5-7	WSW / SW	CALM	D
12	DECEMBER	5-7	NNE / NE	CALM	D

**Legend:** A: Extremely Unstable  
 B: Moderately Unstable  
 C: Slightly Unstable  
 D: Natural  
 E: Slightly Stable  
 F: Moderately Stable


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Annexure – 14									
INCIDENT CONTROLLERS									
Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Bhagwat Upadhye	Head – Dry Cargo	Tug Berth Building	Shantivan Colony	98792 03599 02838-255870	--	Mr. Mahavirsinh Jhala	Tug Berth Building	9687639228 02838-255838
2	Mr. Anand R. Marathe	Head - LT	Liquid Terminal	Shantivan Colony	90990 05225 02838 - 255742	4459	Mr. K R Rao	Liquid Terminal	99252 03436 02838-255872
3	Mr. Ramde Karangiya	Head – AMCT	(AMCT) CT2- New Building	Samudra Township	9099005240 02838 – 255732	--	Mr. Dharmendra Parmar	(AMCT) CT2- New Building	8980015456 02838 - 255917
4	Mr. Jagdish Patel	Head - AICTPL	(AICTPL) CT3 – Building	Samudra Township	99798 55979 02838 – 255732	--	Mr. Hariprasad Desani	(AICTPL) CT3 – Building	89800 15124
5	Mr. Philip Monis	Head - ACMTPL	(ACMTPL) CT4 – Building	Shantivan Colony	99099 27287 02838 - 255809	4458	Mr. Ramesh Bhagat	(ACMTPL) CT4 – Building	8980048879 02838 - 255409
6	Mr. Mavji Vaghamshi	Head - ES	Tug Berth Building	Shantivan Colony	97277 84691 02838-255949	--	Mr. Kuldipsinh Zala	Tug Berth Building	9727784692 02838 - 255949
7	Capt. Sachin Srivastava	Head – Marine	Tug Berth Building	Shantivan Colony	6359883102 02838 – 255727	4629 / 4630	Capt. Divya Gupta	Tug Berth Building	6359631088 02838- 255947


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8	Mr. Jawed Iqbal	Head- Railway Services	Railway Building	Shantivan Colony	98982 91000 02838 – 255763	4477	Mr. O P Sharma	Railway Building	98253 00413 02838 - 255765
9	Mr. Sujan Roy	Head – Howe	PUB Building	Shantivan Colony	77520 19112 02838 – 255581	4721	Mr. Vikas Arora	PUB Building	98792 03557 02838 - 259142
10	Mr. Arindam Goswami	Head-HR	Adani House	Shantivan Colony	90990 05899 02838 - 255723	4635 / 4636	Mr. Shashikant Patyal	Adani House	98711 10840 02838 - 255164




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Annexure – 14B (West Basin)									
INCIDENT CONTROLLERS									
Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Harinder Singh	Head – West Basin Port	SS-1	Shantivan Colony	90999 99260	4623 4624	Mr. Kashyap Pandya	SS-1	9925223632
2	Mr. Nirbhay Devmurari	Associate Manager	SS-1	Samudra Township	89800 15303	--	Mr. Ketan Joshi	SS-1	89800 15057
3	Mr. Bibhudatta Ray	Sr. Manager – DC	SS-1	Shantivan Colony	89800 15282	B-block	Mr. Kasulu Nagireddy	SS-1	89800 15284

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Annexure – 15									
DEPUTY INCIDENT CONTROLLERS									
Sr. No.	Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
	Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	3	4	6	7	8	9	10	11	12
1	Mr. Mahavirsinh Jhala	Manager – Dry Cargo	Tug Berth Building	Shantivan Colony	89800 15471 02838-255939	--	Mr. Mayursinh Jadeja	FCC	8980048813 02838-255987
2	Mr. K R Rao	Sr. Manager – LT	Liquid Terminal	Shantivan Colony	99252 03436 02838 - 255745	4501	Mr. Manish Jain	Liquid Terminal	98796 14715 02838 - 284419
3	Mr. Dharmendra Parmar	Associate Manager– AMCT	(AMCT) CT2- New Building	Samundra Township	8980015456 02838 - 255917	4458	Duty Superintendent	(AMCT) CT2- New Building	96876 39248
4	Mr. Hariprasad Desani	Sr. Manager – AICTPL	(AICTPL) CT3 – Building	Samundra Township	89800 15124	--	Duty Superintendent	(AICTPL) CT3 – Building	89800 48857
5	Mr. Ramesh Bhagat	Manager - AICTPL	(ACMTPL) CT4 – Building	Samundra Township	8980048879 02838 - 255409	4466	Duty Superintendent	(ACMTPL) CT4 – Building	70690 83090

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6	Mr. Kuldipsinh Zala	DGM-ES	Tug Berth Building	Shantivan Colony	9727784692 02838 - 255949	4506	Mr. Devendra Dubey	Tug Berth Building	98792 03578 2838-255832
7	Capt. Divya Gupta	DGM- Marine	Tug Berth Building	Shantivan Colony	6359631088 02838- 255947	4444	Mr. Sudhakar Singh	Tug Berth Building	70690 83039 02838-255787
8	Mr. O P Sharma	AGM – Railway	Railway Building	Shantivan Colony	98253 00413 02838 - 255765	4428	Mr. Paresh Palan	Railway Building	99252 03424 02838-255787
9	Mr. Vikas Arora	DGM – Howe	PUB Building	Shantivan Colony	98792 03557 02838 - 259142	4482	Mr. M. Janoti	PUB Building	89808 02256 02838 – 255719
10	Mr. Shashikant Patyal	GM-Admin	Adani House	Shantivan Colony	9871110840 02838 - 255164	--	Mr. Supratim Sengupta	Adani House	9979855956 02838 - 255158


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Annexure – 15B (West Basin)								
DEPUTY INCIDENT CONTROLLERS								
Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
		In Factory	Residence Address	In the Factory	Residence			
2	3	4	5	6	7	8	9	10
Mr. Kashyap Pandya	Senior Manager – WB	SS-1	Shantivan Colony	9925223632	4517	Mr. Nital Bhut	SS-1	89800 15358
Mr. Bibhudatta Ray	Sr. Manager - DC	SS-1	Samudra Township	89800 15282	B – Block	Mr. Kasulu Nagireddy	SS-1	89800 15284
Mr. Kashyap Pandya	Sr. Manager ES – MHS	SS-1	Shantivan Colony	97277 84692	4472	Mr. Mayur Sadhu	SS-1	8980 015121
Mr. Nirbhay Devmurari	Asso. Manager ES – MHS	SS-1	Samudra Township	89800 15303	Hostel Block	Mr. Ketan Joshi	SS-1	89800 15057
Supporting Staff of Channai Radha [Engineering Services]								
Name	Designation	Place of Availability in Factory		Residence	Phone No.			
Mr. Ravi V	RM – Channai Radha	Workshop		Mundra	8607700609			
Mr. Tapankumar Sarkar	Operation Head - Channai Radha	Workshop		Mundra	9726412631			
Mr. Mahesh Kumar	Maintenance Head – Channai Radha	Workshop		Mundra	9726418881			
Mr. Arha Chakrabarty	HOS E & I - Channai Radha	Workshop		Mundra	9726429031			
Mr. Lakshmanan T	Mechanical Head - Channai Radha	Workshop		Mundra	8683800531			


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Annexure – 16									
SITE MAIN CONTROLLERS									
Sr. No	Site Main Controllers						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	6357160100 02838 – 255002	4568 / 4569	Mr. Harinder Singh Head West Basin	West Basin	90999 99260 02838-252708




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Annexure – 17							
KEY PERSONNEL							
EMERGENCY CONTACT NUMBERS							
Sr. NO.	NAME	Designation	Place of Availability		Phone No		
			Factory	Residence	Land line	Residence	Mobile
1	2	3	4	5	6	7	8
1	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	02838 – 255002		6357160100
2	Mr. Harinder Singh	Head - WB	SS – 01 WB	Shantivan Colony	--	4623 / 4624	90999 99260
3	Mr. Rakshit Shah	ED	Adani House	Shantivan Colony	02838 - 255001	52497	99791 21111
4	Mr. Mavji Vaghamshi	Head-ES	Tug Berth Bld.	Shantivan Colony	02838 - 255713	--	97277 84691
5	Mr. Anand R. Marathe	Head- LT	Liquid Terminal	Shantivan Colony	02838 - 255742	4459	90990 05225
6	Mr. Arindam Goswami	Head - HR	Adani House	Shantivan Colony	02838 - 255723	--	90990 05225
7	Mr. Ramde Karangiya	Head – AMCT	CT2- New Bld.	Samudra Township	02838 – 255732	4617 / 4618	90990 05240
8	Mr. Jagdish Patel	Head – AICTPL	CT3 Bld.	Samudra Township	02838 - 255733	--	89808 02599
9	Mr. Philip Monis	Head - ACMTPL	CT4 Bld.	Shantivan Colony	02838 – 255727	4629 / 4630	9100215558
10	Capt. Sachin Srivastava	Head – Marine	Tug Berth Bldg.	Shantivan Colony	02838 – 255727	4629 / 4630	6359883102
11	Mr. Bhagwat Upadhye	Head – Dry Cargo	Tug Berth Bldg.	Shantivan Colony	02838-255870	--	98792 03599
12	Mr. Jawed Iqbal	Head - Railway	Rly. Building	Shantivan Colony	02838 – 255763	--	90999 91319
13	Mr. Dattatray Gore	Head – OHS & F	CT2- New Bld.	Samudra Township	02838-255777	--	75748 94383
14	Mr. Neeraj Kaushik	Head - Security	Adani House	Shantivan Colony	02838-255800	--	9109988165
15	Mr. Mukul Varshney	SEZ Utilities	Adani House	Samudra Township	02838-255828		6357160086

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Annexure – 19								
SAFE ASSEMBLY POINTS								
Identificati on Sr. No. of the Assembly Point	Location	Accomm odation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential address		
1	2	3	4	5	6	7	8	9
Zone 1.	Terminal -1 (Sec. Gate)	100	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 2.	CG 7	200	Mr. Dattatray Gore	Head – OHS & F	CT2 New bld.	Samudra Township	02838 – 255777	75748 94383
Zone 3.	Driver Canteen	200	Mr. Anand Marathe	Head – LT	LT	Shantivan Colony	02838 - 255742	90990 05225
Zone 4.	LT - Behind Encl-09	200	Mr. Anand Marathe	Head – LT	LT	Shantivan Colony	02838 - 255742	90990 05225
Zone 5.	Old Admin Canteen	200	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bld.	Samudra Township	02838 - 255870	98792 03599
Zone 6.	Rly. Buldng	200	Mr. Jawed Iqbal	Head – Rly	Rly. Buldng	Shantivan Colony	02838 – 255763	98982 91000
Zone 7.	Terminal 2 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 8.	AMCT CT-2 (Sec. Gate)	200	Mr. Ramde Karangiya	Head – AMCT	CT2 New bld.	Shantivan Colony	02838 – 255732	90990 05240
Zone 9.	Main Gate	500	Mr. Neeraj Kaushik	AGM - Security	Main Gate	Shantivan Colony	02838 - 255800	9109988165
Zone 10.	PUB	500	Mr. Sujan Roy	Head Howe	PUB	Shantivan Colony	02838 - 255932	7752019112
Zone 11.	Adani House	200	Mr. Arindam Goswami	Head – HR	Adani House	Shantivan Colony	02838 - 255723	90990 05899
Zone 12.	Terminal – 3 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 13.	South Basin (Sec. Gate)	500	Mr. Jagdish Patel	Head - AICTPL	CT – 03 (AICTPL)	Samudra Township	02838 - 255733	8980802599
Zone 14.	ACMTPL (Sec. Gate)	500	Mr. Philip Monis	Head – ACMTPL	CT – 04 (ACMTPL)	Samudra Township	02838 - 255809	91002 15558

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Annexure – 19B (West Basin)								
SAFE ASSEMBLY POINTS								
Identification Sr. No. of the Assembly Point	Location	Accommo dation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential Address		
1	2	3	4	5	6	7	8	9
Zone 1	Opp. SS-1	100	Mr. Vimal Baldaniya	Sr. Engineer -ES	SS-1	---	----	89800 15123
			Mr. Jignesh Kansara	Supervisor – DC	SS-1	Mundra	02838 – 252936	99132 43060
Zone 2	Nr. Howe Office	100	Mr. Bharat Pokar	Officer – Safety	Howe office	Mundra	----	89800 15467
Zone 3	GIS	100	Mr. Ketan Joshi	AM – E & I	SS-1	Samudra Township	----	89800 15057
			Shift In charge – E & I	----	SS-1	----	----	89800 15212
Zone 4	Nr. Main Gate	100	Mr. Khadim Hussain	Junior Officer, Security	Main Gate	----	----	84609 28563
			Security Shift Incharge	----	Main Gate	----	02838 – 252900	97277 84645
Zone 5	Approach-3	100	Mr. Kashyap Pandya	Sr.Mgr – MHS	SS-1	Shantivan Colony	02838 – 255973	99252 23632
			Mr. Bibhudatta Ray	Sr.Mgr. – DC	SS-1	Samudra Township	02838 – 255924	89800 15282
Zone 6	Amenities Building	100	Mr. Narendrasinh Jadeja	Senior Engineer, ES	SS-1	Shantivan Colony	02838 – 2562381	89800 16461
			Mr. Paresh Gadhavi	Assistant-Admin	SS-1	Mundra	02838 – 255969	89800 16462

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Annexure – 21										
Fire & Toxicity Control Arrangements										
Fire Water & Other sources	Nos. of Reservoir	02 (U/G water reservoir)	Nos. of Tanks	04 (O/H water storage tank)	Total Quantity				19358 KL	Nos. of CO2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Sprinklers/Monitors					
					Fixed		Portable		Alternative power arrangement	
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada water	385	<u>Diesel pump:</u> 06 no. – 273 M³/hr 02 no. – 410 M³/hr 02 no. – 616	60 mtr lengths – 30 nos.	04 no. fire tender	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm²	60 mtr horizont al & 40 mtr vertical throw	7 kg/cm²	Diesel Generator backup	500 Nos.

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		M <sup>3</sup> /hr <u>Electric pump:</u> 03 no. – 273 M <sup>3</sup> /hr 02 no. – 410 M <sup>3</sup> /hr 04 no. – 616 M <sup>3</sup> /hr 01 no. – 100 M <sup>3</sup> /hr <u>Jockey pump:</u> 06 no. – 20 to 40 M <sup>3</sup> /hr 01 no. – 96 M <sup>3</sup> /hr		<u>Capacity:</u> 1) Water tender – 6 KL Water  2) Foam tender 01 - 6 KL Water & 3 KL Foam  3) Foam tender 02 - 5 KL water & 1 KL foam  4) Multipurpose fire tender - 8 KL Water - 3 KL Foam - 45 Kg CO <sub>2</sub> - 150 Kg DCP							
--	--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--	--	--	--	--




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Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipments			
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Respiratory		Non-respiratory	
								Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23
Sodium bicarbonate; 2000 kg	700 Nos.	AFFF & AR-AFFF 28 KL with system & 2 KL storage	08 Nos.	163 cm X 152 cm 04 nos.	Nil	Nil	Nil	1) Self-Contained Breathing Apparatus Set 2) Airline Self-Contained Breathing Apparatus Set	1) 12 nos. 2) 01 Nos.	Safety Helmet Gumboot	50 nos. 25 Nos.

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Annexure – 21B (West Basin)										
Fire & Toxicity Control Arrangements										
Fire Water & Other sources	Nos. of Reservoir	00 (U/G water reservoir)	Nos. of Tanks	02 (O/H water storage tank)	Total Quantity				1100 KL	Nos. of CO <sub>2</sub> Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reels & Total Length	No. of fire tenders and capacity	No. of Monitors 101 nos.				Alternative power arrangement	
					Fixed [99]		Portable [02]			
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada Water	Reservior capacity is 1100 KL	<u>Diesel pump:</u> 01 no. – 273 M <sup>3</sup> /hr	15mts lenghs –  250 nos.	01 no.	30 mtr head	7 kg/cm <sup>2</sup>	20 mtr head	7 kg/cm <sup>2</sup>	Diesel Generator backup	2Kg – 36 4.5Kg – 128
	Nos. of Hydrant 122	<u>Electric pump:</u> 02 no. – 273 M <sup>3</sup> /hr <u>Jockey pump:</u> 02 no. – 10.8 M <sup>3</sup> /hr		<u>Capacity:</u> 1) 5 KL water						

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Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipment			
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Respiratory		Non-respiratory	
								Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23
Sodium bicarbonate; 700 kg	2Kg – 62 5Kg – 15 9Kg – 44 10 Kg – 16 50Kg – 4	AFFF 200 liter	9 Ltr – 7 45 Ltr – 5	01 no.	Nil	Water CO2 type	9 Ltr – 5	Self-Contained Breathing Apparatus Set	03 no	<ul style="list-style-type: none"> <li>Safety Helmet</li> <li>Gumboot</li> <li>Fire Proximity Suit</li> </ul>	25 no.  20 no. 01 no.


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Mutual Aid Arrangement											
Name & Address of the factories & Fire stations	Approx. distance	Contact		FFE available		PPE available		No. of experts & trained persons available	Decontamination substances available	Gas detectors available	Other equipments available
		Person	Phone No.	Type	Quantity	Type	Quantity				
24	25	26	27	28	29	30	31	32	33	34	35
<b>Indian Oil Corporation Limited,</b> Mundra-Panipat Pipeline, Post Box No. – 1, P.O. Mundra, Old Port Road, Mundra, District – Kutch, Gujarat, PIN-370421.	12 km	Mr. Satosh kumar / Mr. Fate kumar	967210 211 / 904106 9414	--	--	--	--	--	--	--	--
<b>Hindustan Petroleum Corporation Limited,</b> Mundra-Delhi Pipeline, P.O. Mundra, IOCL Link Road, Mundra, District – Kutch, Gujarat, PIN-370421.	06 km	M R Chauhan / Mr. Surabh bhatt	992017 3377 / 968760 6093	--	--	--	--	--	--	--	--
<b>Jindal SAW Ltd. (IBU),</b> Village – Samaghoga, Taluka – Mundra, District – Kutch, Gujarat, PIN-370421.	28 km	Mr Girish Kumar / Mr Dipak Kumar	900595 8965 / 968767 8052	--	--	--	--	--	--	--	--

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<b>Adani Power Limited,</b> Adani Power Site, Tunda-Wandh, Mundra-Mandvi Highway, Siracha, Mundra, District – Kutch, Gujarat, PIN-370435.	<b>25 km</b>	<b>Mr. Anil C Datar / Mr. Dinesh Mishra</b>	<b>968766 0356 / 789440 6485</b>	--	--	--	--	--	--	--	--
<b>Costal Gujarat Power Limited,</b> Ultra Mega Power Project, Tunda Vandh Road, Tunda Village, Mundra, District – Kutch, Gujarat, PIN-370435.	<b>28 km</b>	<b>Mr. Pramod Singh /Mr. Jignesh Kumar</b>	<b>922729 5495 / 909999 5701</b>	--	--	--	--	--	--	--	--
<b>Hindustan Mittal Energy Limited</b> Plot no.06 (2), Old port road, Mundra, District -Kutch Gujarat, PIN-370435.	<b>06 Km</b>	<b>Mr Partha Chakrva borty / Mr. Vipin Yadav</b>	<b>989960 0434 / 706900 2406</b>	-	-	-	-	-	-	-	-




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Annexure – 22												
Medical Arrangements												
First-aid Centers / Ambulance room / OHC / Hospital							Ambulance van or alternate arrangement					
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipments	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
1	2	3	4	5	6	7	8	9	10	11	12	13
1	OHC – NR. LT APSEZ LTD	02838 25571 0 89800 15070	On Duty Dr.	8511078 199	Samdra Township	All equipments as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. LT APSEZ LTD	4 Bed capacity	All equipments as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasi nh

	<p style="text-align: center;"><b>ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED</b></p> <hr/> <p style="text-align: center;"><b>EMERGENCY ACTION PLAN</b></p> <p>Authorized by: AGM (QHSE) Issue No. : 03</p> <p style="text-align: right;">Rev : 08 Date: 15<sup>th</sup> July 2021</p>		

2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838 - 25589 9	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh  9099858095
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Annexure – 22B (West Basin)												
Medical Arrangements												
First-aid Centers / Ambulance room / OHC / Hospital							Ambulance van or alternate arrangement					
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipment	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
					Phone	Address						
1	OHC – Nr. SS-1 Building	02838-255984 8980015155	Medical Officer	96876 39281	Samudra Township	All equipmen t as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. SS-1 Building	consulti ng	All equipme nt as per Factory Act 1948	1.Bharat Dhafada (Gundala- Mundra- 9925203405) 2.Bhaves h L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhaves h A Maheshwari 9.Yogendras inh

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2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838-255899	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095
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Annexure – 23									
TRANSPORT & EVACUATION ARRANGEMENT									
Type of siren, if any, for evacuation				Steam & Electrical hooter type siren					
Own Transport Center					Own Vehicles				
Name of Location	Phone No.	In charge person			Sr. No.	Type & No.	Capacity	No & Type of public warning instruments	Driver's name & Address
		Name & Designation	Residence						
			Phone	Address					
Mundra	9909927251	Mr. Archan Bhat	9909927251	Mundra	During Day Time (0730 hrs. to 1830 hrs.)				
					1	HMV	56 seater x 8 54 Seater x 13	Nil	All drivers available
					2	LMV	7 seater x 25 (Available at different location)		
During Night Time (1830 hrs. to 0700 hrs.)									




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					1	HMV	56 Seater x 3 (at SVC)	Nil	Naran, Rupsinh, Tulsi Vijay raj, Mulji, Mintoo, Satendra, Pravin, Kapil, (All available at Port, SVC and Drivers Rest room)
					2	HMV	13 Seater x 2 (at CT 2 & CT3)		
					3	LMV	7 seater x 30 (Dry Cargo – 01, LT – 02, CT 2 – 04, Engg. Service – 01, Marine- 03, Safety-01, Fire-01, Railway-01, Security- 16)		
					4	Ambula nce	05 (02 at Port, 01 WP, 01 SEZ, 01 at SVC)		

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Outside shelters for evacuated persons							
Sr. No .	Name, address & distance	Phone. No.	In charge Person			Accommodation capacity	Facilities available
			Name & Designating	Residence			
				Phone	Address		
11	12	13	14	15	16	17	18
1	Shantivan Colony	09727721638	Mr. Shashikant Patyal	9871110840	Shantivan Colony	1500	Open ground available at SV Colony (Cricket ground and Rang Manch), Shopping Complex available
2	Samundra Township	09727721638	Mr. Shashikant Patyal	9871110840	Samundra Township	2500	Open ground available at Samundra Township(Children Park and utility park), Shopping Complex available

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Annexure – 24											
POLLUTION CONTROL ARRANGEMENTS											
Water Pollution Control				Air Monitoring							
Type & Capacity of effluent treatment plant	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	Type & parameters of tests	Wind direction	Instrument available.	In charge person's name, address & Phone No.				
1	2	3	4	5	6	7	9				
265 KLD	2 sample per month	Mr.Anand R Marathe CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)	Twice a Week	<u>Type</u> Ambient Air Monitoring <u>Parameters</u> PM 10, PM 2.5, SO <sub>2</sub> , NO <sub>x</sub> , CO, Hydrocarbon, Benzene	Wind vane	Respirable Dust Sampler & Fine Particulate Dust Sampler	Mr.Anand R Marathe CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)				
Stack Monitoring				Scrubbers, Incinerators etc.				Land Pollution Controls		Pollution control Board	
No. of sample monitoring & its frequency	Type & parameters of tests	Instrument available.	In charge person's name, address & Phone No	Location	Type & Capacity	For What	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	Permission obtained?	Conditions fulfilled?


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11 sample per month	SO <sub>2</sub> , NO <sub>x</sub> , SPM	Stack Monitoring kit.	As above	----- N A -----	2 sample per month	As above	Yes (As per CC&A)	Yes (As per CC&A)
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Annexure –26											
ALARMS & SIRENS											
Sr. No.	Plant wise alarm points						The alarm (signal) is heard (seen) at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	2	3	4	5	6	7	8	9	10	11	12
1	Liquid Terminal	1) LT Control room, 2) Ground floor of LT office	1 & 2	Roof of the first floor	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
2	Dry Cargo area	Ground floor	3	Roof of fire pump house	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
3	Marine Terminal	Ground floor fire p/h	4	Roof of Marine Terminal building	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
4	Adani House	Ground floor	5	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing




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5	PUB Building	Ground floor	6, 7 & 8	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing
6	ES - Building	Ground floor	9	Roof of ES building	Wailing	Twice in a month	8 km range	All Type of Emergency	Hooter	As per siren code	Wailing
7	AMCT / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
8	Terminal-2	Ground floor fire P/H	11	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
9	AICTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
10	ACMTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing


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Annexure –26B (West Basin)											
ALARMS & SIRENS											
Sr. No.	Plant wise alarm points						The alarm (signal) is heard at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	2	3	4	5	6	7	8	9	10	11	12
1	SS-1	Top floor	1	Roof of SS-1 building	Wailing (Electric)	Twice in a month	8 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing
2	Fire Dept.	Ground floor	1	Fire porta cabin	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing
<div>Code of Siren:</div> <div><div><div>•</div><div>Emergency</div></div><div>: Wailing Siren continuous for one minute with gap Siren for one minute followed by five second gap. Repeated four times.</div><div><div>•</div><div>Testing</div></div><div>: Continuous Siren for one minute (4<sup>th</sup> and 19<sup>th</sup> of Every Month at 1100 hrs.).</div><div><div>•</div><div>All Clear</div></div><div>: Continuous Siren for two minutes.</div></div>											

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**Annexure – 27**  
**INTERNAL PHONES**

Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. ( Internal)	Person available on this phone				
			Name	Designation	Designation or duty under on-site / offsite emergency plan, if any.	Residence	
						Phone No. (Internal)	Address
1	2	3	4		6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4258	SHANTIVAN COLONY
2	FIRE CONTROL ROOM	52801	SHIFT INCHARGE	FIRE OPERATOR	MR. RAKESH CHATURVEDI	4731	SAMUDRA TOWNSHIP
3	MEDICAL	52710	INCHARGE	MEDICAL OFFICER	MEDICAL OFFICER	--	--
4	SECURITY	52300	DUTY OFFICER	OFFICER	MR. NEERAJ KAUSHIK	4504	SHANTIVAN COLONY
5	MARINE CONTROL	52761	SHIFT INCHARGE	HEADMARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY
6	SAFETY OFFICER	52777	SAFETY OFFICER	SAFETY OFFICER	MR. DATTATRAY GORE	--	SAMUDRA TOWNSHIP
7	LT CONTROL ROOM	52744	SHIFT INCHARGE	AVP	MR. ANAND MARATHE	4459	SHANTIVAN COLONY
8	DRY CARGO	52932	SHIFT INCHARGE	HEAD-DC	MR. BHAGWAT UPADHAYE	--	SAMUDRA TOWNSHIP
9	ELECTRICAL & ISTR.	52826	SHIFT INCHARGE	AGM	MR. MAVJI VAGHAMSHI	4506	SHANTIVAN COLONY
10	PORT OFFICE CONTROL	52762	SHIFT INCHARGE	HEAD MARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY


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Annexure – 27B (West Basin)							
INTERNAL PHONES							
Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. ( Internal)	Person available on this phone				
			Designation or duty under on-site / offsite emergency plan, if any.	Designation	Name	Residence	
						Phone No. (Internal)	Address
1	2	3	4	5	6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4181	Shantivan Colony
2	FIRE CONTROL ROOM	52900	SHIFT INCHARGE	AGM	MR. RAKESH CHATURVEDI	4731	Samudra Township
3	MEDICAL	52984	INCHARGE	MEDICAL OFFICER	---	4460	Shantivan Colony
4	SECURITY	52939, 52900	DUTY OFFICER	SR.MANAGER	MR. NEERAJ KAUSHIK	--	Shantivan Colony
5	MARINE CONTROL	52933	SHIFT INCHARGE	GM	CAPT. SACHIN SRIVASTAVA	4726	Shantivan Colony
6	LT CONTROL ROOM		SHIFT INCHARGE	AGM	MR. ANAND R MARATHE	4459	Shantivan Colony
7	DRY CARGO	52936	SHIFT INCHARGE	MANAGER	MR. BIBHUDATTA RAY	4439	Samudra Township
8	ELECTRICAL & INS.	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4506	Shantivan Colony
9	CENTRAL CONTROL ROOM	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4044	Shantivan Colony

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Annexure – 28				
EXTERNAL PHONES				
Sr. No.	Name & Address of the dept. / Service / Person ( including external emergency services)	Phone No. ( External)	Person available	
			Designated person	Services Expected Under On-site / off –site Emergency plan
1.	Bhuj Fire Station	02832 – 222590, 101	Fire Officer	Fire fighting Service
2.	Gandhidham Fire Station	02836-231610, 101	Fire officer	Fire fighting Service
3.	Fire & Ambulance serv.	108	Medical Off.	Fire fighting Service
4.	Kandla Fire Station	02836 - 270176, 270178	Chief Fire Off.	Fire fighting Service
5.	Factory Inspector	02836 – 260020, 260262	Asst. Director	Legal Advisory Service
6.	Collector Office	02832 – 250020, 251805	Collector	Administration Service
7.	Civil Defense	02832-220703	Dy. Collector	Evacuation Service
8.	Hospital, Bhuj	02832 – 221610, 250150	Civil Surgeon	Medical Service
9.	KPT- Hospital, Kandla	02836- 270205, 270633	Medical officer	Medical Service
10.	Police	02832 -250511, 250444	DSP	Law & Order
11.	Police control City	100	Control room	Law & Order
12.	Gujarat Maritime Board	02838-22136	Port Off.	Marine Service
13.	Indian Navy, Porbandar	0286-2240954	Navy Officer	Security service (WAR)
14.	Indian Coast Guards	02831-286430,31(Jhakhau) 0286-2240958 (Porbandar)	Cost Guard officer	Security service



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Annexure – 29						
NOMINATED PERSONS TO DECLARE MAJOR EMERGENCY						
Sr. No .	Name of the plant, department or location	Name & Designation of the nominated persons to declare major emergency	Duty of designation given, if any, under the onsite / off-site emergency plan	Phone No.	Residence	
					Phone No.	Address
1	Mr. Douglas Charles Smith	CEO	Site Main Controller	02838 – 255002	63571 60100	Shantivan colony
2	Mr. Harinder Singh	HEAD - West Basin	Site Main Controller	02838- 252708	90999 99260	Shantivan colony



# **Annexure – 5**



# ADANI Ports And Special Economic Zone Ltd

Mundra -Kutchh

## P.S.P. MONITORING REPORT OF ICCP SYSTEM

MAINT. BASE : Mundra

PIPELINE SECTION : AMC OF CATHODIC PROTECTION FOR SPM-IOCL PIPELINE

Date : 22/04/2023

Criteria for PSP as per OISD 226 / 12.3.5 A or NACE SP0169-2013/ 6.2 underprotected level (-0.85 volt); Overprotected level (-1.2 volt) wrt Cu-CuSO4 reference Electrode

SRL No.	TLP No.	TYPE	Location (detail description)	Chainage (km)	PSP (-ve volt)	Casing PSP(-V)	AC V	Un Protected PSP(-V)	Remarks
1	1	E	Nr. Insulating Joint	0.000	1.210		0.015	0.65	
2	2	D	After Railway Crossing	0.425	1.310	0.61	0.021		
3	3	A	field	1.400	1.320		0.02		
4	4	A	field	2.400	1.310		0.03		
5	5	A	field	3.000	1.220		0.014		
6	6	D	Road crossing	3.440	1.270	0.41	0.011		
7	7	A	field	4.300	1.270		0.006		
8	8	A	field	5.2	1.260		0.012		
9	9	A	IOCL Boundry wall	5.900	1.260		0.01		
10	10	E	Inside IOCL	6.200	1.240		0.021	0.515	

B)

Feeding TRUnit/ CPPSM Locations >>>	TP2
Feed Voltage (DC volt) :	4.26
Feed Current (DC amp) :	4.0
AC voltage (50Hz) at input of TRU/CPPSM:	250V

Graphical Representation (Annexure) : Included

Any other observation/ discrepancy :

Pipeline is well protected

Reviewed by (APSEZL)

Signature :

Name :

Designation :

Monitored by



Signature :

Name :

Designation :

N R ENTERPRISE



 Ports and Logistics	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	PIPE - TO - SOIL MONITORING REPORT	

MAINTENANCE BASE: MUNDRA

DATE: 29.05.2021

PIPELINE SECTION: 48" x 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

REPORT NO.: COR.P53.M&M.R01

CP STATION LOCATION: TP2

DATE OF MONITORING : 28.05.2021

CP SYSTEM PARAMETERS: 4.3 VOLT / 4.1 AMPERE

TLP No	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP(-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	Zn Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.198	-	0.085	-	-	-	-	-	-	-	-	-	1.198	0.668	
2	D	0.425	1.225	-	0.056	1.225	0.655	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.241	-	0.025	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.199	-	0.111	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.214	-	0.124	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.296	-	0.095	1.206	0.545	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.220	-	0.078	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.211	-	0.075	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.201	-	0.105	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.200	-	0.118	-	-	-	-	-	-	-	-	-	1.200	0.595	

Remarks:

Monitored by: Cortigo Technologies Private Limited

Reviewed by: APSEZ Limited

Signature :

Signature :

Name : VIPUL VASAVA

Name :

Designation : CP ENGINEER

Designation :





MAINTENANCE BASE: MUNDRA

DATE: 30.06.2021

PIPELINE SECTION: 48" x 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

REPORT NO.: COR.P53.M&M.R02

CP STATION LOCATION: TP2

DATE OF MONITORING : 26.05.2021 & 29.06.2021

CP SYSTEM PARAMETERS: 1.7 VOLT / 4.6 AMPERE

TLP No	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP(-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	Zn Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.020	-	0.016	-	-	-	-	-	-	-	-	-	1.020	0.868	
2	D	0.425	1.098	-	0.003	1.098	0.526	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.073	-	0.014	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.077	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.027	-	0.007	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.061	-	0.002	1.061	0.508	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.056	-	0.003	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.068	-	0.013	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.018	-	0.008	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.021	-	0.028	-	-	-	-	-	-	-	-	-	1.021	0.879	

Remarks:

Monitored by: Cortigo Technologies

Signature :

Name : VIPUL VASAVA

Designation : CP ENGINEER





Reviewed by: APSEZ Limited

Signature :

Name :

Designation :

 Ports and Logistics	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	PIPE - TO - SOIL MONITORING REPORT	

MAINTENANCE BASE: MUNDRA

DATE: 30.07.2021

PIPELINE SECTION: 48" x 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

REPORT NO.: COR.P53.M&M.R03

CP STATION LOCATION: TP2

DATE OF MONITORING : 26.07.2021

CP SYSTEM PARAMETERS: 3.0 VOLT / 12.4 AMPERE

TLP No	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP(-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	Zn Anode Potential (-V)	Zn Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.204	-	0.018	-	-	-	-	-	-	-	-	-	1.204	1.034	
2	D	0.425	1.213	-	0.022	1.213	0.652	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.182	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.091	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.143	-	0.003	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.138	-	0.007	1.138	0.449	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.147	-	0.013	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200		-		-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.011	-	0.028	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.040	-	0.013	-	-	-	-	-	-	-	-	-	1.040		

Remarks:

Monitored by: Cortigo Technologies Private Limited

Reviewed by: APSEZ Limited

Signature :

Signature :



Name : VIFUL VASAVA

Name :

Designation : CP ENGINEER

Designation :



	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED										
	PIPE - TO - SOIL MONITORING REPORT										

MAINTENANCE BASE: MUNDRA

DATE: 31.08.2021

PIPELINE SECTION: 48" x 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

REPORT NO.: COR.P53.M&amp;M.R05

CP STATION LOCATION: TP2

DATE OF MONITORING : 27.08.2021

CP SYSTEM PARAMETERS: 3.0 VOLT / 12.4 AMPERE

TLP No	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP(-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	Zn Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.199	-	0.003	-	-	-	-	-	-	-	-	-	1.199	0.998	
2	D	0.425	1.208	-	0.012	1.208	0.625	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.177	-	0.041	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.086	-	0.022	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.138	-	0.010	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.133	-	0.045	1.133	0.487	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.142	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200		-		-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.006	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.035	-	0.015	-	-	-	-	-	-	-	-	-	1.035		

Remarks:

Monitored by: Cortigo Technologies Private Limited

Reviewed by: APSEZ Limited

Signature :

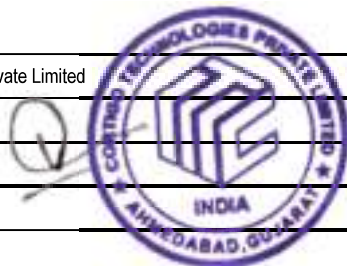
Signature :

Name : VIPUL VASAVA

Name :

Designation : CP ENGINEER

Designation :



	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	PIPE - TO - SOIL MONITORING REPORT	

MAINTENANCE BASE: MUNDRA

DATE: 29.09.2021

PIPELINE SECTION: 48" x 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

REPORT NO.: COR.P53.M&amp;M.R07

CP STATION LOCATION: TP2

DATE OF MONITORING : 27.09.2021

CP SYSTEM PARAMETERS: DC Voltage = 4.4 VOLTS ; DC Current = 3.9 AMPERE

TLP No	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP(-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	Zn Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.407	-	0.029	-	-	-	-	-	-	-	-	-	1.407	1.024	
2	D	0.425	1.427	-	0.030	1.427	0.678	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.451	-	0.024	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.413	-	0.016	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.300	-	0.001	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.339	-	0.001	1.339	0.448	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.377	-	0.015	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.348	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.387	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.383	-	0.018	-	-	-	-	-	-	-	-	-	1.383	0.899	

Monitored by: Cortigo Technologies Private Limited

Reviewed by: APSEZ Limited

Signature :

Signature :

Name : DIPAK VASAVA

Name :

Designation : CP ENGINEER

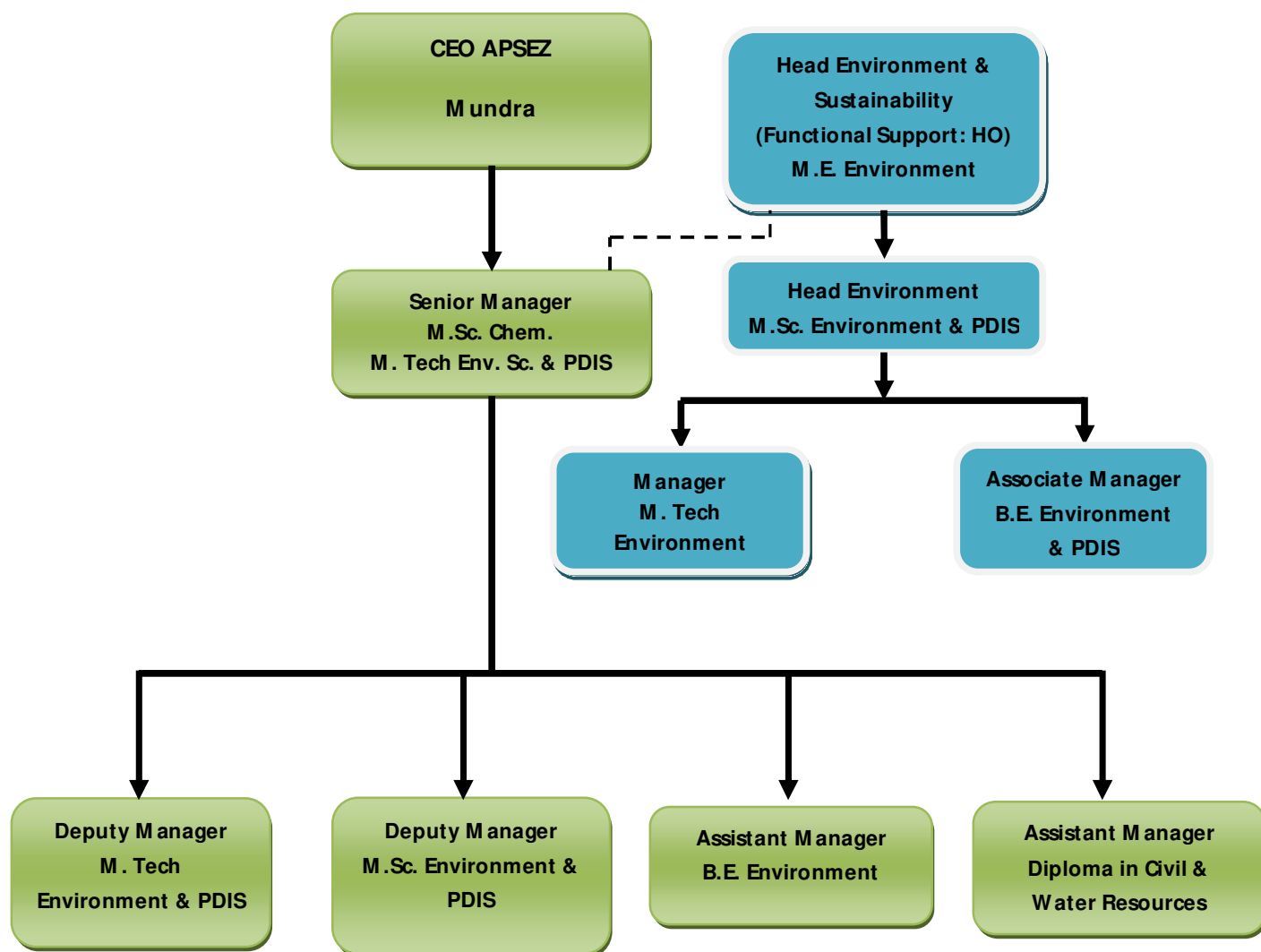
Designation :



# **Annexure – 6**



**Organogram of Environment Management Cell, APSEZ, Mundra**



# **Annexure – 7**

### **Cost of Environmental Protection Measures**

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2019 – 20	2020 – 21	2021 – 22 (Till Sep'21)	2021 – 22
1.	Environmental Study / Audit and Consultancy	0.33	6.2	6.82	7.0
2.	Legal & Statutory Expenses	0.84	10.58	10.04	12.0
3.	Environmental Monitoring Services	21.74	19.17	9.56	20.0
4.	Hazardous / Non-Hazardous Waste Management & Disposal	108.43	83.55	57.64	114.10
5.	Environment Days Celebration and Advertisement / Business development	1.5	5.3	1.81	7.0
6.	Treatment and Disposal of Bio-Medical Waste	1.62	2.09	0.89	2.04
7.	Mangrove Plantation, Monitoring & Conservation	Nil	32.59	Nil	Nil
8.	Other Horticulture Expenses	734.18	689	605.58	865.11
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	110.18	148.49	95.53	219.24
10.	Expenditure of Environment Dept. (Apart from above head)	105.13	89.11	88.28	85.35
<b>Total</b>		<b>1083.95</b>	<b>1086.08</b>	<b>876.15</b>	<b>1331.84</b>

# **Annexure – 8**

## Compliance Report of CIA Study Environment Management Plan

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
<b>1</b>	<b>Land Use Change</b>						
1.1	<p>It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015.</p> <p>New settlements near the SEZ area might create slums.</p> <p>Unorganized urban development leading to poor sanitation and proliferation of vectors and disease.</p>	Level - 1	<p>APSEZ has developed two townships (Shantivan and Samudra) presently accommodating 1668 households. Necessary permissions from concerned authorities were already obtained for the development of townships and Associated infrastructure facilities.</p>	<p>The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.</p>	APSEZ	As and when Required	<p>APSEZ has developed two townships (Shantivan and Samudra) accommodating 2180 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group &amp; SEZ industries. Out of which 88% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 60 nos. of industries (processing &amp; non-processing) are present within the SEZ (45 nos. are in operation). Township facilities are also made by some of SEZ industries within Mundra town for their employees with basic infrastructure facilities and requirements.</p> <p>Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be expanded as per requirement.</p> <p>APSEZ has also been granted permission for receiving domestic sewage @ 2.5 MLD from Mundra village (which was earlier discharged into open area within Mundra region)</p>



S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
							in to wastewater treatment plant for treatment and disposal. APSEZ has already started receiving of domestic sewage from Mundra, which abates the poor sanitation and unhygienic condition within Mundra region. Total project cost for laying domestic sewage underground pipeline with other associated facilities from Mundra to APSEZ is 362 Lacs.
1.2	Once the project is fully developed, due to increase in built up land in the APSEZ area, there will be an increase in the storm water runoff from the facility.	Level-1	The study area experiences scanty rainfall less than 400 mm/year. Considering the natural gradient, ASPEZ have designed and implemented storm water drains in the existing facility to meet the peak daily rainfall of 440 mm/hr. Hence flooding of	Technical feasibility study can be carried out to explore the possibility of developing storm water collection ponds to utilize maximum possible storm water runoff for dust suppression in the coal yard areas during non-rainy days.	APSEZ	Technical Study - one time, Implementation - Continual process	<p>Presently, ~40% of the total SEZ is developed. Based on technical studies, APSEZ has developed adequate storm water facilities that meets with daily demand as per recorded highest rainfall.</p> <p>At present all existing coal yards are designed with drain, for collection of water during water sprinkling and rainfall, which is carried away to dump pond. Supernatant water from dump pond is being collected and used for dust suppression activities or after sedimentation, discharged to sea. Details of drain and dump pond has been submitted in along with EC compliance report (Oct 19 to March 20). Analysis of said water discharging into sea during monsoon season is being carried out (twice in a year during monsoon) through NABL / MoEF&amp;CC accredited laboratory. Analysis report of the same shows there is no any contamination. The report is attached herewith as <b>Annexure – i</b>.</p> <p>During compliance period April 2021 to Sept 2021, the maximum recorded rain fall was <b>85.4 mm/hr</b> observed, which was much less than the design capacity of existing storm water drainage system. So our existing storm water management facility is adequate to handle the storm water</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
			water in the neighboring areas is not envisaged.				runoff from the area. Hence flooding of water in the neighboring areas is not envisaged.
			As per the directions given in the environmental clearance issued for the proposed Multi-Product SEZ and CRZ clearance for Desalination, sea water intake, outfall facility and pipeline project, the master plan of the project was designed and being implemented without disturbing the natural flow of rainwater	The channel depth in all the natural streams shall be maintained to accommodate peak flood flow during the monsoon and periodical de-silting activities in the natural streams passing through the APSEZ area	APSEZ, District Administration* and Irrigation department	As and When Required	Presently there is no Desalination plant, sea water intake and outfall facility developed as part of EC & CRZ clearance of Multiproduct SEZ. The project will be designed and implemented as per requirement without disturbing the natural flow of rainwater in all the seasonal streams.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
			in all the seasonal streams.				
1.3	Due to conservation and protection of mangroves in the designated conservation area, it has been predicted that the current mangrove footprint area would marginally increase in next 15 years due to natural growth. This will enhance the overall biodiversity in the local coastal eco-	Positive Impact with ecological benefits	In addition to conservation of the identified 1254 ha mangrove areas around Mundra port and SEZ, APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations across the coast of Gujarat state in consultation with various organizations	APSEZ will continue mangrove afforestation as per the commitment made with concerned regulatory authority	APSEZ	Short Term	<p>APSEZ has carried out mangrove afforestation in 2890 ha. area across the coast of Gujarat till date.</p> <p>No further mangrove afforestation is pending w.r.t. commitment made with concerned regulatory authority for APSEZ, Mundra project.</p> <p>As per study conducted by NCSCM, Chennai in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr.</p> <p>Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between <b>March 2017 (Total 2340) and September 2019</b> with an extent of <b>256 Ha (Total 2596 Ha Area)</b> which is about <b>10.94%</b> rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is <b>502 Ha</b> between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an <b>increase in dense mangroves</b> along with the conversion of scattered into sparse, that shows the growth</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance						
	system.						<p>of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table><tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr><tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td><ul style="list-style-type: none"><li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li><li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</li><li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which</li></ul></td></tr></table>	Sr. No.	Recommendations	Compliance	1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"><li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li><li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</li><li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which</li></ul>
Sr. No.	Recommendations	Compliance											
1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"><li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li><li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</li><li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which</li></ul>											

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance		
									<p>also shows that the growth of mangroves in a progressive direction.</p> <ul style="list-style-type: none"> <li>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</li> <li>The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</li> </ul>
							2.	Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> <li>APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.</li> <li>The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.</li> <li>The cost of the said activity was INR 1.0 Lacs.</li> </ul>
							3.	Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> <li>Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually.</li> <li>The cost of the said activity was INR 1.2 Lacs.</li> </ul>
							4.	Awareness of mangroves	<ul style="list-style-type: none"> <li>Adani Foundation – CSR Arm of Adani group has done</li> </ul>

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								importance in surrounding communities	<p>awareness camps/activities created in the community regarding importance of mangroves.</p> <ul style="list-style-type: none"> <li>Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during FY 2021-22 (Till Sep'21).</li> <li>Village Gauchar land development for the fodder cultivation to made fodder sustain village &amp; Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre &amp; Zarpara – 25 Acre done which resulted in total production of 82 ton.</li> <li>Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas.</li> <li>Refer CSR report attached as <b>Annexure – 2.</b></li> </ul>



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							Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to extend multi-species mangrove plantation.
1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		Detailed hydro-dynamic modelling and shoreline change prediction for a fully developed APSEZ facility has been studied. The study reveals that the erosion and accretion in the study area at the end of 15th year will be within the designated	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	<p>Shore line change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study is as below.</p> <p>To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis</p> <p>10km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition.</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
			criteria of $\pm 0.5$ m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra shoreline.				<p>The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively.</p> <p>The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.</p> <p>However, next shoreline assessment study will be conducted in FY 2021-22.</p>
<b>2</b>	<b>Regional Traffic Management Plan</b>						
2.1	The projected traffic data as per the EIA Report of Multi-Product Special Economic Zone, the peak vehicular traffic from the port and SEZ	Level-1	As per the master plan of APSEZ, eight artillery roads will be connected to either state highway or national highway for evacuating the goods from APSEZ. None of these roads	Additional road as per master plan will be built in future based on the overall progress of the project. Currently about 25% of cargo from APSEZ is transported by Rail and the same will be	APSEZ	As and When Required	<p>Presently, ~40% of the total SEZ is developed. Based on technical studies, APSEZ has developed adequate storm water facilities that meets with daily demand as per recorded highest rainfall.</p> <p>Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has increased to ~40 % thereby reducing the usage of road.</p> <p>Additional road facilities will be built as per master plan considering future development.</p> <p>The facilities for transportation of cargo other than road will be enhanced considering future development, which will reduce the traffic volumes on the regional road Network.</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude <sup>1</sup>	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
	<p>operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively.</p> <p>There could be a possible increase in traffic congestions on village-highway intersections and road accidents.</p>		<p>are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500 PCU/hr.</p> <p>Out of eight artillery roads considered in</p>	enhanced to 40% when the facility is fully developed in future. This will further reduce the traffic volumes on the regional road network.			

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			APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training Programs to all their contractors to enhance awareness on road safety.	APSEZ can undertake technical feasibility of implementing Intelligent Transport System (ITS) for the freight carriers associated with their development activities.	APSEZ & GSRDC*	Long Term	<p>APSEZ is being imparting the regular in-house classroom and on-job training to all drivers and employees on below topics:</p> <ul style="list-style-type: none"> <li>• Basic induction Training for drivers</li> <li>• ITV Driver Training</li> <li>• ITV Driver Induction for Supervisor</li> <li>• Defensive Driving for LMV &amp; HMV</li> <li>• Defensive Driving &amp; BBS</li> <li>• Driver Assessment</li> <li>• Road accident &amp; rescue</li> <li>• Traffic Management &amp; Road Signage</li> <li>• Driving safety training</li> <li>• RORO Driver training</li> <li>• Road Safety</li> <li>• Defensive Driving &amp; Emergency Action Plan</li> <li>• Drivers Responsibilities &amp; Safe driving</li> <li>• Emergency Rescue (Vehicle) Training</li> </ul> <p>Approx. 2460 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period April 21 to Sept 21. The same will be continued in future also.</p>

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							<p>APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system.</p> <p>Following steps were taken by APSEZ to reduce the accidents.</p> <ul style="list-style-type: none"> <li>✓ Installation of approx. 100 Nos. of cameras which is being operated at ISCR (Integrated security control room) to monitor &amp; manage the traffic system in APSEZ on real time basis.</li> <li>✓ Installation of 05 Nos. RTMS - Remote traffic management system (having combination of Radar + OCR camera + LED display board - showing speed limit) to recognize the over speeded vehicles, so that timely capture the same and avoid any road accidents.</li> <li>✓ Display of signboards at roadsides and various places within APSEZ, Mundra.</li> <li>✓ Monitoring of vehicle speed through speed gun by security personnel on daily basis.</li> </ul>
<b>3</b>	<b>Water resources Management and sewage treatment &amp; disposal Plan</b>						
3.1	For a fully developed APSEZ facility, water demand will be in the order of	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and	As per the master plan and permissions granted under EC, APSEZ will be developing progressively	APSEZ	As and When Required	<p>Currently there are two fresh water sources available with APSEZ.</p> <p><b>Desalination Plant</b> – 47 MLD</p> <p><b>Narmada water through GWIL</b> – 9 MLD (sanctioned capacity).</p> <p>Current water demand for APSEZ along with SEZ industries including Adani Power Plant is an avg. of 32 MLD.</p>

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	4,30,000 m <sup>3</sup> /day (430 MLD). APSEZ will be sourcing majority of the water from the captive desalination plants, which will be developed in progressive manner.		47 MLD captive desalination plant at site. Necessary water allocation from concerned authorities was obtained and the same will be renewed from time to time as per the directions of state government.	4,50,000 m <sup>3</sup> /day (450 MLD) of desalination plants to meet the future demand. Hence stress on regional water resources due to these developmental projects will be less significant.			<p>So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ including member units.</p> <p>The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.</p>
3.2	Existing water demand in the Mundra taluk is estimated as 8500 m <sup>3</sup> /day (@55 lpcd) and the potable	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to	Adani Foundation is planning to implement the various water resource conservation programs in next ten years under various	APSEZ and CGWB*	Long Term	<p>Water needs of APSEZ is being met through existing Desalination Plant of APSEZ and GWIL which may be further enhanced on modular basis, At present Ground water is not utilized for any activities within APSEZ.</p> <p>However various works are being carried out by Adani Foundation continuously under Water Conservation Work to achieve water security in Mundra region by Adani Foundation. Following works are carried out as a part of water conservation work since April – 2018.</p>



S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
	and sanitation water needs would increase to 37,000 m <sup>3</sup> /day (@125 lpcd) in future when the area is fully grown into larger municipality due to induced economic growth. Water demand of the local communities is met through Narmada water supply system to some extent, but largely depending		enhance ground water resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.	schemes.			<p>Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project “Sanrakshan” in coordination with GUIDE and Sahjeevan.</p> <p>Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures.</p> <p><b>Our water conservation work is as below.</b></p> <ul style="list-style-type: none"> <li>• Augmentation of 2 check dams in addition of existing 18 check dams (1 Check dam current year).</li> <li>• Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers.</li> <li>• Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.</li> <li>• Recharge Borewell 125 Nos (50 Nos current year).</li> </ul>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
	on the ground water in the study area. Mundra block is reported to be a safe ground block as on date. Due to influx of people and rapid urbanization due to the economic development, there could be some stress on the ground water resources in future.						<ul style="list-style-type: none"> <li>Drip Irrigation 980 Farmers (56 Application current year) benefitted in coordination with Gujrat Green Revolution Company.</li> <li>Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.</li> <li>Luni Pond Bund Repairing Work is completed.</li> </ul> <p>With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Sep – 2021 for CSR activities which also includes water conservation projects as mentioned above.</p>
3.3	It is estimated that about 60,000 m <sup>3</sup> /day (60	No Impact	Seven sewage treatment plants with an aggregate	APSEZ is permitted to develop decentralized sewage	APSEZ	As and When Required	Current installed capacity of wastewater treatment plants is 6.05 MLD (ETP, STPs & CETP) for treatment of effluent & sewage generated at various locations of APSEZ excluding wastewater treatment plants installed within individual member units.

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	MLD) of sewage will be generated from the APSEZ facility when the project is fully developed.		capacity of 3.1 MLD have already built at APSEZ. Treated sewage is utilized for greenbelt development and sewage is not discharged into either seasonal natural streams or marine environment.	treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized for greenbelt development.			<p>Out of 45, only 4 operational industries within the SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming to CETP inlet norms for further treatment and final disposal. Other SEZ industries have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per specific permission granted by SPCB.</p> <p>APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP.</p> <p>Presently avg. 2.39 MLD of wastewater (in to ETP, STPs &amp; CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during April'21 to September'21. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development.</p> <p>Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.</p>
<b>4</b>	<b>Air quality management Plan</b>						
4.1	Although all the regulated activities in the study area will be adopting	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate	All existing and new industrial establishments will obtain requisite consents from GPCB and	APSEZ And Other Industries	Continual Process	<p>APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air).</p> <p>Ambient Air Quality monitoring is being carried out by NABL accredited and MoEF&amp;CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. and M/s. UniStar Environment</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance																									
	promulgated emission norms, total air emission mass discharge from the study area would increase.		and have been operating the facilities as per the emission norms stipulated in respective consent orders. APSEZ and other two power plants are monitoring the ambient air quality on regular intervals as per GPCB/CPCB guidelines and the data is analyzed and presented to GPCB on monthly basis. Both	adhere to the stipulated emission norms regulations and guidelines issued by authorities from time to time.			<p>&amp; Research Labs Pvt. Ltd. for APL as per NAAQ standards, 2009. Stack emission monitoring is also being carried out on regular basis. Reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>Adani power plant has installed continuous emission and air quality monitoring instruments as per CPCB Directive and submitting the reports also. Another power plant of CGPL is outside APSEZ area.</p> <p>The AAQM summary for last six months (Apr'21 to Sep'21) are as below.</p> <p>Locations: 17 Nos. (APSEZ – 12 + APL – 5 including 3 villages) Frequency: Twice in a week</p> <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit<sup>\$</sup></th></tr><tr><td>PM<sub>10</sub></td><td>µg/m<sup>3</sup></td><td>95.62</td><td>40.22</td><td>100</td></tr><tr><td>PM<sub>2.5</sub></td><td>µg/m<sup>3</sup></td><td>57.32</td><td>15.58</td><td>60</td></tr><tr><td>SO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>30.55</td><td>6.22</td><td>80</td></tr><tr><td>NO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>42.68</td><td>13.50</td><td>80</td></tr></table> <p><sup>\$</sup> as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards.</p> <p>Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p>	Parameter	Unit	Max	Min	Perm. Limit <sup>\$</sup>	PM <sub>10</sub>	µg/m <sup>3</sup>	95.62	40.22	100	PM <sub>2.5</sub>	µg/m <sup>3</sup>	57.32	15.58	60	SO <sub>2</sub>	µg/m <sup>3</sup>	30.55	6.22	80	NO <sub>2</sub>	µg/m <sup>3</sup>	42.68	13.50	80
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			the thermal power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				<p>Other industries located within the SEZ have obtained requisite permissions from the competent authorities for their respective plant and they also carried out environmental monitoring within their premises to comply with the permission granted. The same has been ensured by APSEZ as well as SPCB during their regular visits. APSEZ carries out regular visits/inspections of member industries within SEZ and last visit was conducted during Feb &amp; Mar' 2021 for EMS &amp; compliance verification. During compliance verification, it was verified that monitoring of air emission was well within the permissible standards based on analysis reports. Same will be continued in future also.</p> <p>The monitoring reports of industries within SEZ are also being submitted to the regulatory authorities as a part of half yearly Compliance report of EC for Multi-Product SEZ.</p>
				A common air quality management committee may be framed under the guidance of the State Pollution Control Board and district administration to manage regional level	APSEZ and Other Industries, Stakeholders, District Administration and GPCB*	Long Term And Continual	<p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities for air quality management within APSEZ area. However, at present, APSEZ has formed Internal Environment Monitoring Committee, involving officials from APSEZ, Adani Power Limited and other SEZ member units with following role and responsibilities:</p> <ul style="list-style-type: none"> <li>• Identification of sources of air &amp; noise emission and its dispersion in surrounding villages</li> <li>• Remedial measures to eliminate, control, reduce or capture air &amp; noise emission</li> <li>• Identify available resource to abate the air and noise emission</li> </ul>

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				emission inventory data that can help to manage regional level air quality management goals.			<ul style="list-style-type: none"> <li>Required additional resources for control of air and noise emission</li> <li>Drinking water and its testing of all the available fresh water sources in surrounding villages</li> <li>Identify any surrounding villages affected by organization's improper waste disposal mechanism.</li> </ul> <p>Last committee meeting was conducted on dated 11<sup>th</sup> Sept 2021, and below was the point of discussion for way forward.</p> <ul style="list-style-type: none"> <li>Brief introduction about the Environment Management Plan (EMP)</li> <li>All members conveyed his environment management practices, issue &amp; suggestions</li> <li>Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise.</li> <li>Discussed about the proper management of the canteen waste.</li> <li>Discussed about the cleaning of outside of the SEZ units.</li> <li>Discussed about the management of rain water &amp; cleaning of the storm water drains.</li> </ul> <p>APSEZ and all the industries within SEZ are in compliance to NAAQS and same is being ensured by APSEZ. The monitoring reports of industries within SEZ are being submitted to the regulatory authorities as part of half yearly Compliance report of EC for Multi-Product SEZ.</p>
	Release of		APSEZ has				Following safeguard measures are taken by APSEZ for



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4.2	particulate emissions from handling and storage of coal at the port and power plants would influence PM10 and PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.	Health Impact	been implementing the following management plan to control emissions as per the applicable regulations and similar practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water sprinkling on road and other open areas, regular cleaning of roads, dry fog dust suppression systems	All industries located in the APSEZ shall adhere to the emissions norms and minimum stack height guidelines issued by CPCB and consent to operate issued by Gujarat Pollution Control Board from time to time.	APSEZ and Other Industries	Continual Process	<p>abatement of dust emissions.</p> <ul style="list-style-type: none"> <li>Adequate stack heights to the Boilers, D.G. Sets, TFHs &amp; HWGs for proper dispersion of pollutants within APSEZ</li> <li>Using of liquid &amp; Gaseous fuels instead of solid fuels in Boilers, Thermic fluid heaters and hot water generators.</li> <li>Regular sprinkling on road and other open area</li> <li>Regular cleaning of roads</li> <li>Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts</li> <li>Use of water mist canon</li> <li>Closed type conveyor belts</li> <li>Regular sprinkling on coal heaps</li> <li>Covering other types of dry bulk cargo heaps</li> <li>Installation of wind breaking wall</li> <li>Development of greenbelt along the periphery of the storage yards/back up area</li> <li>Mechanized handling system for coal and other dry bulk cargo</li> <li>Wagon loading and truck loading through closed silo</li> </ul> <p>Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant.</p> <p>The stack monitoring summary for last six months (Apr'21 to Sep'21) are as below.</p> <p>Total Nos. of Stacks: 22 Nos.</p>

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			(DSS) in hoppers, transfer towers and conveyor belts, use of water mist canon, covered conveyor belts, regular sprinkling on coal heaps,				<div>Frequency: Monthly / Half Yearly</div> <table><tr><th>Parameter</th><th>Unit</th><th>GPCB Limit</th><th>Min</th><th>Max</th></tr><tr><td>PM</td><td>mg/Nm<sup>3</sup></td><td>150</td><td>15.30</td><td>35.42</td></tr><tr><td>SO<sub>2</sub></td><td>Ppm</td><td>100</td><td>3.73</td><td>7.71</td></tr><tr><td>NO<sub>x</sub></td><td>ppm</td><td>50</td><td>24.27</td><td>38.50</td></tr></table> <div>Values recorded confirms to the stipulated standards.</div> <div>Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes stack monitoring for overall APSEZ, Mundra.</div> <div>All other industries located within SEZ are adhere to provide adequate stack height and pollution control measures for proper dispersion of pollutants as per respective permissions granted by the board. The same is being inspected and ensured by APSEZ as well as SPCB officials on regular basis.</div>	Parameter	Unit	GPCB Limit	Min	Max	PM	mg/Nm <sup>3</sup>	150	15.30	35.42	SO <sub>2</sub>	Ppm	100	3.73	7.71	NO <sub>x</sub>	ppm	50	24.27	38.50
Parameter		Unit	GPCB Limit	Min	Max																						
PM	mg/Nm <sup>3</sup>	150	15.30	35.42																							
SO <sub>2</sub>	Ppm	100	3.73	7.71																							
NO <sub>x</sub>	ppm	50	24.27	38.50																							
			covering of other types of dry bulk cargo heaps by protective materials, installation of wind breaking wall, development of greenbelt along the	An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively co-ordinate the approach to	APSEZ and Other Industries, Concerned Stake holders, District Administration*	Long Term	<div>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited &amp; other member units, with specific role and responsibilities as defined above.</div> <div>The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons. Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant.</div> <div>Adequate air pollution control measures like ESPs, FGDs,</div>																				

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
			periphery of the storage yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and truck loading through closed silo. Both thermal power plants in the study area have installed electrostatic precipitators on the boilers and are meeting the emission norms as per the respective ECs granted.	coal dust management and monitoring			<p>Bag Filters, etc. and adequate stack heights provisions within the thermal power plant for proper dispersion of pollutants.</p> <p>Green belt / plantation is provided around the periphery of dry cargo storage area and regular water sprinkling is also being done to abate the dust emission from coal hips.</p> <p>Last committee meeting was conducted on dated 11<sup>th</sup> Sept 2021, and below were the point of discussion for way forward.</p> <ul style="list-style-type: none"> <li>Brief introduction about the Environment Management Plan (EMP)</li> <li>All members conveyed his environment management practices, issue &amp; suggestions</li> <li>Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise.</li> <li>Discussed about the proper management of the canteen waste.</li> <li>Discussed about the cleaning of outside of the SEZ units.</li> <li>Discussed about the management of rain water &amp; cleaning of the storm water drains.</li> </ul>

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			Due to installation of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due to release of emissions from two power plants is insignificant.				
4.3	Ships are one of the significant sources of SO <sub>2</sub> and NO <sub>x</sub> emissions in the study area. Marine diesel engines on the ships often utilize fuel oils that	Level-2	A Standard Operating Procedure (SOP) has been developed to be included as a part of APSEZ environment management	The current global limit for Sulphur content of ships fuel oil is 3.5 % m/m (mass by mass). According to MARPOL, the new global cap on sulphur in the marine	APSEZ and Ship Owners	Long Term	<p>The ships coming to the APSEZ are complying with MARPOL and other shipping rules and regulations.</p> <p>APSEZ has already started providing shore power supply to the tugs (11 Nos.), dredgers (2 Nos.) and barges (1 No.). The feasibility of shore power will be explored and implemented on large scale for the visiting vessels to reduce idling stage ship emissions.</p>

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	might contain higher sulphur content. As per the international best practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due to lower stack heights of the marine diesel engine, ship emissions often gets		plan to verify that all ships anchored at the port are adopting the MARPOL4 regulations.	vessel fuels will be 0.50% m/m by the 1st January 2025. APSEZ should explore the possibility of providing shore power to the ships at the port to reduce idling stage ship emissions.			

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	dispersed in the local environment and might pose risk of fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
4.4	Road vehicle emissions will be other major contributors to the air pollution in the region when the facility is fully	Level-2	Not Applicable	Due to implementation of Bharat VI fuels (MoEF&CC)6 in near future the vehicular and diesel engine emissions will be reduced by about 50% from the current national levels. APSEZ should	APSEZ and All Industries	Short Term	<p>Presently, cargo evacuation through rail / conveyer / pipeline has increased to ~40 % thereby reducing the usage of road.</p> <p>Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area.</p> <p>In future, APSEZ will also explore the feasibility of using Electric Vehicles for internal cargo movement.</p>



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	developed.			develop a robust contractor environmental policy to ensure that Bharat Stage VI emission norms are adopted by all their contractors and sub-contractors.			
5	Noise emissions						
5.1	Noise emissions are envisaged from port operations, industrial operations and power plants in the study area. Any increase	Level-1	Due to adoption of various mechanized operations at the waterfront development, the noise emissions from the port cargo handling will be minimal.	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to demonstrate the compliance	APSEZ	Continual Process	<p>Below Safeguard measures are already taken for abatement of noise emissions.</p> <ul style="list-style-type: none"> <li>• Development of greenbelt along the periphery of the operational area.</li> <li>• D.G. Sets having Acoustic enclosures.</li> <li>• Maintenance of plant machineries and equipment's on regular frequency.</li> </ul> <p>Noise monitoring is being carried out by NABL accredited and MoEF&amp;CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. as per permission granted and reports are being submitted to the concerned authorities on regular basis.</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance															
	in noise levels beyond three decibels from the background levels would be perceived as noise nuisance (USEPA)7.		An adequate greenbelt is being developed by APSEZ to further reduce any residual impacts due to noise emissions from the facility. Periodic noise level monitoring programs were adopted by APSEZ. Predicted noise levels were found to be well within the designated noise standards for Industrial facilities.	with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the community grievances, when ever required. To assess the overall site wide compliance and also to address any community grievances related to noise issues due to operation of APSEZ facilities.			<p>The noise monitoring summary for last six months (Apr'21 to Sep'21) are as below.</p> <p>Locations: 12 Nos. Frequency: Once in a month (24 hourly)</p> <table><tr><th>Noise</th><th>Unit</th><th>Leq Max</th><th>Leq Min</th><th>Leq Perm. Limit<sup>\$</sup></th></tr><tr><td>Day Time</td><td>dB(A)</td><td>73.5</td><td>69.8</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>48.4</td><td>43.5</td><td>70</td></tr></table> <p style="text-align: right;"><sup>\$</sup> as per GPCB standards</p> <p>Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.</p> <p>All the results are well within the standards. From this it can be inferred that there no impacts on the surrounding community.</p> <p>All other industries located in the APSEZ are adhere to monitor and control the ambient noise level as per permission granted by SPCB and same is being confirmed by APSEZ as well as SPCB on regular basis.</p> <p>Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.</p>	Noise	Unit	Leq Max	Leq Min	Leq Perm. Limit <sup>\$</sup>	Day Time	dB(A)	73.5	69.8	75	Night Time	dB(A)	48.4	43.5	70
Noise	Unit	Leq Max	Leq Min	Leq Perm. Limit <sup>\$</sup>																		
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				In order to address the public grievances related to noise from the facility, an internal Noise Management Committee can be formed by APSEZ to investigate the root cause and to develop and implement noise mitigation plans in the specific zones.	APSEZ	Continual Process	<p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited &amp; other member units, having role and responsibilities as defined above.</p> <p>Last committee meeting was conducted on dated 11<sup>th</sup> Sept 2021, and below were the point of discussion for way forward.</p> <ul style="list-style-type: none"> <li>Brief introduction about the Environment Management Plan (EMP)</li> <li>All members conveyed his environment management practices, issue &amp; suggestions</li> <li>Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise.</li> <li>Discussed about the proper management of the canteen waste.</li> <li>Discussed about the cleaning of outside of the SEZ units.</li> <li>Discussed about the management of rain water &amp; cleaning of the storm water drains.</li> </ul> <p>No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.</p>
<b>6</b>	<b>Surface water quality (Terrestrial and Marine )</b>						
6.1	In general, release of untreated	Level -1	As per the master plan of APSEZ, 67 MLD of	As per the master plan of APSEZ, the existing CETP	APSEZ	As and When Required	APSEZ has installed Common Effluent Treatment Plant (CETP) having 2.5 MLD capacities for treatment of partially treated effluent and sewage generated from industries within SEZ.

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	wastewater from industrial facilities would pose threat to water quality of streams, estuaries and marine water bodies.		wastewater is expected to be generated from the fully developed project scenario, for which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP capacity of 2.5 MLD is in place. Presently member units treat their effluents to meet the CETP inlet norms and	shall be augmented to 67 MLD in progressive manner based on the future demand. The facility should limit the marine discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.			<p>Currently, CETP receives 685 KLD (Avg.) hydraulic load and considering the current development scenario, existing CETP is adequate to treat and handle the total effluent load coming from industries within SEZ.</p> <p>Out of 45 only 4 industries within SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming CETP inlet norms for further treatment and final disposal. Other industries within SEZ have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per permission granted by SPCB.</p> <p>The capacities of CETP will be enhanced on modular basis as per future requirement.</p> <p>Presently avg. 2.39 MLD (from CETP, ETP &amp; STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period April 21 to Sept'21 and no discharge is made to any other source.</p>

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			then send it to CETP. Treated wastewater from CETP meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				
			Online wastewater quality monitoring systems are installed at CETP to ensure quality of treated effluent meets the requisite discharge norms. No wastewater	Efforts shall be made to recycle complete treated wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility	APSEZ	Based on outcome Techno-feasibility Study	Online continuous effluent monitoring system installed at the discharge point of CETP to track any deviation from discharge norms.  Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.

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			from CETP is discharged into natural bodies as on date..	study.																															
			Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond) to remove any residual dust particulates for further disposal into sea	Storm water runoff from the facility during the first rain shall be sampled and analyzed for the presence of heavy metals or other criteria pollutants to adopt corrective and preventive actions to protect the marine water quality. All red and hazard category industry within APSEZ shall adopt spill	APSEZ	Continual	<p>There are provision of drains around coal stack yard to carry to runoff water to dump ponds. This water is either used for dust suppression or after sedimentation (to remove residual dust), is allowed disposal to sea.</p> <p>Presently Marine monitoring is being carried out once in a month by NABL and MoEF&amp;CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. for APSEZ and M/s. UniStar Environment &amp; Research Labs Pvt. Ltd. for APL. The analysis reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>The marine water quality monitoring summary for last six months (Apr'21 to Sep'21) is as per below.</p> <p>Locations: 14 Nos. (APSEZ – 9 + APL – 5) Frequency: Once in a Month / Half Yearly</p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr><tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr><tr><td>pH</td><td>--</td><td>8.47</td><td>8.02</td><td>8.48</td><td>7.95</td></tr><tr><td>TSS</td><td>mg/L</td><td>135</td><td>46</td><td>156</td><td>46</td></tr><tr><td>BOD (3 Days @27 °C)</td><td>mg/L</td><td>5</td><td>2.26</td><td>3.9</td><td>ND*</td></tr></table>	Parameter	Unit	Surface		Bottom		Max	Min	Max	Min	pH	--	8.47	8.02	8.48	7.95	TSS	mg/L	135	46	156	46	BOD (3 Days @27 °C)	mg/L	5	2.26	3.9	ND*
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				prevention and control program and no effluents shall be discharged into storm water-drains.			<table><tr><td>DO</td><td>mg/L</td><td>6.4</td><td>5.4</td><td>6</td><td>5</td></tr><tr><td>Salinity</td><td>ppt</td><td>37.4</td><td>34.3</td><td>37.7</td><td>33.8</td></tr></table> <p>Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.</p>	DO	mg/L	6.4	5.4	6	5	Salinity	ppt	37.4	34.3	37.7	33.8
DO	mg/L	6.4	5.4	6	5														
Salinity	ppt	37.4	34.3	37.7	33.8														
			Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices, sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As	Good dredging practices shall be adopted by APSEZ: (i).Improving the dredging accuracy (ii).Improving onboard automation and monitoring, (iii). Reduce spill and loss, (iv). evaluating the need for installing silt screens near mangrove areas during the dredging phase operations, (v).	APSEZ	Long Term	<p>No capital dredging has been done, since Apr 2015. Dredged material generated during maintenance dredging is being disposed at designated locations within deep sea as identified by NIO.</p> <p>Dredging Management plan is adopted for carrying out dredging and management of dredge material. Presently there are 3 nos. (2 Nos. Cutter suction + 1 No. Trailer suction) of dredgers are in operation for dredging.</p> <p>Marine monitoring is being carried out once in a month by NABL and MoEF&amp;CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. Summary of marine water for the last six months is as mentioned above.</p> <p>The same practice will be continued in future also as per direction by MoEF&amp;CC as well as GPCB.</p> <p>Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.</p>												

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			part of the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly basis.	Environment friendly dredging activities can be undertaken in such a way that the overall turbidity levels near the mangrove and ecologically sensitive zones shall not exceed 100 NTU or 200 mg/l of TSS (10% lethal level of fish) Existing marine monitoring program shall be continued as per the directions of MoEF&CC and GPCB.			
7	<b>Groundwater quality and salinity ingress</b>						
	While Mundra		APSEZ is not utilizing	A dedicated desalination		As and When	Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through

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7.1	block is enjoying safe ground water status as on date (based on the data published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra region. This might increase the TDS and chloride levels in the ground water in	Level-2	ground water for any type of use. APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	plant of capacity 4,50,000 m3/day (450 MLD) will be developed in progressive manner to meet the APSEZ requirements.	APSEZ	Required	<p>Gujarat Water Infrastructure Limited and same is sufficient to meet the present water demand.</p> <p>APSEZ does not draw any ground water.</p> <p>The desalination plant of additional capacities will be installed on modular basis considering future development and requirement.</p>

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7.2	Due to induced growth in the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.	Level-2	Ground water is not drawn by APSEZ for its operations. Natural streams (seasonal rivers) passing through the APSEZ area will not be disturbed, the micro-watershed in the area will not be disturbed. Due to the above reasons, the possibility of salinity ingress due to APSEZ development is not envisaged.	The Govt. of Gujarat, Narmada, Water Resources, Water Supply & Kalpsar Dept.,(WRD)12 has been implementing various salinity ingress prevention projects	District Administration*	Long Term	<p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities.</p> <p>APSEZ does not draw any ground water for the fresh water requirement.</p> <p>However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals.</p> <p>Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project “Sanrakshan” in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures.</p> <p><b>Our water conservation work is as below.</b></p> <ul style="list-style-type: none"> <li>Augmentation of 2 check dams (1 Check dam current year).</li> </ul>

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			Mundra and Anjar blocks fall under fresh water to medium salinity zones. It can be observed that little variation was observed in the ground water salinity levels from year 2013 to 2016 across the Mundra and Anjar blocks. This aspect confirms that the overall salinity ingress from the shore into the land due to existing				<ul style="list-style-type: none"> <li>Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers.</li> <li>Roof Top Rain Water Harvesting 90 Nos. (35 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.</li> <li>Recharge Borewell 125 Nos (50 Nos current year) which is best ever option to.</li> <li>Drip Irrigation 980 Farmers (56 Application current year) benefitted in coordination with Gujrat Green Revolution Company.</li> <li>Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.</li> <li>Luni Pond Bund Repairing Work is completed.</li> </ul> <p>With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Narmada Water Resources, Water Supply &amp; Kalpsar Dept.,(WRD)1 has been implementing various salinity ingress prevention projects. Under Sardar Sarovar canal project, Govt. of Gujarat has proposed to implement about 8200 Km</p>

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			APSEZ facilities and power plant outfalls are less significant.				stretch of water canal and the project is at various stages of implementation. Under this project about 112,000 ha of land in about 180 villages will be benefitted with irrigation needs. This will significantly reduce the pressure on the ground water resources in the region.																																								
				While the individual industries in the study area will continue to undertake ground water quality monitoring as per the environmental clearances issued for the respective projects, a regional level ground water conservation action committee can be formed under the guidance of state ground	All Concerned Stakeholders , District Administration and CGWB*	Continual Process	<div>APSEZ (7 Locations – half yearly) &amp; Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water sampling and reports of the same are being submitted to the regulatory authorities on regular basis.</div> <div>The summary of APSEZ ground water quality monitoring for last six months (Apr'21 to Sep'21) are as below.</div> <table><tr><th>Nos. of Location: 07Sr. No.</th><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th></tr><tr><td>1</td><td>pH</td><td>--</td><td>7.73</td><td>8.35</td></tr><tr><td>2</td><td>Salinity</td><td>ppt</td><td>0.91</td><td>7.44</td></tr><tr><td>3</td><td>Oil &amp; Grease</td><td>mg/ L</td><td>ND*</td><td>ND*</td></tr><tr><td>4</td><td>Hydrocarbon</td><td>mg/ L</td><td>ND*</td><td>ND*</td></tr><tr><td>5</td><td>Lead as Pb</td><td>mg/ L</td><td>0.02</td><td>0.22</td></tr><tr><td>6</td><td>Arsenic as As</td><td>mg/ L</td><td>ND*</td><td>ND*</td></tr><tr><td>7</td><td>Nickel as Ni</td><td>mg/ L</td><td>ND*</td><td>ND*</td></tr></table>	Nos. of Location: 07Sr. No.	Parameter	Unit	Min	Max	1	pH	--	7.73	8.35	2	Salinity	ppt	0.91	7.44	3	Oil & Grease	mg/ L	ND*	ND*	4	Hydrocarbon	mg/ L	ND*	ND*	5	Lead as Pb	mg/ L	0.02	0.22	6	Arsenic as As	mg/ L	ND*	ND*	7	Nickel as Ni	mg/ L	ND*	ND*
Nos. of Location: 07Sr. No.	Parameter	Unit	Min	Max																																											
1	pH	--	7.73	8.35																																											
2	Salinity	ppt	0.91	7.44																																											
3	Oil & Grease	mg/ L	ND*	ND*																																											
4	Hydrocarbon	mg/ L	ND*	ND*																																											
5	Lead as Pb	mg/ L	0.02	0.22																																											
6	Arsenic as As	mg/ L	ND*	ND*																																											
7	Nickel as Ni	mg/ L	ND*	ND*																																											



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				water board and district Administration			<table><tr><td>8</td><td>Total Chromium as Cr</td><td>mg/L</td><td>0.02</td><td>0.04</td></tr><tr><td>9</td><td>Cadmium as Cd</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr><tr><td>10</td><td>Mercury as Hg</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr><tr><td>11</td><td>Zinc as Zn</td><td>mg/L</td><td>0.14</td><td>0.64</td></tr><tr><td>12</td><td>Copper as Cu</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr><tr><td>13</td><td>Iron as Fe</td><td>mg/L</td><td>0.27</td><td>3.86</td></tr><tr><td>14</td><td>Insecticides/Pesticides</td><td>mg/L</td><td>ND*</td><td>ND*</td></tr><tr><td>15</td><td>Depth of Water Level from Ground Level</td><td>meter</td><td>1.90</td><td>2.18</td></tr></table>	8	Total Chromium as Cr	mg/L	0.02	0.04	9	Cadmium as Cd	mg/L	ND*	ND*	10	Mercury as Hg	mg/L	ND*	ND*	11	Zinc as Zn	mg/L	0.14	0.64	12	Copper as Cu	mg/L	ND*	ND*	13	Iron as Fe	mg/L	0.27	3.86	14	Insecticides/Pesticides	mg/L	ND*	ND*	15	Depth of Water Level from Ground Level	meter	1.90	2.18	* ND – Not Detectable			
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14	Insecticides/Pesticides	mg/L	ND*	ND*																																															
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<p>Approx. INR 9.56 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22 (Till Sep'21), which also includes noise monitoring for overall APSEZ, Mundra.</p> <p>The freshwater requirement of all the industries within SEZ is being satisfied through APSEZ. All the industries are encouraged to monitor ground water quality as per the permissions granted by competent authorities.</p> <p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of</p>																																																			

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							<p>APSEZ, Adani Power Limited and other member units, having role and responsibilities as defined above.</p> <p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities for ground water management.</p>
<b>8</b>	<b>Waste Management</b>						
8.1	Solid waste will be generated from industrial activities of APSEZ and other permitted facilities in the study area including Mundra town. These wastes would contain recyclable material, construction debris, organic	Level-2	APSEZ has been adopting Zero waste Initiatives and the entire waste generated from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	APSEZ will continue to adopt Zero Waste Initiative and wastes will be segregated at source and disposed to various recycling vendors, co-processing in cement plants. This initiative helps not only to reduce the waste to landfill significantly, but also to recycle the materials there	APSEZ	Continual Process	<p>Presently APSEZ has implemented Zero waste Initiatives as per 5R (Reduce, Reuse, Recycle, Recover &amp; Reprocess) principles of waste management. At present, APSEZ has developed material recovery facility for 6.0 TPD capacities. A well-established system for segregation of dry &amp; wet waste is in place. All wet waste (Organic waste) is being segregated &amp; utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plants for Co-processing as RDF (Refused Derived Fuel). The same practice will be continued in future also. APSEZ has also been recognized for Zero Waste to Landfill certification from reputed organization.</p> <p>APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUV Rheinland</p>

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	waste, inert material and e-waste etc. In the absence of any organized source segregation programs and material recycling strategies and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.			by avoiding ecological impacts.			<p>India Pvt. Ltd. (valid up to 31.05.2024). APSEZ, Mundra has also been certified as Single Use Plastic (SUP) Free Port by Confederation of Indian Industry (CII) (valid up to 25.05.2022). Details of the same are attached as <b>Annexure – 9</b>.</p> <p>APSEZ will continue proper solid waste management in his operational area.</p>
8.2	Considering an average solid waste generation	Level-2	APSEZ has made a provision for central waste management facilities	The existing waste segregation and material recycling facilities will	APSEZ	Continual Process	

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	of 0.25 Kg/person/day, the estimated solid waste from facilities within APSEZ will be in the order of 100 TPD (36,500 TPA).		within the existing site based on the future needs. As part of the Zero Waste Initiatives, no landfill facilities will be installed at APSEZ.	be augmented to dispose safely the wastes generated from APSEZ areas. Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			Industries located within the SEZ area are also complying with the waste management rules stipulated by statutory authorities and same is also being confirmed by APSEZ as well SPCB on regular basis.
8.3	About 35 TPD (13,000 TPA) of solid waste would be generated from the	Level-2	As per the MSW Rules 2016 all the industrial facilities and SEZs are required to	Solid Waste Management Program shall be adopted and implemented as per Municipal	All Industries	Continual Process	

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	proposed industrial areas located outside the APSEZ area.		adopt waste segregation facilities at the respective properties and non-recyclable waste shall be disposed to landfill sites.	Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			
<b>9</b>	<b>Ecological aspects (terrestrial and marine)</b>						
9.1	About 1576 ha of shrub forest land contiguous to APSEZ area is applied for land diversion for various developmen	Level -1	It is noted that the designated forest land is free from any native vegetation and comprises of Prosopis juliflora. It is also noted that no	APSEZ has approached concerned authorities for diversion of designated forest land. Suitable compensatory afforestation plan shall be adopted based on the recommendations and	APSEZ/State Forest Department*	Long Term	Stage – 1 forest Clearance for about 1576.81 Ha Forest land has been obtained. Presently APSEZ is in the process of compliance to the stage – 1 Forest Clearance conditions, for further submitting to Govt. authorities for issuance of Stage-2 Forest Clearance.

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	tal activities. This might have certain level of changes in the biodiversity in the study area.		endangered species are present at the shrub forests that are applied for land diversion. It is also noted that no forest produce is reported from this designated forest land parcel due to lack of economic importance of plant species reported in the shrub forest. It is also noted that no tribal lands are located in the	directions of the concerned authorities. Due to adoption of compensatory afforestation program through a scientific manner, the overall ecological footprint in the district will be increased. Due to plantation of native tree species as part of greenbelt development, the overall biodiversity of the region will increase considerably when the project is fully developed.			



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			designated forest land parcel. Hence there will not be any change in biodiversity due to the proposed diversion.				
9.2	Mangrove conservation areas are located adjacent to the APSEZ area. Accidental discharges of industrial effluents into the marine environment would pose certain ecological risk.	Level -1	No development activities will be undertaken within mangrove conservation areas. APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	<p>As per study conducted by NCSCM in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr.</p> <p>Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between <b>March 2017 (Total 2340) and September 2019</b> with an extent of <b>256 Ha (Total 2596 Ha Area)</b> which is about <b>10.94%</b> rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is <b>502 Ha</b> between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an <b>increase in dense mangroves</b> along with the</p>

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			across the coast of Gujarat state in consultation with various organizations The Adani Foundation introduced 'Mangrove Nursery Development and Plantation' scheme in the area as an alternative income generating activity for the people of the region.				<p>conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table><tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr><tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td><ul style="list-style-type: none"><li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li><li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</li><li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion</li></ul></td></tr></table>	Sr. No.	Recommendations	Compliance	1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"><li>APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.</li><li>As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 &amp; 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</li><li>This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion</li></ul>
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									<p>of scattered to sparse which also shows that the growth of mangroves in a progressive direction.</p> <ul style="list-style-type: none"> <li>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</li> <li>The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</li> </ul>
							2.	Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> <li>APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.</li> <li>The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.</li> <li>The cost of the said activity was INR 1.0 Lacs.</li> </ul>
							3.	Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> <li>Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually.</li> <li>The cost of the said activity was INR 1.2 Lacs.</li> </ul>

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							<p>4. Awareness of mangroves importance in surrounding communities</p> <ul style="list-style-type: none"> <li>Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves.</li> <li>Adani Foundation has also provided 8.95 lacs kg Dry Fodder and 24.25 lacs kg Green fodder in 21 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 122.7 Lacs during FY 2021-22 (Till Sep'21).</li> <li>Village Gauchar land development for the fodder cultivation to made fodder sustain village &amp; Avail green fodder in scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre &amp; Zarpara – 25 Acre done which resulted in total production of 82 ton.</li> <li>Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas.</li> <li>Refer CSR report attached as <b>Annexure – 2.</b></li> </ul>

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							<p>Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. Current year 3 ha development is planned to extend multi-species mangrove plantation.</p> <p>Mangrove plantation done at Luni sea coast with fisher folk community during World Environment Day Celebration. Web talk show was organized on the occasion of “World Mangrove days On Multi species Mangrove bio diversity with Joint effort of GUIDE and Adani Foundation, Mundra. 8th June is celebrated as world ocean day. Adani foundation had celebrated the world ocean day by coastal cleaning activity at Juna Bandar, Luni Bandar and Bavadi Bandar.</p> <p>Mangroves nursery is developed in a Khari creek behind IOCL &amp; 50,000 Nos. of new saplings were planted in creek area by APSEZ.</p>
9.3	Outfall from the thermal power plants desalination and CETP would pose	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the	All approved marine outfalls shall be monitored for salinity, temperature and other designated	APSEZ and Concerned Industry	Continual Process	<p>Presently marine monitoring is being carried out by the Adani power plant at the marine outfall locations and reports are being submitted to the concerned authorities on regular basis.</p> <p>APSEZ is carrying out Marine monitoring once in a month at 9 locations in deep sea by NABL and MoEF&amp;CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. The analysis reports of the same are being submitted to the</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance																						
	certain level of impact on the marine environment .		background temperature and salinity at mangrove conservation area will not increase from the prevailing background levels as the outfalls are located far away. APSEZ and respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated environmental and ecological parameters.	parameters as per consent to establish issued by GPCB. Existing marine environmental monitoring program shall be continued.			<p>concerned authorities on regular basis.</p> <p>Adani power plant is also doing marine water quality at 5 locations (2 locations at outfall location) in deep sea by NABL and MoEF&amp;CC accredited agency namely M/s. Unistar Environment &amp; Research Labs Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. The summary of marine water quality is shown above.</p> <p>The comparison of marine water results between CIA and current monitoring data are as below.</p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Max</th><th colspan="2">Min</th></tr><tr><th>CIA</th><th>Present</th><th>CIA</th><th>Present</th></tr><tr><td>Temp.</td><td>°C</td><td>30.2</td><td>29</td><td>28</td><td>28</td></tr><tr><td>Salinity</td><td>ppt</td><td>41.8</td><td>35.3</td><td>34.9</td><td>33.8</td></tr></table> <p>As per above results, it can be seen that there is no major deviation in the concentration of parameters and thus indicates that impacts are insignificant.</p>	Parameter	Unit	Max		Min		CIA	Present	CIA	Present	Temp.	°C	30.2	29	28	28	Salinity	ppt	41.8	35.3	34.9	33.8
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9.4	<b>Terrestrial Ecology:</b> Study area doesn't have any notified national parks or ecological sanctuaries. Since the area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in the area is very small.	Level-1	APSEZ has developed greenbelt in an area of 550ha as against the committed area of 430ha. A dedicated nursery is set up to promote plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	The compensatory afforestation area to be monitored annually to check the survival rate of the plantation.	APSEZ	Continual Process	<p>APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial plantation/greenbelt development. APSEZ, Individual SEZ Industries and Adani Power Plant has developed more than 700 Ha. area as greenbelt with plantation more than 10 Lacs saplings within the APSEZ area including SEZ industries &amp; Adani Power Plant.</p> <p>Dedicated horticulture department is maintaining and monitoring the terrestrial green belt development on regular basis to check the survival rate of plantation.</p> <p>Total expenditures of the horticulture dept. of APSEZ during the FY 2021-22 (Till Sep'21) within APSEZ is INR 605 lakhs.</p>
10	<b>Socio-economic aspects</b>						
10.1	Population growth in the Mundra region was reported to be in the order of	Level-1	Dedicated townships are developed within APSEZ area with necessary	The existing townships will be expanded to accommodate about 4lakh people when the	APSEZ	As and When Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2180 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 88% Occupancies are

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	85% during the past decade (2001-2011). Further expansion of the urban area could be possible due to induced economic growth in the region. Increase in population will have an additional need for public infrastructure in the region.		community infrastructures such as hospital, school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR	project activity is fully developed.			<p>accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 45 nos. of industries (processing &amp; non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within Mundra town for their employees having basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate to accommodate the people considering present APSEZ development. The existing townships with associated facilities will be expanded as per requirement. Other infrastructure facilities have been developed for people as follows.</p> <ul style="list-style-type: none"> <li>• Multi-Specialty Hospital</li> <li>• School</li> <li>• Commercial complex</li> <li>• Religious place</li> </ul> <p>APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation in the main five persuasions is mentioned below.</p> <ul style="list-style-type: none"> <li>• Community Health</li> <li>• Sustainability Livelihood – Fisher Folk</li> <li>• Education</li> <li>• Rural Infrastructures</li> </ul>

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			activities in the Mundra region since 2010. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				<p>Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Sep – 2021 for CSR activities which also includes cost of rural infrastructure projects.</p> <p>Major works carried out since April 2018 as a part of CSR activities are as below.</p> <ul style="list-style-type: none"> <li>• Pond Deepening work at Vadala &amp; Mota Bhadiya</li> <li>• Artificial recharge borewell in Borana, Mangara &amp; Dhrub village.</li> <li>• Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities.</li> <li>• Construction of 45 Toilet block and proper bathing place for labours.</li> <li>• RO Plant – Samaghogha, Siracha village &amp; Vallabh Vidyalaya at Mundra</li> <li>• Basic sanitation facility (18 Nos) at Balvadi, medical centre and retiring places at labour settlements</li> <li>• Ground recharge activities (pond deepening work for more than 52 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers.</li> <li>• Roof Top Rain Water Harvesting 54 Nos. and Recharge Bore well 75 Nos.</li> <li>• Drip Irrigation 980 Farmers benefitted in coordination with Gujrat Green Revolution Company</li> <li>• Participatory Ground Water Management in ten villages with holistic approach for Kankavati Sandstone Aquifer Programme.</li> <li>• Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due</li> </ul>

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							<p>to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.</p> <ul style="list-style-type: none"> <li>• Development of Prisha Park at Mundra.</li> <li>• Pond Bund strengthening at Zarpara Village</li> <li>• Approach Road Restoration at all Fisher folk vasahat.</li> <li>• Garden Development at Primary School Rampar village</li> <li>• Shed Development at Shukhpurvah Mundra</li> <li>• Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported <b>117 home biogas</b> in Dhrub, Zarpara and Navinal Villages.</li> <li>• Adani Foundation at Mundra-Kachchh has initiated multi-species plantation of mangroves in Kachchh in association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha.</li> <li>• Sea Weed Culture - A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red sea weeds Kappaphycus alvarezii, Gracilaria dura and green sea weed Ulva. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period.</li> <li>• 31 RRWHS structure have been completed</li> <li>• 45 Bore-well recharging activity is completed.</li> <li>• Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara</li> <li>• Earthen bund Repairing work at Pond, Luni.</li> </ul>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
							<ul style="list-style-type: none"> <li>Pre-monsoon activity Approach repairing, Village Pond Lake strengthen, and river cleaning (babul cutting) work is ongoing in Various Villages</li> <li>Approach Road repairing at Various Fishermen Vasahat (ARC).</li> </ul> <p>Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.</p>
10.2	The overall sex ratio was found to reduce by 28% in the Mundra taluk (study area) during the period 2001 - 2011. This could be attributed to increase in influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced	Level-2	Adani foundation is taking up several girl child education programs as part of CSR activities to create awareness about girl child protection.	Suitable regional level awareness programs on the girl child protection and encouragement programs in line with state and national policies shall be adopted under Corporate Social Responsibility programs in association with district authorities.	APSEZ, Other development projects and District Administration*	Long Term	<p>Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below.</p> <ul style="list-style-type: none"> <li>The Adani Foundation provided scholarship support to motivation and encouragement of fishermen boys and girls for higher education under this program. APSEZ provide 100% fees support to girls as a scholarship.</li> <li>Uthhan Project promotes girl child education, Creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samridhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it.</li> <li>Separate sanitation facilities for girl child in schools.</li> <li>Suposhan Project focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescents under this Project and brought them to considerable status.</li> <li>.Beti Vadhavo Programme was organized in 32 Villages in the presence of Village Sarpanch and other leaders in year 2017-18. We explained people about the various topics i.e. importance of girl child, Sex Ratio, Gender</li> </ul>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
	economic growth in the region.						<p>Equality and laws regarding Child abortion. This initiative was well accepted by community and we have observed a visible change in their mindset. We have facilitated 560 daughters with Kit (Small Bed sheet, Mosquito net, Soap and Cream with nutritious food for mother) To create awareness about health, personal hygiene, child education and nutritional diet in fishermen community, various awareness programs have been organized.</p> <ul style="list-style-type: none"> <li>• During the year various activity like, Covid-19 awareness in village &amp; Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National Deworming Day, National Nutrition Month had been celebrated.</li> <li>• Project Suposhan is initiated with the Motive ... Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages. <ul style="list-style-type: none"> <li>✓ 100 beneficiaries covered in Menstrual Hygiene Day - with slogan called "RED-ACHHA HAI"</li> <li>✓ 204 beneficiaries covered in Breastfeeding Week</li> <li>✓ 320 beneficiaries covered in National Deworming Day</li> <li>✓ 20 villages covered in celebration of NATIONAL NUTRITION MONTH</li> <li>✓ 42 FAMILY COUNSELLING</li> </ul> </li> <li>• To reduce malnutrition and anemia amongst Children 95 % &amp; adolescent girls and pregnant &amp; lactating women by 70 % in three years</li> <li>• Reduction IMR and MMR</li> <li>• Support Awareness &amp; Cover 100 % Vaccination taken by Child &amp; women.</li> </ul>



S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
							<ul style="list-style-type: none"> <li>SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other dignitaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta.</li> <li>The National girl child day was celebrated with ICDC Department with Vahli Dikri Yojna form filling, paediatric health camp and Baby health kit distribution at Mundra. Mrs. Ashaben-CDPO Mundra was remain present in this event. Total 61 forms has received approval letter from GOG and 15 forms filled upon the same day.</li> <li>Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area.</li> </ul> <p>About INR 4977.63 lakhs has been spent on various CSR activities in the Mundra region since April 2018 till Mar 2021 including cost of community health and education for woman and girl child.</p>
10.4	Due to economic growth leading to rapid urbanization, which prompts the	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future	APSEZ	Long Term	<p>Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township.</p> <p>Primary health center and community health center are in place within the Mundra taluka.</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
	need for healthcare facilities in the region. For an influx of 6 lakh people from APSEZ operations and additional 3 Lakh from induced growth by the year by 2030 (fully developed scenario), total hospitals facilities with about 540 beds would be required.		primary and secondary health care services to Adani group employees and the local populace of Mundra. The existing 100 bed Adani hospital at Mundra has been catering the services ranging from wellness and preventative care.	depending on the growth scenario at APSEZ development.			<p>Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below.</p> <p>Adani foundation has spent approx. INR 4977.63 lakhs from April – 2018 to Mar – 2021 for CSR activities cost including cost of community health.</p> <ul style="list-style-type: none"> <li>• Mobile Health Care Units and Rural Clinics</li> <li>• 9 Rural Clinics</li> <li>• 06 from Mundra, 02 from Anjar &amp; 01 from Mandvi block treated;</li> <li>• 3843 patients</li> <li>• 31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit</li> <li>• 3364 patients benefited during six months</li> <li>• 06 patients are provided Dialysis treatment at 133 times with nominal charges at Adani Hospital.</li> <li>• 471 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.</li> <li>• For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 1100 patients of Mundra Taluka.</li> <li>• 16 Senior Citizens have been linked with Government Niradhar pension scheme, 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness.</li> </ul> <p>Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations for last two years.</p> <p>Present Hospital facilities are adequate to avail the medical treatment for Mundra region considering present development. Other Occupational Health centres, primary</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
							<p>health centres and community health centres are also in place in Mundra to take care the people residing in Mundra. Adani group is also operating high quality health care services to the people of Kutch at G. K. General Hospital, Bhuj having 750 beds facilities on public private partnership (PPP) model, which is 60 km far from Mundra.</p> <p>APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.</p>
10.5	<p>Due to rapid economic development in the region, several employment opportunities can be generated to the local people.</p> <p>When the area is fully developed by the end of 2030, the working population of the Mundra taluk would increase from</p>		<p>APSEZ has been giving preferences to people from Gujarat for providing employment opportunities based on eligibility and skills. In Mundra, special programmes have been conducted by Adani Foundation to enhance the employability of youth from fisherfolk</p>	<p>APSEZ is committed to provide support for fishermen livelihood activities and has submitted a detailed 5 years plan to MoEF&amp;CC with a total budget of Rs.13.5 Cr.</p>	APSEZ	Short Term	<p>Following support provided during this compliance period as a fisherfolk livelihood.</p> <ul style="list-style-type: none"> <li>Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with Narmada water through GWIL and Mundra Gram Panachayat from which 355 households get benefited.</li> <li>11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022.</li> <li>Facilitation of Pagadiya Welfare scheme &amp; boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department, Bhuj for pagadiya and boat License.</li> <li>During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation.</li> <li>To promote Natural farming Adani Foundation has originated cow-based farming initiative with</li> </ul>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
	current level of 55,000 to as high as 4,00,000, which will be 45% of the total envisaged population in Mundra Taluk by the end of 2030.		communities. Based on the need assessment results, several livelihood options have been introduced by the Adani Skill Development Centre, Mundra. In these centres, youth can join and get vocational training for a number of technical and non-technical skills. An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum				<p>interconnected techniques which can increase farmer yield.</p> <ul style="list-style-type: none"> <li>• 23 wormicompost unit have been set-up. Which is facilitated through Government with farmer Contribution.</li> <li>• 50 Farmers have started to preparing Jiva Mrut &amp; Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation.</li> <li>• Two Farmers Groups is registered with ATMA–Agricultural technology management Agency–it will leverage Government schemes.</li> <li>• Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg.</li> <li>• Fodder Cultivation-To made fodder sustain villages -25 Acre Gauchar land of Siracha village is being cultivated for the same.</li> <li>• Current year for the dates Packaging and Marketing, KKPC Started to sell 10 Kg capacity packaging Box at Minimum Profit Margin At Rs.29/Boxes which resulted in turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly.</li> <li>• Dragon fruit farming is on going by Five farmers each farmer is doing in 2 Acre farm –Total 11000 plants.</li> <li>• Skill Development and Income Generation –Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job.</li> </ul>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ ESMP	Responsible agency	Timeframe for implementation	Compliance
			possible extent.				<p>APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes:</p> <ul style="list-style-type: none"> <li>• Vidya Deep Yojana</li> <li>• Vidya Sahay Yojana – Scholarship Support</li> <li>• Adani Vidya Mandir</li> <li>• Fisherman Approach in SEZ</li> <li>• Machhimar Arogya Yojana</li> <li>• Machhimar Kaushalya Vardhan Yojana</li> <li>• Machhimar Sadhan Sahay Yojana</li> <li>• Machhimar Awas Yojana</li> <li>• Machhimar Shudhh Jal Yojana</li> <li>• Sughad Yojana</li> <li>• Machhimar Akshay kiran Yojana</li> <li>• Machhimar Suraksha Yojana</li> <li>• Machhimar Ajivika Uparjan Yojana</li> <li>• Bandar Svachhata Yojana</li> </ul> <p>These initiatives are planned for the period 2016 – 2021 with a committed expense of INR 13.5 Cr as submitted earlier in detail in the report namely “Silent Transformation of Fisher folk at Mundra”, .</p> <p>Till, Sep’21 approx. 9.78 Cr. INR, has already been spent in support for fishermen livelihood activities.</p>





## TEST REPORT FOR WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 2

Customer's Name and Address :

**M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED**  
**C/O. ENVIRONMENT CELL, 3<sup>rd</sup> FLOOR,**  
**ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,**  
**TALUKA-MUNDRA, DIST-KUTCH-370421**

Test Report No. : **PL/AM 0735**

Issue Date : **31/08/2021**

Customer's Ref. : **As Per W.O.**

Description of Sample : <b>Nr. ATT -2A</b>	
Sampling Date : <b>24/08/2021</b>	Quantity/No. of Samples : <b>05 Lit/One</b>
Sampling By : <b>Pollucon Laboratories Pvt. Ltd.</b>	Sampling Procedure : <b>Grab</b>
Sample Receipt Date : <b>25/08/2021</b>	Lab ID : <b>AM/2108/68</b>
Packing/ Seal : <b>Sealed</b>	Test Parameters : <b>As per table</b>
Date of Starting of Test : <b>25/08/2021</b>	Date of Completion : <b>31/08/2021</b>

### RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -2A	
1	Colour	Co-pt	10	IS 3025 (Part – 4) 2017
2	Odour	--	Agreeable	IS 3025 (Part – 5) 2019
3	Total Suspended Solids	mg/L	21	IS 3025 (Part – 17) 2017
4	pH	--	7.43	IS 3025 (Part – 11) 2017 Electrometric Method
5	Temperature	°C	29.8	IS 3025 (Part-9) 2017
6	Oil & Grease	mg/L	Not Detected	APHA(23rd Edition) 5520 B 2017
7	Total Residual Chlorine	mg/L	Not Detected	APHA(23 <sup>rd</sup> Edition 2017) 4500 Cl G-DPD colorimetric method
8	Ammonical Nitrogen	mg/L	1.85	IS 3025 (Part-34) 2019 Nesslerization Method
9	BOD	mg/L	6.0	IS 3025 (Part-44) 2019
10	COD	mg/L	48	APHA (23rd Edition 2017) 5220 B Open Reflux Method
11	Arsenic as As	mg/L	Not Detected	APHA (23rd Edition 2017) 3114 B
11	Mercury as Hg	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3112 B
12	Lead as Pb	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
13	Cadmium as Cd	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B

**Continue...**

  
**H. T. Shah**  
**Lab. Manager**

  
**Dr. Arun Bajpai**  
**Lab Manager (Q)**

Note: This report is subject to terms & conditions mentioned overleaf.

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"Pollucon House", Plot No.5/6, Opp.Balaji Industrial Society, Old Shantinath Silk Mill Lane, Near Gaytri Farsan Mart,  
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## TEST REPORT FOR WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 2

Customer's Name and Address :

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Test Report No. : **PL/AM 0735**

Issue Date : **31/08/2021**

Customer's Ref. : **As Per W.O.**

### RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -2A	
14	Hexavalent Chromium as Cr <sup>+6</sup>	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3500 Cr B Colorimetric method
15	Total Chromium	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
16	Copper as Cu	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
17	Zinc as Zn	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
18	Selenium as Se	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3114 B
19	Nickel as Ni	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
20	Cyanide as CN	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 4500 CN E Colorimetric Method
21	Fluorides as F	mg/L	0.60	APHA (23 <sup>rd</sup> Edition 2017) 4500 F D SPANDS Method
22	Dissolved Phosphate as P	mg/L	0.027	IS 3025 (Part-16) 2017
23	Sulphides as S	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 4500 S2 F Iodometric method
24	Phenolic Compound as C <sub>6</sub> H <sub>5</sub> OH	mg/L	Not Detected	IS 3025 (Part - 43) 2019 Aminoantipyrine Method
25	Bio-assay Test	%	90% survival offish after 96hours in 100% sample	OECD 203 B/IS: 6582-2001
26	Manganese as Mn	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
27	Iron as Fe	mg/L	0.10	APHA (23 <sup>rd</sup> Edition 2017) 3500 Fe B
28	Vanadium as V	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
29	Nitrate Nitrogen as N	mg/L	0.11	IS 3025 (Part-34) 2019 Spectrophotometry

Not Detection Limit: Oil & Grease :2.0 mg/L, Total Residual Chlorine:0.2 mg/L Arsenic as As : 0.001 mg/L, Mercury as Hg:0.0006 mg/L, Lead as Pb : 0.02 mg/L, Cadmium as Cd : 0.004 mg/L, Total Chromium : 0.05 mg/L, Copper as Cu : 0.02 mg/L, Zinc : 0.05 mg/L, Selenium as Se:0.008mg/L, Hexavalent Chromium as Cr+6:0.05 mg/L, Nickel as Ni:0.02 mg/L, Cyanides as CN: 0.01 mg/L, Sulphides as S:0.1 mg/L, Phenolic Compound as C<sub>6</sub>H<sub>5</sub>OH: 0.01mg/L, Vanadium as V:0.25 mg/L, Manganese as Mn: 0.03.

**H. T. Shah**  
**Lab. Manager**

**Dr. Arun Bajpai**  
**Lab Manager (Q)**

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## TEST REPORT FOR WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 2

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**TALUKA-MUNDRA, DIST-KUTCH-370421**

Test Report No. : **PL/AM 0736**

Issue Date : **31/08/2021**

Customer's Ref. : **As Per W.O.**

Description of Sample : **Nr. ATT -4**

Sampling Date : **24/08/2021**

Quantity/No. of Samples : **05 Lit/One**

Sampling By : **Pollucon Laboratories Pvt. Ltd.**

Sampling Procedure : **Grab**

Sample Receipt Date : **25/08/2021**

Lab ID : **AM/2108/69**

Packing/ Seal : **Sealed**

Test Parameters : **As per table**

Date of Starting of Test : **25/08/2021**

Date of Completion : **31/08/2021**

### RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -4	
1	Colour	Hazen	5.0	IS 3025 (Part – 4) 2017
2	Odour	--	Agreeable	IS 3025 (Part – 5) 2019
3	Total Suspended Solids	mg/L	26	IS 3025 (Part – 17) 2017
4	pH	--	7.73	IS 3025 (Part – 11) 2017 Electrometric Method
5	Temperature	°C	30.0	IS 3025 (Part-9) 2017
6	Oil & Grease	mg/L	Not Detected	APHA(23 <sup>rd</sup> Edition) 5520 B 2017
7	Total Residual Chlorine	mg/L	Not Detected	APHA(23 <sup>rd</sup> Edition 2017) 4500 Cl G-DPD colorimetric method
8	Ammonical Nitrogen	mg/L	1.96	IS 3025 (Part-34) 2019 Nesslerization Method
9	BOD	mg/L	5.0	IS 3025 (Part-44) 2019
10	COD	mg/L	39	APHA (23 <sup>rd</sup> Edition 2017) 5220 B Open Reflux Method
11	Arsenic as As	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3114 B
11	Mercury as Hg	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3112 B
12	Lead as Pb	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
13	Cadmium as Cd	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B

**Continue...**

  
**H. T. Shah**  
**Lab. Manager**

  
**Dr. Arun Bajpai**  
**Lab Manager (Q)**

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## TEST REPORT FOR WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 2

Customer's Name and Address :

**M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED**  
**C/O. ENVIRONMENT CELL, 3<sup>rd</sup> FLOOR,**  
**ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,**  
**TALUKA-MUNDRA, DIST-KUTCH-370421**

 Test Report No. : **PL/AM 0736**

 Issue Date : **31/08/2021**

 Customer's Ref. : **As Per W.O.**

### RESULT TABLE

SR NO	TEST PARAMETERS	UNIT	RESULT	TEST METHOD
			Nr. ATT -4	
14	Hexavalent Chromium as Cr <sup>+6</sup>	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3500 Cr B Colorimetric method
15	Total Chromium	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
16	Copper as Cu	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
17	Zinc as Zn	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
18	Selenium as Se	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3114 B
19	Nickel as Ni	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
20	Cyanide as CN	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 4500 CN E Colorimetric Method
21	Fluorides as F	mg/L	0.54	APHA (23 <sup>rd</sup> Edition 2017) 4500 F D SPANDS Method
22	Dissolved Phosphate as P	mg/L	0.021	IS 3025 (Part-16) 2017
23	Sulphides as S	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 4500 S2 F Iodometric method
24	Phenolic Compound as C <sub>6</sub> H <sub>5</sub> OH	mg/L	Not Detected	IS 3025 (Part - 43) 2019 Aminoantipyrine Method
25	Bio-assay Test	%	90% survival offish after 96hours in 100% sample	OECD 203 B/IS: 6582-2001
26	Manganese as Mn	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
27	Iron as Fe	mg/L	0.13	APHA (23 <sup>rd</sup> Edition 2017) 3500 Fe B
28	Vanadium as V	mg/L	Not Detected	APHA (23 <sup>rd</sup> Edition 2017) 3111 B
29	Nitrate Nitrogen as N	mg/L	0.08	IS 3025 (Part-34) 2019 Spectrophotometry

Not Detection Limit: Oil & Grease :2.0 mg/L, Total Residual Chlorine:0.2 mg/L Arsenic as As : 0.001 mg/L, Mercury as Hg:0.0006 mg/L, Lead as Pb : 0.02 mg/L, Cadmium as Cd : 0.004 mg/L, Total Chromium : 0.05 mg/L, Copper as Cu : 0.02 mg/L, Zinc : 0.05 mg/L, Selenium as Se:0.008mg/L, Hexavalent Chromium as Cr+6:0.05 mg/L, Nickel as Ni:0.02 mg/L, Cyanides as CN: 0.01 mg/L, Sulphides as S:0.1 mg/L, Phenolic Compound as C<sub>6</sub>H<sub>5</sub>OH: 0.01mg/L, Vanadium as V:0.25 mg/L, Manganese as Mn: 0.03

**H. T. Shah**  
 Lab. Manager

**Dr. Arun Bajpai**  
 Lab Manager (Q)

Note: This report is subject to terms & conditions mentioned overleaf.

● FSSAI Approved Lab ● Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986 ● GPCB approved schedule II auditor ● ISO 14001:2004 ● OHSAS 18001:2007 ● ISO 9001:2008

"Pollucon House", Plot No.5/6, Opp.Balaji Industrial Society, Old Shantinath Silk Mill Lane, Near Gaytri Farsan Mart, Navjivan Circle, Udhana Magdalla Road, Surat-395007, Gujarat, India.

Phone : 0261-2635750, 0261-2635751, 0261-2635775, 0701660511 | Email: info@polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

# **Annexure – 9**



# Certificate

Standard: **Zero Waste to Landfill Management System  
(ZWTL MS 2020)**

Certificate Holder: **Adani Ports and Special Economic Zone Limited**  
Mundra Port, Kutch - 370421,  
Gujarat, India

Scope: **Providing Port Facilities for Import and Export of  
Bulk, Break Bulk, Liquid and Containerized Cargo,  
its Storage and RORO Operation for Export of  
Vehicles**

Validity: **Proof has been furnished by means of an audit that the  
Requirements of ZWTL MS 2020 are met, with the  
achievement of waste diversion rate of above 99%**  
**This certificate is valid from 01-06-2021 until 31-05-2024  
Subject to satisfactory annual surveillance audits.**

Certificate No. TUV/ZWLMS/2021/Adani Ports/0501



New Delhi, 01-06-2021

TÜV Rheinland India Pvt. Ltd.  
Office 610, 6<sup>th</sup> Floor, iThum  
Tower, A-40, Sector-62,  
Noida- 201301, India





CII-ITC Centre of Excellence  
for Sustainable Development



Confederation of Indian Industry

## Certificate

### Single-use Plastic Free

#### **Adani Ports and Special Economic Zone Limited**

Adani Mundra Port, Adani House, PO Box No. 1, Mundra, Kutch 370 421, Gujarat, India

This is to certify that Adani Ports and Special Economic Zone Limited, at the location mentioned above, is Single-use Plastic Free as verified by the Confederation of Indian Industry, under the provisions of the **Plastics-use Protocol: Verification and Certification (1.0)**.

This Certificate is valid from 26 May 2021 to 25 May 2022.

PLASTICS-USE  
PROTOCOL



**Ms Seema Arora**  
Deputy Director General  
Confederation of Indian Industry (CII)  
Centre of Excellence for Sustainable Development (CESD)

**Certificate Date:** 07 June 2021

**Certificate No.:** CII/PuP/2021/012

This certificate has been awarded after the company fulfilled the requirements for phasing-out single-use plastics and providing evidence for it. Responsibility for the data provided to CII rests solely with the company. The conditions of certification and terms are detailed in the Annex.



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### Annex

The certification applies to the following single-use plastic items:

- Cutlery (knives, forks, spoons, chopsticks)
- Crockery (plates, glasses, cups, lids, bowls)
- Food containers
- Straws
- Stirrers
- Carry bags
- Items of decoration (polystyrene)
- Garbage bags

**Organizational Boundary:** Adani Ports and Special Economic Zone Limited

**Operational Boundary:** Administration, canteen, kitchen and operational areas

**Material Boundary:** Single-use Plastics

#### Reference

**Verification Date:** 26 May 2021

**Verification Report No.:** PuP/Verification/2021/AdaniPorts/004

**Mode:** On account of the COVID-19 pandemic, the verification process was virtual and followed provisions outlined in the Verification Procedure 1.0 of the Protocol