

Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Monday, May 30, 2022 11:05 AM
To: eccompliance-guj@gov.in; iro.gandhingr-mefcc@gov.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 -Port Expansion 2000 for Period Oct'21 to Mar'22
Attachments: 2. EC Compliance Report_Port Expansion 2000_Oct'21 to Mar'22.pdf

adani

Ports and
Logistics

APSEZL/EnvCell/2022-23/018

Date: 27.05.2022

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: eccompliance-guj@gov.in, iro.gandhingr-mefcc@gov.in

Sub : Half yearly Compliance report of Environment Clearance under CRZ notification for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat by M/s. Adani Ports & SEZ Limited."


Ref : Environment clearance under CRZ notification granted to M/s Adani Ports & SEZ Limited vide letter dated 20th September, 2000 bearing no. J-16011/40/99-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 October-2021 to March-2022 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


Douglas Charles Smith
Chief Executive Officer
Mundra & Tuna Port

Encl: As above

Copy to:

Thanks & Regards,

Bhagwat Swaroop Sharma
Sr. Manager - Environment
Mundra & Tuna port

Adani Ports & Special Economic Zone Ltd.

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adani

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with
Goodness

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Logistics

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Mundra & Tuna Port

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Copy to:

- 1) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003.
- 2) The Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara – 390023.
- ✓ 3) The Member Secretary, GPCB – Head Office, Paryavaran Bhavan, Sector 10 A, Gandhi Nagar – 382010.
- 4) The Director, Forests & Environment Department, Block – 14, 8th floor, Sachivalaya, Gandhi Nagar – 382010.
- 5) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham – 370201.

Adani Ports and Special Economic Zone Ltd
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01/06/2022
Gujarat Pollution Control Board
Head Office
Sector No. 10-A,
Gandhinagar-382010

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India



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Logistics

APSEZL/EnvCell/2022-23/018

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Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
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Environmental Clearance Compliance Report



Port Expansion Project including Dry/Break Bulk Cargo Container Terminal, Railway Link and related Ancillary and Back-up facilities at Mundra Port, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited

For the Period of:
October – 2021 to March – 2022

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**EC & CRZ
Clearance
Compliance
Report**

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

- 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 Apr'21 to Sep'21.

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

- Half yearly Compliance report of Environment Clearance under CRZ notification for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat vide letter no. J-16011/40/99-IA.III dated 20th September, 2000'

Sr. No.	Conditions	Compliance Status as on 31-03-2022															
A. Specific Condition																	
i	All the conditions stipulated by the Gujarat Pollution Control Board vide their NOC No. PC/NOC/Kutch/391/18424 dated 10.6.99 and No. PC/NOC/Kutch/222(2)1688 O dated 1.5.99 shall be strictly implemented.	<p>Complied.</p> <p>Consent to operate (CC&A) has been renewed from GPCB vide consent no. AWH-117045 valid till 20th November, 2026. Please refer attached Annexure-1.</p> <p>Consent to Establish (CtE) and Consent to Operate (CtO) are obtained from GPCB and renewed/amended from time to time as per the progress of the project activity. The present in-force CtE / CtO are mentioned below.</p> <table><tr><th>Sr. No.</th><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr><tr><td>1</td><td>CtO – Renewal</td><td>Mundra Port Terminal</td><td>AWH-117045</td><td>20.11.2026</td></tr><tr><td>6</td><td>CtE – Amendment</td><td>WFDP</td><td>17739 / 15618</td><td>18.05.2027</td></tr></table> <p>The permission mentioned above (Sr. No. 2) was submitted along with earlier compliance report submission. The copy of CtO renewal order (Sr. No. 1) is attached as Annexure – 1.</p>	Sr. No.	Permission	Project	Ref. No. / Order No.	Valid till	1	CtO – Renewal	Mundra Port Terminal	AWH-117045	20.11.2026	6	CtE – Amendment	WFDP	17739 / 15618	18.05.2027
Sr. No.	Permission	Project	Ref. No. / Order No.	Valid till													
1	CtO – Renewal	Mundra Port Terminal	AWH-117045	20.11.2026													
6	CtE – Amendment	WFDP	17739 / 15618	18.05.2027													
ii	The conditions stipulated in the letter No ENV-1098-6477-PI dated October 28, 1999 and No. ENV-1099-2702-PI dated 27.12.99 of shall be strictly implemented.	<p>Complied.</p> <p>Point wise compliance report of CRZ recommendations issued vide letter No ENV-1098-6477-PI dated October 28, 1999 and No. ENV-1099-2702-PI dated 27.12.99 is enclosed as Annexure- A.</p>															
iii	The turning circle should be increased from 550 m to 600 m.	<p>Complied.</p> <p>Construction activities are completed and project is in operation phase.</p>															
iv	A girdle canal with	Not applicable at present.															

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022
	settlement tanks shall be provided around the coal storage area.	Coal handling is not practiced at project site.
v	All efforts shall be made for water conservation and rainwater harvesting. Arrangements shall be made for roof top rainwater harvesting from various structures.	<p>Complied.</p> <p>Under the Water Conservation and Optimization Drive at APSEZ, various initiatives were taken for conservation of water such as,</p> <ol style="list-style-type: none"> 1. 100% utilization of treated water for horticultural purpose. 2. Total 128 Water-free urinals are installed and in operation within APSEZ. 3. Recirculation of water from fixed firefighting system to reservoir through flexible pipe during testing of firefighting system. 4. Conservation of Condensate from Air Conditioner and use for gardening. 5. Water flow reducers (total 8740 nos.) are provided in taps of Adani House, Tug Berth, CT2, CT3 & CT4 buildings to reduce the water consumption and are in use. 6. Water Maker machine is installed near Tug Berth jetty which generates drinking water from atmospheric moisture. The capacity of this machine is 250 liters per day. 7. Attending leakages and damages of water lines at various locations of APSEZ. 8. Process optimization 9. Aware to people by display of poster/sticker/ slogan of water saving at wash basin/bathroom/toilets areas of APSEZ & Residential colonies. <p>Above initiative have saved substantial amount of water consumption.</p> <p>Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rainwater within project area is managed through storm water drainage.</p> <p>We have installed Rainwater recharge bore well (4 Nos.) within our township to recharge ground water. Details of the same were submitted along with half yearly EC compliance report for the period Apr'19 to Sep'19.</p>

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<p>During last monsoon Approx. 2.06 ML of rainwater has been recharged to increase the ground water table.</p> <p>We have also connected roof top rainwater duct of operational building (Tug berth building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Details of the same were submitted along with EC Compliance report for the period Oct'18 to Mar'19.</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.</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>Our water conservation work is as below.</p> <ul style="list-style-type: none"> • A large number of water harvesting structure (21 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 56 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 115 Nos. (50 Nos current year) which is having 10,000 litre storage which is

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<p>sufficient for one year drinking water purpose for 5 people family.</p> <ul style="list-style-type: none"> Recharge Borewell 189 Nos (83 Nos current year) which is best ever option to. Drip Irrigation 1158 Farmers (180 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 borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. Luni Pond Bund Repairing Work is completed. <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>Please refer Annexure - 2 for full details of CSR activities carried out by Adani Foundation in the Kutch region. Budget for CSR Activity for the FY 2021-22 is to the tune of INR 1628.45 lakh. Out of which, Approx. INR 1492.6 lakh are spent during current FY 2021-22.</p>
vi	To obviate the problem of coastal erosion due to dredging, the setback distance of at least 50 m from the Chart Datum line of Bocha island would be maintained.	<p>Complied.</p> <p>During Maintenance dredging in this area, it is ensured that at least 50 m distance is maintained.</p>
vii	The dredged material shall be disposed of only in the identified locations outside the CRZ area. While dumping the dredged material, sufficient distance should be ensured from the existing mangroves so that there is no damage to the ecology. During dumping of dredged material the mitigative measures as suggested by NIO shall be implemented.	<p>Complied.</p> <p>Capital dredging is completed and only maintenance dredging is being carried out, if required which is being ensured that there no damage of marine ecology.</p> <p>In order to ensure no damage to marine ecology Marine water & sediment monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'21 to Mar'22 is mentioned below.</p>

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2022																																																														
	It shall be ensured that there is no dumping of dredged material in the CRZ.	<div>Total Sampling Locations: 09 Nos.</div> <table><tr><th rowspan="2">Para meter</th><th rowspan="2">Unit</th><th colspan="3">Surface</th><th colspan="3">Bottom</th></tr><tr><th>Max</th><th>Min</th><th>Average</th><th>Max</th><th>Min</th><th>Average</th></tr><tr><td>pH</td><td>--</td><td>8.26</td><td>7.78</td><td>8.01</td><td>8.21</td><td>7.5</td><td>7.97</td></tr><tr><td>TSS</td><td>mg/L</td><td>144</td><td>92</td><td>116.76</td><td>118</td><td>76</td><td>97.50</td></tr><tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>3.3</td><td>2.1</td><td>2.77</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>DO</td><td>mg/L</td><td>6.7</td><td>5.8</td><td>6.11</td><td>6.5</td><td>5.7</td><td>5.98</td></tr><tr><td>Salinity</td><td>ppt</td><td>36.7</td><td>34.1</td><td>35.51</td><td>36.46</td><td>33.4</td><td>35.77</td></tr><tr><td>TDS</td><td>mg/L</td><td>37604</td><td>29104</td><td>35921</td><td>37992</td><td>31828</td><td>36488</td></tr></table> <div>*ND = Not Detectable</div> <div>Please refer Annexure – 3 for detailed analysis reports. Approx. INR 14.31 Lakh is spent for all environmental monitoring activities during the FY 2021-22 for overall APSEZ, Mundra.</div>	Para meter	Unit	Surface			Bottom			Max	Min	Average	Max	Min	Average	pH	--	8.26	7.78	8.01	8.21	7.5	7.97	TSS	mg/L	144	92	116.76	118	76	97.50	BOD (3 Days @ 27 °C)	mg/L	3.3	2.1	2.77	ND*	ND*	ND*	DO	mg/L	6.7	5.8	6.11	6.5	5.7	5.98	Salinity	ppt	36.7	34.1	35.51	36.46	33.4	35.77	TDS	mg/L	37604	29104	35921	37992	31828	36488
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viii	The mangrove afforestation shall be undertaken at the identified sites and the progress report in this regard shall be submitted to this Ministry regularly. All the recommendations suggested in the NIO report for restoration of the coastal habitat by mangrove afforestation at Navinal island shall be strictly implemented.	<div>Complied.</div> <div>All construction activities are completed and project is in operation phase since long time. 24 hectare of mangrove afforestation was carried out at identified sites in consultation with Dr Maity, (Mangrove Consultant of India).</div> <div>Green belt was developed 72.81 ha. Total 1,33,462 trees were planted with the density of 1835 trees per hectare within the port area. So, far APSEZ has developed 486.19 ha. area as greenbelt with plantation of more than 9.4 Lacs saplings within the APSEZ area.</div> <div>To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 3140 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 847.8 lakh.</div> <div>Details on Mangroves afforestation & Green belt development carried out by APSEZ till date is annexed</div>																																																														

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<p>as Annexure – 4.</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 M/s. 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. During current FY 2021-22, 03 ha area coastal stretches have been planted with mangrove species. Total 16 Ha. multi-species mangrove plantation has been carried out till March-22 association with M/s. GUIDE, Gujarat.</p> <p>Please refer attached Annexure – 2 for CSR activity report carried out by Adani Foundation.</p>
ix	No ground water shall be withdrawn for this project.	<p>Complied.</p> <p>Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through Gujarat Water Infrastructure Limited. Average water consumption for entire APSEZ area is 3.45 MLD during compliance period i.e. Oct'21 to Mar'22.</p>
x	The project proponent shall ensure that the construction workers do not cut the Mangroves for fuel wood etc.	<p>Complied.</p> <p>All construction activities are completed and project is in operation phase since long time.</p>
xi	The project proponent shall ensure that no creeks are blocked and the natural drainage of the area is not affected due to project activities.	<p>Complied.</p> <p>Prominent creek system (main creeks and small branches of creeks) in the study region are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river).</p> <p>All above creeks are in existence allowing free flow of water and there is no filling or reclamation of any creek area. APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Apart from that three RCC Bridges have been constructed over Kotdi creek with total length of 230 m at the cost of INR 10 Crores. Photographs of the same were submitted as part of compliance report for the</p>

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022																																									
		<p>duration of Apr'17 to Sep'17.</p> <p>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>																																									
xii	The project proponent shall ensure that there will be no disposal of sludge and sewage generated from construction camps, surface run-off from construction sites, and oil and grease spillage from the construction equipment's in the creeks.	Complied.																																									
		Project is in operation phase.																																									
		Sewage generated from port is being treated in designated ETP and treated sewage is used for horticulture purposes.																																									
		<table><tr><th>Location</th><th>Capacity</th><th>Quantity of Treated Water (Avg. from Oct'21 to Mar'22)</th><th>Type of ETP / STP</th></tr><tr><td>LT</td><td>265 KLD</td><td>78 KLD</td><td>Activated Sludge</td></tr></table>	Location	Capacity	Quantity of Treated Water (Avg. from Oct'21 to Mar'22)	Type of ETP / STP	LT	265 KLD	78 KLD	Activated Sludge																																	
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LT	265 KLD	78 KLD	Activated Sludge																																								
	<p>Summary of ETP treated water analysis results during compliance period as mentioned below.</p> <table><tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit[§]</th></tr><tr><td>pH</td><td>--</td><td>7.11</td><td>7.59</td><td>7.29</td><td>6.5 – 8.5</td></tr><tr><td>SS</td><td>mg/L</td><td>23</td><td>56</td><td>35</td><td>100</td></tr><tr><td>TDS</td><td>mg/L</td><td>1376</td><td>1678</td><td>1542</td><td>2100</td></tr><tr><td>COD</td><td>mg/L</td><td>71.10</td><td>78.00</td><td>74.38</td><td>100</td></tr><tr><td>BOD</td><td>mg/L</td><td>16</td><td>22</td><td>18</td><td>30</td></tr><tr><td>Ammonical Nitrogen as NH₃-N</td><td>mg/L</td><td>7.44</td><td>25.4</td><td>11.38</td><td>50</td></tr></table>	Parameter	Unit	Min	Max	Average	Perm. Limit [§]	pH	--	7.11	7.59	7.29	6.5 – 8.5	SS	mg/L	23	56	35	100	TDS	mg/L	1376	1678	1542	2100	COD	mg/L	71.10	78.00	74.38	100	BOD	mg/L	16	22	18	30	Ammonical Nitrogen as NH ₃ -N	mg/L	7.44	25.4	11.38	50
Parameter	Unit	Min	Max	Average	Perm. Limit [§]																																						
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Ammonical Nitrogen as NH ₃ -N	mg/L	7.44	25.4	11.38	50																																						
		<p>[§] as per CC&A granted by GPCB</p> <p>The quality of marine water, treated effluents, air emissions and noise levels are being regularly analyzed by NABL accredited and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi.. Please refer Annexure – 3 for detailed analysis reports for the period Oct'21 to Mar'22. Approx. INR 14.31 Lakh is spent for all environmental monitoring activities</p>																																									

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<p>during the FY 2021-22 for overall APSEZ.</p> <p>It is also noted that GPCB is doing regular site inspection along with wastewater sampling and analysis. The last GPCB sample analysis report were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21 which shows all the parameters are well within the permissible limit.</p>
xiii	The project proponent shall stick to the time bound program submitted to the Department of Environment, Government of Gujarat for the proposed activities including installation of desalination plant for meeting the entire water requirement. They shall coordinate their construction/operations schedule with the installation schedule of desalination plant.	<p>Complied.</p> <p>Desalination plant has already been installed as per time bound program for overall APSEZ area and is in use. Details regarding water consumption are mentioned in Sr. no. ix above.</p>
xiv	The project proponent shall ensure that the commercial fisheries are not hampered due to presence of barges, vessels and other activities in the region. Necessary plan in this regard shall be prepared in consultation with the NIO and submitted within 3 months.	<p>Complied.</p> <p>No commercial fisheries are prevailing in this area except Pagadia and fishermen with small boats. Unhindered access is provided to the fishing boats.</p> <p>During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, APSEZ has provided seven (7) access roads. Total length of all the approach roads is approx. 23 Kms and expenditure involved was Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats. Details of the same were submitted along with EC Compliance report for the period Apr'18 to Sep'18.</p>
xv	The project proponent shall bear the cost of the external agency that may be appointed by the	<p>Complied.</p> <p>Construction activities are completed and project is in operation phase.</p>

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2022
	Department of Environment, Government of Gujarat for carrying out the supervision and/or the monitoring of the construction activities.	<p>As part of the directions given by MoEF&CC vides order dated 18th Sep, 2015, following studies were conducted.</p> <ol style="list-style-type: none"> 1. NCSCM (MoEF&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. <p>As a part of mangrove conservation plan, APSEZ has done following activities.</p> <ol style="list-style-type: none"> 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. b. Tidal observation in creeks in and around APSEZ – The cost of the said activity was INR 1.0 Lacs incurred by APSEZ. c. Algal & Prosopis removal from Mangrove area - The cost of the said activity is INR 2.8 Lacs incurred by APSEZ during FY 2021-22. Please refer attached Annexure – 5 for Report of Algal removal work in mangrove area. d. Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 206.11 Lacs during FY 2021-22, which was incurred by APSEZ. <ol style="list-style-type: none"> 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 GCZMA. The cost of said study was 1.3 Cr, which was incurred by APSEZ.
xvi	The project proponent shall carry out the post-project monitoring of various environmental parameters in consultation with the Department of	<p>Complied.</p> <p>Monitoring of various environmental parameters for Ambient Air, Noise, Wastewater, ground water, marine water and sediments along with the parameters mentioned in the consent order issued by GPCB is being</p>

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Sr. No.	Conditions	Compliance Status as on 31-03-2022
	Environment, Government of Gujarat and Gujarat Pollution Control Board.	carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi. Monitoring reports for the period from Oct'21 to Mar'22 are enclosed as Annexure - 3 .
xvii	The project proponent shall prepare the detailed traffic control management plan for the port and shall participate in the VTMS to be developed for the Gulf of Kachchh.	<p>Complied.</p> <p>APSEZ is practicing well defined traffic control procedure.</p> <p>A VTMS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India.</p> <p>APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel-77. Arrival and departure information in Gulf of Kutch is provided to VTMS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch@yahoo.com and vtsgok@yahoo.com.</p> <p>Mundra port has subscribed and taking VTMS feed from Kandla from link www.vts.gov.in.</p>
xviii	Action plan shall be prepared by the project proponents to prevent damage to marine life and also to the coastline in case of any oil spillage and the same shall be strictly implemented. Regular mock drills shall be carried out to ensure fitness of the equipment in place.	<p>Complied.</p> <p>Oil spill contingency response plan is being updated on regular basis and the same was last updated on 01.11.2021 is in place and implemented. The Oil spill contingency response plan is enclosed as Annexure-6.</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) prepared by APSEZ is in accordance with the NOSDCP.</p> <p>Regional Level Pollution Response exercise "SWACHCHH SAMUDRA-NW 2019" was carried out by Indian Coast Guard on 18th Dec, 2019. All participants from various Oil Handling Agencies and Stakeholders</p>

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Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<p>(ICG, GMB Port, DPT Vadinar, IOCL, RIL, NAYARA Energy, BORL, ESBTL Salaya, APSEZL, HMEL, GSFC, PCB, Forest Dept., Customs, Fisheries & DPT Kandla) were participated in this exercise.</p> <p>Mock drills are conducted regularly by APSEZ. Last Oil Spill Mock drill was conducted on 27.10.2021. Oil Spill Mock Drill report is enclosed as Annexure-7.</p>
xix	<p>The project proponents shall work out the maximum quantity of spilled material, which can find its way into the coastal waters, under different accident scenarios, and their impact on aquatic life shall be studied after clearly demarcating the impact zones. On the basis of such studies, the necessary action plan to mitigate the likely impacts shall be prepared before commencement of the operations. Action taken report in this regard shall be submitted to the Ministry.</p>	<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>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.</p> <p>Recommendations of Marine EIA by NIO with respect to pollution emergency contingency plan for Multipurpose Terminal, Container, Dry & Break Bulk Terminal as well as associated facilities are addressed in Oil Spill Response Plan.</p> <p>This action plan prepared by APSEZ to combat the oil spill (LOS-DCP) is in accordance with the NOS DCP, International Petroleum Industry Environmental Conservation Association (IPIECA). Please refer Point No. xviii.</p>
B. General Condition		
i	<p>Construction of the proposed structures should be undertaken meticulously conforming to the existing Central / local rules and regulations. All the construction designs / drawings relating to the proposed construction activities must have</p>	<p>Already complied. Not applicable at present.</p> <p>All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.</p> <p>Approval under the preview of GMB, PESO and Factories act were taken prior to start of construction.</p>

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2022																																																																																
	approvals of the concerned State Government Departments / Agencies.																																																																																	
ii	The proponent shall ensure that as a result of the proposed constructions ingress of the saline water into the ground water does not take place. Piezometers shall be installed for regular monitoring for this purpose at appropriate locations on the project site.	<p>Complied.</p> <p>To monitor the ground water quality, bore wells are provided at various location in the port and SEZ areas. Third party analysis of the ground water is being carried out twice a year by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'21 to Mar'22 is mentioned below. Monitoring Reports are attached as Annexure – 3 for the same.</p> <p>Number of Sampling Locations: 5</p> <table><tr><th>Parameters</th><th>Unit</th><th>MIN</th><th>MAX</th><th>AVERAGE</th></tr><tr><td>pH @ 25 ° C</td><td>--</td><td>7.60</td><td>8.06</td><td>7.87</td></tr><tr><td>Salinity</td><td>ppt</td><td>0.95</td><td>11.85</td><td>4.66</td></tr><tr><td>Oil & Grease</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Hydrocarbon</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Lead as Pb</td><td>mg/L</td><td>0.04</td><td>0.06</td><td>0.04</td></tr><tr><td>Arsenic as As</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Nickel as Ni</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Total Chromium as Cr</td><td>mg/L</td><td>0.08</td><td>0.09</td><td>0.09</td></tr><tr><td>Cadmium as Cd</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Mercury as Hg</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Zinc as Zn</td><td>mg/L</td><td>0.15</td><td>0.28</td><td>0.21</td></tr><tr><td>Copper as Cu</td><td>mg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Iron as Fe</td><td>mg/L</td><td>0.38</td><td>1.12</td><td>0.96</td></tr><tr><td>Insecticides/Pesticides</td><td>µg/L</td><td>ND*</td><td>ND*</td><td>ND*</td></tr><tr><td>Depth of Water Level from Ground Level</td><td>meter</td><td>1.90</td><td>2.15</td><td>2.07</td></tr></table> <p>*ND = Not Detectable</p> <p>Approx. INR 14.31 Lakh is spent for all environmental monitoring activities during the FY 2021-22 for overall APSEZ, Mundra.</p>	Parameters	Unit	MIN	MAX	AVERAGE	pH @ 25 ° C	--	7.60	8.06	7.87	Salinity	ppt	0.95	11.85	4.66	Oil & Grease	mg/L	ND*	ND*	ND*	Hydrocarbon	mg/L	ND*	ND*	ND*	Lead as Pb	mg/L	0.04	0.06	0.04	Arsenic as As	mg/L	ND*	ND*	ND*	Nickel as Ni	mg/L	ND*	ND*	ND*	Total Chromium as Cr	mg/L	0.08	0.09	0.09	Cadmium as Cd	mg/L	ND*	ND*	ND*	Mercury as Hg	mg/L	ND*	ND*	ND*	Zinc as Zn	mg/L	0.15	0.28	0.21	Copper as Cu	mg/L	ND*	ND*	ND*	Iron as Fe	mg/L	0.38	1.12	0.96	Insecticides/Pesticides	µg/L	ND*	ND*	ND*	Depth of Water Level from Ground Level	meter	1.90	2.15	2.07
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iii	A comprehensive contingency plan in collaboration with the concerned authorities must be formulated to	<p>Complied.</p> <p>Oil spill contingency response plan is being updated on regular basis and the same was last updated on 01.11.2021 is in place and implemented. The Oil spill</p>																																																																																

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	contain in case of any oil spills. Appropriate devices such as oil skimmer, oil monitor, oil water separator must be acquired for strengthening the contingency plan. All the service vessels that required for oil spill operations must be equipped with booms and dispersants. The personal onboard of these vessels must be properly trained in operation of these booms and dispersants.	<p>contingency response plan is enclosed as Annexure-6.</p> <p>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. 2 sets</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> <p>11 Dolphin tugs are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required. The tugs are fitted with a fire curtain and remote-controlled fire monitors.</p> <p>IMO module course organized by Maritime Training Institute is conducted & 24 personnel have achieved IMO level 1 & 04 personnel have achieved IMO Level 2. Different training modules as Oil Spill, Oil Spill Equipment, Oil spill Management course, Notification exercise, Table Top, Incident are conducted at different frequency.</p> <p>Detail of resource available at APSEZL is provided in Annexure-6 of Oil Spill Contingency Response Plan.</p>	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. 2 sets	Canadyne Fence Boom (Reel model 7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter	1 No.
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iv	The operation plan for responding to an oil spill must include clear	<p>Complied.</p> <p>Oil spill contingency plan is in place to handle Tier 1</p>																						

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	procedures for notification of a spill, response decision, cleanup operations, communications, and termination of cleanup operations, cleanup cost, oil pollution, damage control and disaster management plan.	<p>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 01.11.2021 is in place and implemented. The Oil spill contingency response plan is enclosed as Annexure-5.</p> <p>Oil Spill Contingency Plan includes procedures for notification of a spill as point no 7.1, response strategy as Point no. 3.0, cleanup operations, Clean-up cost and termination of cleanup in point no. 3.5, communications in point no. 6.0.</p>																																																												
v	A well-equipped laboratory with suitable instruments to monitor the quality of air and water shall be set up so as to ensure that the quality of ambient air and water conforms to the prescribed standards. The laboratory will also be equipped with qualified manpower including a marine biologist so that the marine water quality is regularly monitored in order to ensure that the marine life is not adversely affected as a result of implementation of the said project. The quality of ambient air and water shall be monitored periodically in all the seasons and the results should be properly maintained for inspection of the concerned pollution Control agencies. The periodic monitoring reports at least once in 6 months must be sent to	<p>Being complied</p> <p>Site is provided with environment monitoring equipment with sufficient & competent staff of Third-Party laboratory accredited by NABL & MoEF&CC.</p> <p>Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi.Summary of the same for duration from Oct'21 to Mar'22 is mentioned below.</p> <p>Total Ambient Air & Noise Sampling Locations: 4 Nos.</p> <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Average</th><th>Perm. Limit^{\$}</th></tr><tr><td colspan="6">AAQM</td></tr><tr><td>PM₁₀</td><td>µg/m³</td><td>91.55</td><td>41.55</td><td>76.44</td><td>100</td></tr><tr><td>PM_{2.5}</td><td>µg/m³</td><td>55.39</td><td>18.65</td><td>36.33</td><td>60</td></tr><tr><td>SO₂</td><td>µg/m³</td><td>40.18</td><td>6.53</td><td>19.23</td><td>80</td></tr><tr><td>NO₂</td><td>µg/m³</td><td>44.38</td><td>14.35</td><td>29.20</td><td>80</td></tr><tr><td colspan="6"></td></tr><tr><th>Noise</th><th>Unit</th><th>Leq Max</th><th>Leq Min</th><th>Leq Ave.</th><th>Leq Perm. Limit*</th></tr><tr><td>Day Time</td><td>dB(A)</td><td>69.90</td><td>55.40</td><td>64.82</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>64.90</td><td>52.34</td><td>60.20</td><td>70</td></tr></table> <p>^{\$} as per NAAQ standards, 2009 * as per CC&A granted by GPCB Values recorded confirms to the stipulated standards.</p> <p>Sewage generated from port is being treated in</p>	Parameter	Unit	Max	Min	Average	Perm. Limit ^{\$}	AAQM						PM ₁₀	µg/m ³	91.55	41.55	76.44	100	PM _{2.5}	µg/m ³	55.39	18.65	36.33	60	SO ₂	µg/m ³	40.18	6.53	19.23	80	NO ₂	µg/m ³	44.38	14.35	29.20	80							Noise	Unit	Leq Max	Leq Min	Leq Ave.	Leq Perm. Limit*	Day Time	dB(A)	69.90	55.40	64.82	75	Night Time	dB(A)	64.90	52.34	60.20	70
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	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
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Sr. No.	Conditions	Compliance Status as on 31-03-2022
	<p>this Ministry as well as its Regional Office at Bhopal.</p>	<p>designated ETP / STPs and treated sewage is being used for horticulture purposes.</p> <p>Please refer Specific Condition No. xii for further details.</p> <p><u>Marine Monitoring:</u></p> <p>Summary of the marine water monitoring for duration from Oct'21 to Mar'22 is provided above in point No. vii (specific conditions).</p> <p>Adani group has appointed a marine biologist Mr. Dhiraj Narale to monitor marine water quality. Also the third party monitoring of the Marine water is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi, who has marine biologist to ensure that the marine water quality do not adversely affects the marine life. Monitoring Reports are attached as Annexure - 3 for the same.</p> <p>Approx. INR 14.31 Lakh is spent for all environmental monitoring activities during the FY 2021-22 for overall APSEZ, Mundra.</p> <p>Compliance report of EC conditions is uploaded regularly. Last compliance report including results of monitoring data for the period of Apr'21 to Sep'21 was submitted to Regional Office of MoEF&CC @ Bhopal, IRO MoEF&CC @ Gandhinagar, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar & Gandhidham and Dept. of Forests & Env., Gandhinagar vide our letter dated 27.11.2021. Copy of the same is also available on our web site https://www.adaniports.com/ports-downloads. A soft copy of the same was also submitted through e-mail on 30.11.2021 to all the concern authorities. Please refer below for the details regarding past six compliance submissions.</p>

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
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Sr. No.	Conditions	Compliance Status as on 31-03-2022																					
		<table> <tr> <th>Sr. No.</th><th>Compliance period</th><th>Date of submission</th></tr> <tr> <td>1</td><td>Oct'18 to Mar'19</td><td>31.05.2019</td></tr> <tr> <td>2</td><td>Apr'19 to Sep'19</td><td>28.11.2019</td></tr> <tr> <td>3</td><td>Oct'19 to Mar'20</td><td>20.05.2020</td></tr> <tr> <td>4</td><td>Apr'20 to Sep'20</td><td>26.11.2020</td></tr> <tr> <td>5</td><td>Oct'20 to Mar'21</td><td>25.05.2021</td></tr> <tr> <td>6</td><td>Apr'21 to Sep'21</td><td>30.11.2021</td></tr> </table>	Sr. No.	Compliance period	Date of submission	1	Oct'18 to Mar'19	31.05.2019	2	Apr'19 to Sep'19	28.11.2019	3	Oct'19 to Mar'20	20.05.2020	4	Apr'20 to Sep'20	26.11.2020	5	Oct'20 to Mar'21	25.05.2021	6	Apr'21 to Sep'21	30.11.2021
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vi	Adequate provision for infrastructure facilities such as water supply, fuel for cooking, sanitation etc. must be provided for the laborers during the construction period in order to avoid damage to the environment. Colonies for the laborers should not be located in the CRZ area. It should also be ensured that the construction workers do not cut trees including mangroves for fuel wood purpose.	<p>Already complied. Not Applicable at present.</p> <p>Construction Activity is already completed. Adequate infrastructure facilities as mentioned in the condition were provided during construction phase.</p> <p>The facility for drinking water, toilet and rest shelter are provided for the dignity of operation labours.</p> <p>Photographs of the same were provided along with the compliance submission for the duration of Oct'16 to Mar'17.</p>																					
vii	To prevent discharge of sewage and other liquid wastes in to the water bodies, adequate system for collection and treatment of the wastes must be provided. No sewage and other liquid wastes without treatment should be allowed to enter into the water bodies. The quality of treated effluents, emissions, solid wastes and noise levels must confirm to the standards laid down by the competent authority including the Central/State	<p>Complied.</p> <p>Adequate pipelines are provided to ensure the collection and treatment of effluent. Raw sewage is collected from 30 different collection pits at APSEZ locations through dedicated browsers and is transferred to ETP for treatment.</p> <p>Sewage generated from port is being treated in designated ETP and treated sewage is used for horticulture purposes. No treated water is discharged into the water bodies. Please refer Specific Condition No. xii for further details.</p> <p>Third party analysis of the treated water, Flue Gas, Ambient Air and Noise is being carried out regularly by NABL and MoEF&CC accredited agency namely M/s.</p>																					

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	Pollution Control Board.	<p>Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi.</p> <p>Summary of six-monthly monitoring of Flue gas emission is provided below.</p> <p>Total Nos. of Stacks: 16 Nos.</p> <table><tr><th>Parameters</th><th>Unit</th><th>Max</th><th>Min</th><th>Average</th><th>Permissible Limit[§]</th></tr><tr><td>PM</td><td>mg/Nm³</td><td>32.45</td><td>16.53</td><td>22.38</td><td>150</td></tr><tr><td>SO₂</td><td>ppm</td><td>9.30</td><td>4.25</td><td>6.25</td><td>100</td></tr><tr><td>NOx</td><td>ppm</td><td>38.25</td><td>18.76</td><td>28.40</td><td>50</td></tr></table> <p>[§] as per CC&A granted by GPCB</p> <p>Six monthly reports of flue gas emissions for duration from Oct'21 to Mar'22 is attached as Annexure – 3.</p> <p>Summary of Ambient Air and Noise for duration from Oct'21 to Mar'22 is provided in general condition No. v above.</p> <p>Waste Management – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste.</p> <p>Non-Hazardous Solid Waste: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & 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, and Glasses, etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plant (M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel).</p> <p>APSEZ, Mundra is certified for Zero Waste to Landfill</p>	Parameters	Unit	Max	Min	Average	Permissible Limit [§]	PM	mg/Nm ³	32.45	16.53	22.38	150	SO ₂	ppm	9.30	4.25	6.25	100	NOx	ppm	38.25	18.76	28.40	50
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		<p>management system (ZWTL MS 2020) by TUV Rheinland 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 were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21.</p> <p><u>Hazardous & Other Waste:</u></p> <ul style="list-style-type: none"> • Bio medical waste generated from OHCs and Adani Hospital is being disposed at Common Bio Medical Waste Treatment Facility namely M/s. Distromed Kutch Services Pvt. Ltd., Bhuj. • E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. Galaxy Recycling, Rajkot and Sabnam Enterprise, Kutch respectively. • Solid Hazardous Waste is being disposed through co-processing / incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau and/or cement industries of Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem - Bhavnagar. It is also being reused within organization for lubrication purpose. • Discarded drums / barrels are being sold to authorized decontamination facility i.e. M/s. Jawrawala Petroleum, Ahmedabad. It is also being reused within organization for filling hazardous waste. • Solid hazardous waste i.e. Tank bottom sludge is being sold to authorized recycler namely M/s. Mundra Oil Pvt. Ltd., Mundra for recycling. • Expired paint materials is being disposed by incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau. • Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals.

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		<ul style="list-style-type: none"> Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem - Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no received or disposal of Slope Oil. Horticulture waste is collected from various green belt areas and it is using for making of manure and manure is being utilizing in horticulture purpose within plant premises. <p>Details of permissions / agreements of hazardous waste authorized vendors were submitted along with pervious half yearly EC Compliance Reports. And there is no further change.</p> <p>The following table summarizes the waste management practice (from Oct'21 to Mar'22) for different types of wastes at APSEZ:</p> <table> <tr> <th>Type of Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr> <tr> <td colspan="3">Hazardous Waste</td></tr> <tr> <td>Pig Waste</td><td>6.71</td><td rowspan="3">Co-processing at cement industries</td></tr> <tr> <td>ETP / CETP Sludge</td><td>4.84</td></tr> <tr> <td>Oily Cotton waste</td><td>64.89</td></tr> <tr> <td>Used / Spent Oil</td><td>146.984</td><td>Sell to registered recycler</td></tr> <tr> <td>Discarded Containers / Barrels</td><td>2.89</td><td>Sell to registered recycler</td></tr> <tr> <td colspan="3">Other Waste</td></tr> <tr> <td>E-Waste</td><td>2.91</td><td>Sell to registered recycler</td></tr> <tr> <td>Bio Medical Waste</td><td>3.62</td><td>To approved CBWTF Site</td></tr> <tr> <td colspan="3">Non-Hazardous Waste</td></tr> <tr> <td>Recyclables Dry Waste / Scrap</td><td>1906.771</td><td>After recovery sent for recycling / Reuse within premises</td></tr> <tr> <td>Non-Recyclable Dry Waste (RDF)</td><td>158.15</td><td>Co-processing at Cement Industries</td></tr> <tr> <td>Wet Waste (Food waste + Organic waste)</td><td>412.96</td><td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td></tr> <tr> <td>Horticulture Waste</td><td>404.00</td><td>Used for making of compost and utilize for horticulture purpose</td></tr> </table>	Type of Waste	Quantity in MT	Disposal method	Hazardous Waste			Pig Waste	6.71	Co-processing at cement industries	ETP / CETP Sludge	4.84	Oily Cotton waste	64.89	Used / Spent Oil	146.984	Sell to registered recycler	Discarded Containers / Barrels	2.89	Sell to registered recycler	Other Waste			E-Waste	2.91	Sell to registered recycler	Bio Medical Waste	3.62	To approved CBWTF Site	Non-Hazardous Waste			Recyclables Dry Waste / Scrap	1906.771	After recovery sent for recycling / Reuse within premises	Non-Recyclable Dry Waste (RDF)	158.15	Co-processing at Cement Industries	Wet Waste (Food waste + Organic waste)	412.96	Converted to Manure for Horticulture use / Biogas for cooking purpose	Horticulture Waste	404.00	Used for making of compost and utilize for horticulture purpose
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viii	Appropriate facility should be created for the collection of solid and liquid wastes generated by the barges/vessels and their safe treatment and disposal should be ensured to avoid possible contamination of the water bodies.	<p>Complied.</p> <ul style="list-style-type: none"> Ships berthing at Mundra Port comply with MARPOL / DG Shipping regulations. The port is registered with DG Shipping PAN India portal "Swatch Sagar" for providing reception facility. All vessels wish to deliver waste at Mundra Port, raises request in Swatch Sagar Portal. The Port arranges waste collection from vessels and uploads Waste Delivery Receipt in Swatch Sagar Portal against vessel's request. The waste disposal is being done as per regulation. The PRF is also annually audited by DG Shipping. The reception facility for all category of waste except Annex VI as per IMO and DG Shipping requirements is available in the port. From all the waste, waste categorized in Annex – V category is being collected and disposed by port itself i.e. APSEZL Mundra. Port collects Solid waste (i.e. Garbage) categorized in Annex – V from vessels and collected waste is being sent to Material Recovery Facility for segregation & then segregated waste is being disposed in line with 5R principles. Waste categorized in Annex – 1 (Sludge Oil) category is directly collected and disposed by GPCB authorized recyclers. No discharge such as bilge wastes, sewage or any other liquid wastewater is allowed into marine environment inside port limits. As a general practice APSEZ has been authorized under Hazardous Waste Rules – 2016 to provide facility for receiving waste / slop oil from vessels through hose connection with oil tankers. These tankers divert waste / slop oil to Oil water separator system where water and oil particles are separated. Separated oil is being sold to authorized recycler /re-processor. However, no waste / slope oil was received during the compliance period.
ix	Necessary navigational aids such as channel markers should be provided to prevent accidents. Internationally recognized safety standards shall be	<p>Complied.</p> <p>Navigational aids such as buoys and leading lights have been provided. The rules and regulation of the port contributes to the safe, efficient and environmentally responsible handling of shipping traffic. The</p>

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	applied in case of barge /vessel movements.	<p>international rules of IMO, such as SOLAS convention and its amendments and national regulations are in force at APSEZ, Mundra.</p> <p>APPLICABLE REGULATION</p> <ul style="list-style-type: none"> ➤ Port Security Law (ISPS) ➤ Indian Port Act ➤ Gujrat Maritime Board Act 1981 ➤ Navigational Safety Port Committee (NSPC) ➤ All relevant international rules and regulations on MARPOL, Load lines etc.
x	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>Proper precautions are taken to avoid any oil spills during operation such as pressure checks of oil transfer lines and manual watch during oil cargo transfer.</p> <p>Available mechanisms to avoid oil spills are identified as below</p> <p><u>At liquid terminal:</u></p> <ul style="list-style-type: none"> • Immediate shut off valve from vessel and shore. • Periodical testing of lines • Immediate suction of material by pump. • Emergency operation shut down. <p><u>At Marine Operations:</u></p> <ul style="list-style-type: none"> • Scupper plug, dip tray, absorbent pad, saw dust is provided to address confined spillage/leakage. <p><u>At Container Terminals:</u></p> <ul style="list-style-type: none"> • Leak cart is available for collect spilled chemical. • Spill control materials in place. • Oil drums are stored in covered shed where pellets are used. Tray provided to collection of spillage/leakage if occurred. <p>No oily waste is discharged to water bodies. Oily waste or oil contaminated waste is being disposed as mentioned in General Condition no. vii above.</p>
xi	The project authorities should take appropriate community development	<p>Complied.</p> <p>APSEZ is actively working with local community around</p>

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	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>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">✚ Education✚ Community Health✚ Rural Infrastructure✚ Sustainability Livelihood <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 compliance period Activities carried out for the same are summarized as below.</p> <table><tr><th>Area</th><th>Activity</th></tr><tr><td>Fight Against COVID-19</td><td><ul style="list-style-type: none">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-ordination duty at GKGH, Bhuj for 23 days.AHMPL, Mundra was converted into Covid Hospital with 110 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</td></tr><tr><td>Community Health</td><td><ul style="list-style-type: none">Mobile Heath Care Units and Rural Clinics12 Rural Clinics09 villages of Mundra, 03 villages of Anjar & Mandvi block has benefited by rural clinic service.Support to 1409 vulnerable patients.31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit57420 patients direct & 193661 patient indirect benefited during FY 2021-22.344 patients are directly/indirectly benefitted by Dialysis support at various times with nominal charges at Adani Hospital.05 patient with critical & severe condition has been supported for dialysis various time with nominal</td></tr></table>	Area	Activity	Fight Against COVID-19	<ul style="list-style-type: none">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-ordination duty at GKGH, Bhuj for 23 days.AHMPL, Mundra was converted into Covid Hospital with 110 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 Health	<ul style="list-style-type: none">Mobile Heath Care Units and Rural Clinics12 Rural Clinics09 villages of Mundra, 03 villages of Anjar & Mandvi block has benefited by rural clinic service.Support to 1409 vulnerable patients.31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit57420 patients direct & 193661 patient indirect benefited during FY 2021-22.344 patients are directly/indirectly benefitted by Dialysis support at various times with nominal charges at Adani Hospital.05 patient with critical & severe condition has been supported for dialysis various time with nominal
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		<p>charges.</p> <ul style="list-style-type: none"> 1409 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. 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. 154 Widows, Senior Citizens and Handicapped people linked with Government pension scheme 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.
	Sustainable Livelihood – Fisher folk, Agriculture & Women	<ul style="list-style-type: none"> 1031 families has benefitted by water supply at nine fisher folk vasahats under Machhimar Ajivika Uparjan Yojana. 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 benefitted. Engage more than 500 fisher folk youth in Skill Development Training to provide consistent scope of income. 11604 fisherfolk direct or indirect benefitted with Education, Mangrove, Water and Livelihood. 39 Fisher Youth were interviewed in various industries among that 12 have been selected. Our target is to support 500+ Fisherman in alternative livelihood till March 2022. 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. During the Taukate cyclone fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation. To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. Survey and identification of farmers to adopt Natural farming-Total 150 Farmers were selected as criteria in first phase of the Project. 23 Vermi compost unit have been set-up. Which is facilitated through Government with farmer Contribution. 150 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. Four Farmers Groups is registered with ATMA– Agricultural technology management Agency–it will

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			<p>leverage Government schemes.</p> <ul style="list-style-type: none"> Adani Foundation has also provided 117.11 lacs kg Dry Fodder and 89.00 lacs kg Green fodder in 29 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. 206.11 Lacs during FY 2021-22. 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. Fodder Cultivation-To made fodder sustain villages - 25 Acre Gauchar land of Siracha village is being cultivated for the same. 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 turnover of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly. Dragon fruit farming is ongoing by five farmers each farmer is doing in 2 Acre farm –Total 11000 plants. 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.
		Education	<ul style="list-style-type: none"> 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. Online Outreach – 259 Students Individual Home visit – 415 Students Sheri sikshan and school students - 838 Students 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. Dedicatedly 80 hours provided for preparing JNV and NMMS examination. 19 number of students qualified for JNV and NMMS. 100 hours capacity building programs for Utthan Sahayaks and school Teachers. Total 394 webinar and capacity building program were arranged for Utthan Sahayaks and Government Officers. 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. 473 underprivileged students of Fisherman & Maldhari communities from 8 villages taking

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			education at the Adani Vidya Mandir school. • Celebration of various days in village school.
	Rural Infrastructure & Environmental Sustainability		Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. WORK COMPLETED <ul style="list-style-type: none"> • 50 RRWS structure have been completed • 83 Bore-well recharging activity is completed. • Development Approach road Prasala vadi vistar Gogan Pachim at Zarpara • Earthen bund Repairing work at Pond, Luni. • Pre-monsoon 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). • Construction of community gathering and training Center construction at different villages • 23 Fishermen of Randar bandar are benefitted to Pakka house constructed under AF Fishermen Avasa yojna ENVIRONMENT SUSTAINABILITY PROJECTS <ul style="list-style-type: none"> • Miyawaki Forest Development, Nana Kapaya - Plantation of 4965 saplings of different 42 species is completed which will result in dense forest within 2 years • Smruti Van - Plantation more than 40,000 sapling with more than 115 species through Miyawaki methodology. • Ecosystem Restoration, Guneri - Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years. The faunal survey was initiated in the month of December and continued till February 2022. • Multi-Species Mangrove Park - 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. During current FY 2021-22, 03 ha area coastal stretches have been planted with mangrove species. Total 16 Ha. multi-species mangrove plantation has been carried out till March-22 association with M/s. GUIDE, Gujarat. • Home biogas - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 223 home biogas system in Dhruv, Zarpara and Navinal Villages • As per SORI use of biogas each farmer can save Rs.23399/year. Total 223 farmers can save Rs.5217977/- in a year. • Seaweed Culture - A pilot cultivation facility (5 KL tanks in 6 nos.) for the farming of different

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			<p>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.</p> <ul style="list-style-type: none"> • Water Conservation Projects – <ul style="list-style-type: none"> ✓ A large number of water harvesting structure (Total 21 Nos. of check dams and Augmentation of 2 check dams (1 Check dam current year). ✓ Ground recharge activities (pond deepening work for more than 56 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan ✓ Pond deepening and bund strengthen of Rampar village pond increase water storage capacity. ✓ Roof Top Rain Water Harvesting 115 Nos. (50 Nos current FY 2021-22) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. ✓ Recharge Borewell 189 Nos (83 Nos current FY 2021-22) which is best ever option to. ✓ Drip Irrigation 1158 Farmers (180 formers are supported with 15% of amount of total cost for maximum 4.0 lac. in current FY 2021-22) ✓ 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. ✓ Luni Pond Bund Repairing Work.
		Skill Development	<p>Over the previous 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><u>ASDC, Mundra</u></p> <ul style="list-style-type: none"> • RPL–Recognition of Prior Learning Training given to Adani Group Contractual Employees–Total 218 Employees have been benefitted • In Phase I, 51 fishfolk community youth will be skilled and certified in job roles like Assistant Electrician, Mason and Bar bender under 90 days training program supported by placements. • 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 seabird CFS of Mundra. • Basic computer and spoken English training for 152 Fisherfolk students of Zarpara and Luni Vasahat.

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Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<div> ASDC, Bhuj <ul style="list-style-type: none"> Launched New online General Duty Assistant & Beauty Therapist for 63 candidates under (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 Beneficiaries: <ul style="list-style-type: none"> Technical Training: 365 Nos. Sof-Skill Training: 52 Nos. </div> <p>Please refer Annexure - 2 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 1492.6 lakh are spent during current FY 2021-22.</p>
xii	The quarrying material required for the construction purpose shall be obtained only from the approved quarries / borrow areas. Adequate safeguard measures shall be taken to ensure that the overburden and rocks at the quarry site does not find their way into water bodies.	<p>Not applicable at present.</p> <p>Construction activities are completed. No such activity is carried out during the compliance period of Oct'21 to Mar'22.</p>
xiii	The dredging operations, if any, to be undertaken with the prior approval of this Ministry, shall be executed with appropriate safeguard measures to prevent turbidity conditions in consultation with the expert agencies such as CWPRS / NIO.	<p>Complied</p> <p>Capital dredging is completed and only maintenance dredging is being carried out, if required.</p>
xiv	For employing unskilled, semi-skilled and skilled workers for the project, preference shall be given to local people.	<p>Complied</p> <p>Adani Foundation – CSR Arm of Adani Group is doing following activities as a part of Skill Development in surrounding communities in Kutch area.</p>

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Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<ul style="list-style-type: none"> Adani Skill Development Center (ASDC), Mundra & Bhuj is providing skill development training to the locals for Soft Skill, Technical Training and Career Guidance & knowledge-based training. Adani Skill Development Centre (ASDC) is playing a pivotal role in implementing sustainable development in the state. ASDC is envisioned to be playing a major role in elevating the socio-economic status of the people belonging to the lowest strata of the society by empowering them with various skill development training for employability and livelihood. Over the previous few years, ASDC 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. ASDC imparted various soft skilled and technical training to make Atma Nirbhar India. During this year till Mar'22, Total 632 people trained in various trainings to enhance socio economic development. Preference is given to local people for employment based on their qualification and experience. All Mangrove plantations are done in consultation with GUIDE and Local forest dept. 24 hectare of mangrove afforestation at Mundra was done through active participation of local fishermen at the cost of INR 25.0 Lac. 5440+ Man-days Fisherman person days employed in Mangroves Plantation. The Foundation has also supported Pagadiya fishermen as painting laborers by providing them with employment and job in various field. <p>Details on skill development training imparted during compliance period i.e. Oct'21 to Mar'22 by Adani Foundation are enclosed as Annexure – 2.</p>
xv	To meet any emergency situation, appropriate firefighting system and water pipelines should be installed. Appropriate	<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>

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2022																								
	arrangements for uninterrupted power supply to the environment protection equipment and continuous water supply for the firefighting system should be made.	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 APSEZ was submitted as a part of compliance report for the duration of Apr'17 to Sep'17.																								
xvi	Regular drills should be conducted to check the effectiveness of the on-site Disaster Management Plan.	<p>Complied.</p> <p>Regular drills are being conducted for effectiveness of the system. There were seven drills conducted for various scenarios during compliance period (Oct'21 to Mar'22) as mentioned below.</p> <table border="1"> <thead> <tr> <th>Location</th><th>Date</th><th>Scenario</th></tr> </thead> <tbody> <tr> <td>Encl. 2 Liquid Terminal</td><td>22.10.2021</td><td>Leakage from Pipe Line and fire while discharging naphtha from Tank 28.</td></tr> <tr> <td>Dry Cargo – FCC, MBU No 04</td><td>29.10.2022</td><td>Person injured due to slip / trip inside the wagon</td></tr> <tr> <td>Liquid Terminal – Enclosure 9 Pump House drainage</td><td>11.11.2021</td><td>Cargo DEA(Denatured Ethyl Alcohol) leakage from strainer flow into the drainage and caught the fire</td></tr> <tr> <td>STS-06, CB-03, Bollard no-02, AMCT (CT-2)</td><td>21.12.2021</td><td>Scenario was created as one lasher Mr. Sudhir fall into sea while placing lifebuoy ring on STS-06 at CB-03</td></tr> <tr> <td>Steel Yard (Goliath no - 3, Track 1A Line)</td><td>10.01.2022</td><td>Pipe falling from the stack and person injured on Right Leg.</td></tr> <tr> <td>AMCT yard 4G58</td><td>09.02.2022</td><td>LMV driver became unconscious when ITV hit the LMV at yard 4G</td></tr> <tr> <td>Central Store (West basin)</td><td>10.02.2022</td><td>Caught fire in stored paint and oil drums due to electrical short-circuit and it's caused to two storekeeper got unconscienced by inhalation of dense smoke.</td></tr> </tbody> </table> <p>Mock drill report (latest report) conducted during the</p>	Location	Date	Scenario	Encl. 2 Liquid Terminal	22.10.2021	Leakage from Pipe Line and fire while discharging naphtha from Tank 28.	Dry Cargo – FCC, MBU No 04	29.10.2022	Person injured due to slip / trip inside the wagon	Liquid Terminal – Enclosure 9 Pump House drainage	11.11.2021	Cargo DEA(Denatured Ethyl Alcohol) leakage from strainer flow into the drainage and caught the fire	STS-06, CB-03, Bollard no-02, AMCT (CT-2)	21.12.2021	Scenario was created as one lasher Mr. Sudhir fall into sea while placing lifebuoy ring on STS-06 at CB-03	Steel Yard (Goliath no - 3, Track 1A Line)	10.01.2022	Pipe falling from the stack and person injured on Right Leg.	AMCT yard 4G58	09.02.2022	LMV driver became unconscious when ITV hit the LMV at yard 4G	Central Store (West basin)	10.02.2022	Caught fire in stored paint and oil drums due to electrical short-circuit and it's caused to two storekeeper got unconscienced by inhalation of dense smoke.
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Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2022	
		compliance period is enclosed as Annexure – 8.	
xvii	The recommendations made in the Environmental Plan and Disaster Management Plan, as contained in the EIA and Risk Analysis Reports of the project, shall be effectively implemented.	Complied All the recommendations are being implemented.	
		Few Marine EIA recommendations:	
		Operational protocols and safety procedure should be printed and freely available to concerned staff. The employees must be adequately trained to inculcate a high level of competence not only in day to day operations but also during emergency situations. Periodic refresher courses must also be organized to maintain the level of their competence.	The company has written the operational protocols and safety procedures as a part of ISO 14001:2015, ISO 45001:2018 and ISO 9001:2015 certifications. APSEZ has established training department to impart training to its employees. IMO module course organized by Maritime Training Institute is conducted & 24 personnel have achieved IMO level 1 & 4 personnel have achieved IMO Level 2. Different training modules as Oil Spill, Oil Spill Equipment, Notification exercise, Incident are conducted at different frequency.
		Periodic monitoring should be undertaken at the designated sites after the terminals become operational and the results of each monitoring should be carefully evaluated to identify changes if any and to take corrective measures, if warranted.	Monitoring of various environmental parameters for Ambient Air, Noise, Wastewater, ground water, marine water and sediments is being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi. Monitoring reports for the period from Oct'21 to Mar'22 are enclosed as Annexure – 3.
		Adequate vigilance is required to adherence of ships to Marpol protocol and related regulations.	During the vessel declaration compliances with respect to Air Pollution and Oil are monitored by the Port Authority. The ships are certified with international certification bodies only after complying with the Marpol protocol.

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
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Sr. No.	Conditions	Compliance Status as on 31-03-2022	
		<p>Manual Listing Procedure for conducting ship movement operations in the port area must be available to the concerned staff.</p> <p>Berthing Policy & Tariff Structure is made available for conducting ship movement to the concerned staff and made available on web link www.adaniports.com/pdfs/PIB_06122013.pdf Port Information Booklet is also made available on web link www.adaniports.com/Port_Operations_Port_Tariffs.aspx</p>	
		Few Risk Assessment Recommendations of EIA of Multipurpose Terminal carried out in 1995:	
		<p>There should be a provision for activating a fire alarm at the fire control room from various strategic/hazard prone areas in the factory. In areas where there is high level of Noise, It may be necessary to install more than one audible alarm transmitter or flashing lights.</p>	<p>Provision of activating a fire alarm is available at Control Room. Employees are provided with communication system with which they can communicate about any emergency to Control Room. Emergency alarm systems are installed which is audible from any port location. Alarm testing is carried out at a frequency of once in a month.</p>
		<p>Wind sleeves with adequate lightings around them should be provided at various places to guide personnel to escape in a direction perpendicular to the prevailing wind direction.</p>	<p>Wind sleeves with adequate various lighting system around them are available at various places of Port locations to guide personnel to escape in a direction perpendicular to the prevailing wind direction.</p>
		<p>Succession or second line Coordinators should be named for assuming responsibilities in case disaster occurs in the absence of principal coordinators.</p>	<p>Disaster Management Plan for APSEZ is in place and that includes second line coordinators to assume responsibilities in absence of principal coordinators.</p>
xviii	<p>A separate Environment Management Cell with suitably 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>	<p>Complied.</p> <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. Environment Management Cell Organogram were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21. And there is no further</p>	

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
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Sr. No.	Conditions	Compliance Status as on 31-03-2022
		change.
xix	The project affected people, if any, should be properly compensated and rehabilitated.	<p>Not applicable.</p> <p>The project was conceptualized in such a way that there are no impacts on the local settlements due to the project proposal. However, the project is already implemented and is in operation phase.</p>
xx	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.	<p>Complied</p> <p>Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is 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 1521.59 lakh. Out of which, Approx. INR 1371.79 lakh are spent during the year 2021-22. Detailed breakup of the expenditures for the past 3 years is attached as Annexure – 9.</p>
xxi	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 Boards 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 07.03.2022 for Main port and compliance of the same was submitted vide our letter dated 11.03.2022. Details of the same is attached as Annexure – 10.</p> <p>Inline to the compliance certification process of Environment Clearance condition of Waterfront Development Plan, RO, MoEF&CC Bhopal had visited the site on 27th & 28th January, 2020 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&CC. During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed.</p>

	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'21 To : Mar'22
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Sr. No.	Conditions	Compliance Status as on 31-03-2022
		<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 17th 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&CC Order dated 18th September, 2015, Joint Review Committee (JRC) comprising officials from various competent authorities visited the APSEZ, Mundra from 1st to 3rd 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. As per the report received by MoEF&CC vide dated 01.12.2021, there was no non-compliance observed.</p>
xxii	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 ones for ensuring environmental protection. The project proponents should be responsible for implementing the suggested safeguard measures.	Point Noted.
xxiii	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.
xxiv	This Ministry or any other	Point Noted.


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Sr. No.	Conditions	Compliance Status as on 31-03-2022
	competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.	
xxv	A copy of the clearance letter will be marked to concerned Panchayat / local NGO. If any, from whom any suggestion / representation has been received while processing the proposal.	Not applicable at present
xxvi	State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industries centre and Collector's Office/Tehsildar's Office for 30 days	Applicable for State Pollution Control Board.
xxvii	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 letters are available with the State Pollution Control Board and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in/ .	Already Complied.

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Sr. No.	Conditions	Compliance Status as on 31-03-2022
xxvii i	The Project Proponents should inform the Regional Office as well as the Ministry the date of financial closure and final approval of the project by the concerned authorities and the date of start of Land Development Work.	Already Complied.
xxix	The Project Proponent should make specific arrangements for rainwater harvesting in the project design and the rainwater so harvested should be optimally utilized.	<p>Complied</p> <p>Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rainwater within project area is managed through storm water drainage.</p> <p>Please refer specific condition no. v for further details upon ground water recharging and rainwater harvesting is being done by Adani Foundation as a part of CSR activity.</p>

Compliance Report of CRZ Recommendations

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'21 To : Mar'22
Status of the conditions stipulated under CRZ Recommendation		

Half yearly Compliance report of CRZ recommendation for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat vide DoEF, GOG letter no. ENV-1098-6477-p1 dated 28th October 1999.

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022
A. Specific Condition		
1	The company shall submit comprehensive Environmental Impact Assessment Report and Risk Assessment Report containing worst case scenario and detailed oil spill control management plan before carrying out the construction activities and shall implement all the mitigative measures/suggestions/recommendations given in the report of NIO and Tata AIG Risk Management Services.	<p>Already Complied. Not applicable at present</p> <p>Environmental Clearance was granted based on the submission of said documents. Rapid EIA was submitted on Feb 29, 2000 & Risk Assessment Report containing worst case scenario and detailed oil spill control management plan was submitted on Dec 28, 1999.</p> <p>For more details, please refer to general condition no xvii of the compliance of EC and CRZ clearance.</p>
2	The company in no case tap ground water.	<p>Complied.</p> <p>Please refer to Specific Condition no. ix of the compliance of EC and CRZ clearance above for details.</p>
3	The company shall not cut mangroves for the project activities except for stray mangrove seeding required for the railway line only after detailed assessment through NIO and 25 acre of land shall be planted with mangroves in consultation with NIO.	<p>Already Complied. Not applicable at present</p> <p>The company has not cut any mangroves. APSEZ has carried out 24 hectare of mangrove plantation near Navinal creek.</p> <p>To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 3140 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 847.8 lakh.</p>
4	The company shall carry out the mangroves plantation programme in	<p>Green belt was developed 72.81 ha. Total 1,33,462 trees were planted with the density of 1835 trees per hectare within the port area. So, far APSEZ has developed 486.19 ha. area as greenbelt with plantation of more than 9.4 Lacs saplings</p>

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Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022
	<p>addition to 25-acre mangrove plantation to be done with the help of the NIO, in consultation with the forest department.</p>	<p>within the APSEZ area. Details on Mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as Annexure – 4.</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. During current FY 2021-22, 03 ha area coastal stretches have been planted with selected mangrove species. Total 16 Ha. multi-species mangrove plantation has been carried out till March-22 association with GUIDE, Gujarat.</p> <p>Please refer attached Annexure – 2 for CSR activity report carried out by Adani Foundation.</p> <p>EIA report was prepared by NIO in which all impacts on mangroves and coastal ecology of the region for the proposed design were studied in detail.</p> <p>Please refer to Specific Condition no. viii of the compliance of EC and CRZ clearance above for details.</p> <p><u>Conservation of mangroves:</u></p> <ul style="list-style-type: none"> • In and around APSEZ, approx. 1800 ha. Mangrove area was identified by NIO in an EIA report prepared in the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. • As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, mangrove cover in and around APSEZ was over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha.

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Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022								
		<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&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions. Details of the same were submitted as a part of previous half yearly EC compliance report for the period Oct'20 to Mar'21.</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">APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.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 & 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%.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.Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.The cost of the said study was INR</td></tr></table>			Sr. No.	Recommendations	Compliance	1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none">APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.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 & 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%.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.Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.The cost of the said study was INR
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Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022	
			23.56 Lacs incurred by APSEZ.
		2. Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. The cost of the said activity was INR 1.0 Lacs.
		3. Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> 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. Algal & Prosopis removal from Mangrove area for FY 2021-22- The cost of the said activity was INR 2.8 Lacs incurred by APSEZ. Please refer attached Annexure - 5 for Report of Algal removal work in mangrove area.
		4. Awareness of mangroves importance in surrounding communities	<ul style="list-style-type: none"> Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattle's / 3008 farmers and hence enhancing cattle productivity during last FY 2021-22 (Till Mar'22). Individual Farmer fodder cultivation supported for Maize seed and NB21 to more than 200 farmers which has created revenue of Rs. 27 Lacs. Adani foundation and Government Animal hospital jointly organizing Cattle awareness camps total 22 villages and in 2021, Total 666 families 5083 animal benefited. Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 206.11 Lacs during FY 2021-22, which was incurred by APSEZ. Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'21 To : Mar'22
Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022		
				<p>scarcity phase. With the support of Gauchar Seva Samiti Grassland development in Siracha – 85 Acre & Zarpara – 25 Acre done which resulted in total production of 82 ton.</p> <ul style="list-style-type: none"> 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. Refer CSR report attached as Annexure – 2. <p>Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of previous half yearly EC compliance report for the period Oct'20 to Mar'21.</p>
5	The company shall ensure that the construction labors do not cut mangroves for fuel, etc.	<p>Already Complied. Not applicable at present Construction activity is already completed.</p> <p>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 APSEZ.</p>		
6	The company shall ensure that no creek are blocked due to the project activities,	<p>Complied.</p> <p>Please refer to Specific Condition no. xi of the compliance of EC and CRZ clearance above for details.</p>		
7	The company shall ensure that there will be no disposal of sullage and sewage generated from construction camps, surface run-off from construction sites, and oil and grease spillage from construction equipment in the creeks.	<p>Already complied. Not applicable at present.</p> <p>Please refer condition no. xii of EC Compliance report. Project is in operation phase.</p> <p>Sewage and effluent generated from port is being treated in designated ETP and treated water is used for horticulture purposes.</p> <p>Third party analysis of the treated water is being carried out twice in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi. The results of the same are attached as Annexure – 3.</p>		

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'21 To : Mar'22
Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022
8	The company shall stick to the time bound programme submitted to this department for the proposed activities including installation of desalination plant for meeting the entire water requirement.	<p>Already complied. Not applicable at present.</p> <p>Construction work was completed on time and project is in operation phase. Desalination plant with the capacity of 47 MLD is installed to meet the water requirement for overall APSEZ, Mundra.</p> <p>For detail on present source of water and quantity of water consumption, Please refer to Specific Condition no. ix of the compliance of EC and CRZ clearance above.</p>
9	The company shall ensure that the commercial fisheries are not hampered due to the presence of barges, vessels and other activities in the region. Necessary plan in this regards shall be prepared in consultation with the NIO.	<p>Complied.</p> <p>Communication mechanisms have been developed for the smooth movement of fishing boats vis-à-vis shipping activities.</p> <p>Please refer to Specific Condition no. xiv of the compliance of EC and CRZ clearance above for details.</p>
10	The company shall bear the cost of the external agency that may appointed by this department for carrying out the supervision and/or the monitoring of the construction activities.	<p>Complied.</p> <p>Construction activities are completed and project is in operation phase. If at all any study is suggested by Govt. of Gujarat, we will give full co-operation.</p> <p>Please refer to Specific Condition no. xv of the compliance of EC and CRZ clearance above for details.</p>
11	The company shall carry out the post project monitoring of various environmental parameters in consultation with this department and Gujarat Pollution Control Board.	<p>Being complied.</p> <p>Post project monitoring of various environmental parameters is being carried out regularly.</p> <p>Please refer to Specific Condition no. xvi of the compliance of EC and CRZ clearance above for details.</p>
12	The company shall prepare the detailed traffic control management plan for the port and shall	<p>Complied.</p> <p>APSEZ has participated in VTMS.</p> <p>Please refer to Specific Condition no. xvii of the compliance of EC and CRZ clearance above for details.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'21 To : Mar'22
Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2022
	participate in the VTMS to be developed for the Gulf of Kachchh.	
13	In order to eliminate adverse impact on the mangroves of Bocha Island and coastal ecology of the region, the company shall carry out construction activities only after the construction design and methodology is approved by NIO.	<p>Already complied. Not applicable at present.</p> <p>Construction activity is already completed.</p> <p>EIA report was prepared by NIO in which all impacts on mangroves and coastal ecology of the region for the proposed design were studied in detail.</p>
14	Any other conditions may be stipulated by this department from time to time.	Point noted.

Annexure – 1



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar-382 010

Phone : (079) 23226295

Fax : (079) 23232156

Website : www.gpcb.gov.in

By R.P.A.D

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous and Other Waste (Management and Transboundary) Rules, 2016 framed under the Environmental (Protection) Act-1986.

And whereas Board has received consolidated consent application inward No. 202362 dated 19/09/2021 for the **Renewal of Consolidated Consent and Authorization (CC&A)** of this Board under the provisions / rules of the aforesaid Acts. Consents & Authorization are hereby granted as under:

CONSENTS AND AUTHORISATION:

(Under the provisions /rules of the aforesaid environmental acts)

To,
M/s. Adani Ports & Special Economic Zone,
Plot no. 169/P, At Navinal Island,
Tal: Mundra,
Dist: Kutch - 370 421

1. Consent Order No. AWH-117045 Date of issue: 14/02/2022.
2. The consents shall be valid upto 20/11/2026 for the use of outlet for the discharge of trade effluent and emission due to operation of industrial plant for storage & handling of the following items/ products:

Sr. No	Product/Services	Capacity
1	General Cargo Handling	112.8 MMTPA
2.	Dry Cargo Handling	
3.	Liquid Cargo (Chemical/ POC Products)	5 MMTPA
4.	Import, Storage and Distribution of Edible Oil	2.20 MMTPA
5.	Storage and Distribution of Bitumen	0.30 MMTPA
6.	Container Terminal Handling Operation	5.7 Million TEUs/ Annum
7.	Waste Destruction system for decomposition/ destruction of municipal solid waste	3.5 Cubic Meter (MSW Destruction Capacity @ 500 kg/day)
8.	Oil water separate (Flame Proof) to remove oil portion from slope oil received from vessels/ ships	25 M ³ /Hr

Subject to specific condition:

1. Industry shall comply with conditions of CRZ Clearance issued by MoEF vide order no. 10-47/200/-IA-III dated 12/01/2009 & its amendment.
2. Industry shall comply with conditions of Environment Clearance and CRZ Clearance issued by MoEF vide order no. F. no. 10-138/2008-IA-III dated 15/07/2014.

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3. Industry shall comply with this office circular dated 27/08/2021 regarding retrofitting of emission control/ equipment in D.G. Set of capacity 125 KVA and above at the earliest and submit compliance.
4. Industry shall comply with Manufacture, Storage and Import of Hazardous Chemicals Rules-1989 (MSIHC) as amended time to time.
5. Industry shall ensure that all storage terminal located within DPT area shall strictly comply with MSIHC Rules including site notification & submit details periodically to board with relevant details.
6. Industry shall renew Public Liability Insurance time to time & submit a copy to this Board.
7. Industry shall notify site under MSIHC Rule-1989 from competent authority as mentioned in schedule-5 of MSIHC Notifications.
8. Industry shall not withdraw groundwater without prior NOC from CGWA as per Hon. National Green Tribunal order.
9. Industry shall manage Solid Wastes generated from industrial activities as per Solid Waste Management Rules-2016 (solid waste as defined in Rule-3(46)).
10. Industry shall comply with Plastic Waste Management Rules– 2016 and amendments made therein.
11. Industry shall strictly comply with coal handling guideline of this board.
12. Industry shall provide dedicated storage facility for dry cargos & ensure to take adequate measures to prevent dusting.
13. Industry shall ensure that there shall be no damage to the existing mangrove patches near site and also ensure the free flow of water to avoid damage to the mangroves.
14. Industry shall ensure as per EC condition that no creeks or rivers are blocked due to any activities at the site and free flow of water is maintained.
15. Industry shall provide proper system for collection, storage & treatment & disposal of waste water generated by vessel as per MARPOL & maintain records.
16. Industry shall install storm drainage catch basin to avoid directly discharge into surface water.
17. Waste effluent accumulated with port activities including storm water & sewage from port operation including sewage ballast water, bilge water & clean waste water from ships shall be as per MARPOL norms.
18. Industry shall make separate records regarding generation, collection, transportation & disposal of waste generation from ship & maintain its records.
19. Industry shall made necessary arrangement for the plastic Waste, Solid Waste or other waste generation due to port activities & for facilitation of reception facilities under MARPOL & Environment (Protection) Act-1986 rules etc.
20. Ports shall obtain approval of their oil spill contingency plan (OSCP) as required under national oil spill disaster contingency plan (NOS-DCP) of coast guard, ministry of defence, govt. of India.
21. Best environmental practices by ports maybe uploaded on "Indian ports Association" as well as the same maybe linked to websites of CPCB and respective SPCBs.



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22. Manually handling of cargo should be converted into mechanized system, in time bound manner.

3. Conditions under the Water act-1974:

- 3.1 Source of Water: - Narmada Water from GWIL/ Sea water from APSEZ/ Desalination Plant.
- 3.2 The quantity of the fresh water consumption for industrial purpose shall not exceed 1304.1 KL/Day.
- 3.3 The quantity of the fresh water consumption for domestic purpose shall not exceed 370 KLD.
- 3.4 The quantity of the industrial effluent to be generated from the manufacturing process and other ancillary industrial operations shall not exceed 90.31 KL/Day.
- 3.5 The quantity of domestic waste water shall not exceed 248 KLD.
- 3.6 Domestic waste water shall be treated in ETP along with industrial effluent.
- 3.7 Industry shall operate Effluent Treatment Plant (ETP) adequately so that treated effluent shall comply with following norms:

PARAMETERS	PRESCRIBED LIMITS
pH	6.5 to 8.5
Temperature	40°C
Colour (Pt.Co. scale) in units	100 units
Total Suspended Solids	100 mg/L
Oil and Grease	10 mg/L
Ammonical Nitrogen	50 mg/L
BOD (3 days at 27o C)	30 mg/L
COD	100 mg/L
Chlorides	600 mg/L
Sulphates	1000 mg/L
Total dissolved solids	2100 mg/L
Percent Sodium	60 %
Sulphides	5.0 mg/L
Sodium Absorption Ratio	26

- 3.8 Treated effluent, confirming to above norms shall be discharged on land for gardening and plantation purpose within premises only having area 175 hectare. In no case effluent shall be discharged outside premises.
- 3.9 Industry shall provide fixed pipeline network with flow meter for even distribution of treated effluent and maintain its record.
- 3.10 Disposal system for storm water shall be provided separately. In no case storm water & sewage from port facility shall not be discharge into surface water.

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4. Conditions under the Air Act-1981:

4.1. The following shall be used as a fuel in Hot Water Generator, Fuel Heater and D.G. Sets respectively:

Sr. No.	Utility	Fuel	Quantity
1	Hot Water Generator & Fuel Heater	LDO/ HSD	975 Lit/Hr
2	D.G. Sets	HSD	100 Ltr/Hr

4.2. The applicant shall install & operate air pollution control system efficiently in order to achieve prescribed norms.

4.3. The flue gas emission through stack attached to Hot Water Generator, Fuel Heater and D.G. Sets shall conform to the following standards

Sr. No.	Stack attached to	Stack height in Meter	APCM	Parameter	Permissible Limit
1	Hot Water Generator-1	35		PM SO ₂ NO _x	150 mg/NM ³ 100 ppm 50 ppm
2	Hot Water Generator-2	35			
3	Fuel Heater (Thermic) (2 nos.)	35		PM SO ₂ NO _x	150 mg/NM ³ 100 ppm 50 ppm
4	D.G. Set (9 nos.) (500 KVA) (Stand by)	9 meter each	Adequate Stack Height		
5	D.G. Set (3 nos.) (1250 KVA) (Stand by)	30 common stack	Adequate Stack Height		
6	D.G. Set (6 nos.) (1500 KVA) (Stand by)	30 meter each	Adequate Stack Height		

4.4. The Process gas emission through stack attached to Waste Destruction System with auxiliary heater shall conform to the following standards.

Sr. No.	Stack attached to	Stack height in Meter	APCM	Parameter	Permissible Limit
1	Waste Destruction System with auxiliary heater	10	Ventury Scrubber	SO ₂ NO _x	40 mg/NM ³ 25 mg/NM ³

4.5. The concentration of the following parameters in the ambient air within the premises of the industry shall not exceed the limits specified hereunder as per National Ambient Air Quality Standards issued by MoEF & CC dated 18th November-2009. In addition to following parameters Industry shall also carry out AAQ monitoring of all



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other applicable parameter as per MoEF notification dated 18/11/2009 and submit the report to the Board.

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air in $\mu\text{g}/\text{M}^3$
1.	Sulphur Dioxide (SO_2)	Annual 24 Hours	50 80
2.	Nitrogen Dioxide (NO_2)	Annual 24 Hours	40 80
3.	Particulate Matter (Size less than $10 \mu\text{m}$) or PM_{10}	Annual 24 Hours	60 100
4.	Particulate Matter (Size less than $2.5 \mu\text{m}$) or $\text{PM}_{2.5}$	Annual 24 Hours	40 60

- 4.6. The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/displayed to facilitate identification.
- 4.7. The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75dB(A) during day time and 70 dB (A) during night time. Daytime is reckoned in between 6a.m. and 10 p.m. and nighttime is reckoned between 10 p.m. and 6 a.m.

5. AUTHORIZATION as per HAZARDOUS AND OTHER WASTE (MANAGEMENT AND TRANSBOUNDARY) RULES, 2016 Form-2 [See rule 6 (2)]

Form for grant of authorization for occupier or operator handling Hazardous waste

5.1 Authorization order no:-**AWH-117045** Date of issue: 14/02/2022.

5.2 **M/s. Adani Ports & Special Economic Zone** is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at Plot no. 169/P, At Navinal Island, Tal: Mundra, Dist : Kutch.

Sr. No.	Waste	Quantity/ Year	Schedule & Category	Facility
1	Used/ Spent Oil	300 MT	I- 5.1	Collection, storage, Transportation,, Disposal by selling out to registered recyclers/ reprocessor
2	ETP Sludge	109.5 MT	I-34.3	Collection, storage, Transportation & disposal at TSDF site of SEPPL.
3	Sludge & filters contaminated with oil	5 MT	I-3.3	Collection, storage, Transportation, Disposal by co-processing at cement industries, and/or CHWIF site

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4	Waste Residue containing Oil/oily rags	150 MT	I-33.2	Collection, storage at designated place, Transportation, Disposal at TSDF Site.
5	Pig Waste	24 MT	I-3.1	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site
6	Tank Bottom sludge	Whatever Quantity generated	I-3.2	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site/ or recycling to registered recycler.
7	Discard containers/ barrels	16 MT	I-33.3	Collection, storage, Transportation, Disposal by reuse within premises and / or selling out to registered decontamination.
8	Asbestos Waste	Whatever Quantity generated	I-15.1	Collection, storage, Transportation, Disposal at CHWIF site.
9	Glass Wood Waste	Whatever Quantity generated	II-9	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or incineration at CHWIF site and / or recycling through registered recycler.
10	Downgrade Chemical	Whatever Quantity generated	I-20.2	Collection, storage, Transportation, Disposal by reuse within premises and / or selling out to authorized solvent recover.
11	Waste Oil	0.18 MT	I-5.2	Collection, storage, Transportation,, Disposal by selling out to registered recyclers
12	Expired Paint Material	10 MT	I-21.1	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site





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- 5.3 The authorization shall be valid up to **20/11/2026**.
- 5.4 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.
- 5.5 The authorization is granted to operate a facility for collection, storage within factory premises transportation and ultimate disposal of Hazardous wastes as per condition no 5.2 to the industry having valid CCA of this Board.

5.6 TERMS AND CONDITIONS OF AUTHORISATION

1. The applicant shall comply with the provisions of the Environment (Protection) Act-1986 and the rules made there under.
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the Gujarat Pollution Control Board.
3. The persons authorized shall not rent, lend, sell, and transfer or otherwise transport the hazardous wastes without obtaining prior permission of the Gujarat Pollution Control Board.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the authorization order by the persons authorized shall constitute a breach of this authorization.
5. The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;
6. The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Wastes and Penalty"
7. It is the duty of the authorized person to take prior permission of the Gujarat Pollution Control Board to close down the facility.
8. An application for the renewal of an authorization shall be made as laid down in rules 6(2) under Hazardous and Other Waste Rules, 2016.
9. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
10. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.
11. The hazardous and other wastes which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorization.
12. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.
14. The waste generator shall be totally responsible for (i.e. collection, storage, transportation and ultimate disposal) the wastes generated.
15. Records of waste generation, its management and annual return shall be submitted to Gujarat Pollution Control Board in Form-4 by 30th day of June of every year for the preceding period April to March.

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16. In case of any accident, details of the same shall be submitted on Form-11 to Gujarat Pollution Control Board.
17. As per "Public Liability Insurance Act-91" company shall get Insurance Policy, if applicable.
18. Empty drums and containers of toxic and hazard material shall be treated as per guideline published for "Management & Handling of discarded containers". Records of the same shall be maintained and forwarded to Gujarat Pollution Control Board regularly.
19. In case of transport of hazardous wastes to a facility for (i.e. treatment, storage and disposal) existing in a State other than the State where hazardous wastes are generated, the occupier shall obtain 'No Objection Certificate' from the State Pollution Control Board or Committee of the concerned State of Union Territory Administration where the facility exists.
20. Unit shall take all concrete measures to show tangible results in waste generation, reduction, avoidance, reuse and recycle. Actions taken in this regard shall be submitted within three months and also along with Form-4.
21. Industry shall have to display the relevant information with regards to hazardous waste as indicated in the Hon. Supreme Court's Order in W.P. No.657 of 1995 dated 14th October, 2003.
22. Industry shall have to display on-line data outside the main factory gate with regard to quantity and nature of hazardous chemicals being handled in the plant, including wastewater and air emissions and solid hazardous wastes generated within the factory premises.

6. **SPECIFIC CONDITIONS:-**

- 6.1 The authorized actual user of hazardous and other wastes shall maintain records of hazardous and other wastes purchased in a passbook issued by the State Pollution Control Board along with the authorization.
- 6.2 Handling over of the hazardous and other wastes to the authorized actual user shall be only after making the entry in the passbook of the actual user.
- 6.3 In case of renewal of authorization, a self-certified compliance report in respect of effluent, emission standards and the conditions specified in the authorization for hazardous and other wastes shall be submitted to SPCB.
- 6.4 The occupier of the facility shall comply Standard operating procedure/guidelines published by MOEF&CC or CPCB or GPCB from time to time.
- 6.5 Unit shall comply provisions of E-Waste Management Rules-2016.
- 6.6 The disposal of Hazardous Waste shall be carried out as per the waste Management hierarchy.
- 6.7 The occupiers of facilities shall not store the hazardous and other wastes for a period not exceeding **ninety days**. Prior permission of the Board shall be obtained for extension of the storage period.
- 6.8 The occupier shall maintain the records of generation, sale, storage, transport, recycling, co processing and disposal of hazardous waste and make available during the inspection.
- 6.9 The transportation of the hazardous waste shall be carried out in GPS mounted dedicated vehicles.





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7. GENERAL CONDITIONS: -

- 7.1 Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.
- 7.2 Applicant shall also comply with the general conditions given in annexure I.
- 7.3 Whenever due to accident or other unforeseen act or ever, such emissions occur or is apprehended to occur in excess of standards laid down such information shall be forthwith reported to Board, concerned Police Station Office of Directorate of Health Service, Department of Explosives, Inspectorate of Factories and local body.
- 7.4 In case of failure of pollution control equipments, the production process connected to it shall be stopped. Remedial actions/measures shall be implemented immediately to bring entire situation normal.
- 7.5 The Environmental Management Unit/Cell shall be setup to ensure implementation on and monitoring of environmental safeguards and other conditions stipulated by statutory authorities. The Environmental Management Cell/Unit shall directly report to the Chief Executive of the organization and shall work as a focal point for internalizing environmental issues. These cells/units also coordinate the exercise of environmental audit and preparation of environmental statements.
- 7.6 The Environmental audit shall be carried out yearly and the environmental statements pertaining to the previous year shall be submitting to this State Board latest by 30th September every year.
- 7.7 The Board reserves the right to review and/or revoke the consent and/or make variations in the conditions, which the Board deems, fit in accordance with Section 27 of the Act.
- 7.8 In case of change of ownership/management the name and address of the new owners/ partners/directors/proprietor should immediately be intimated to the Board.
- 7.9 Industry shall have to display the relevant information with regard to hazardous waste as indicated in the Hon. Supreme order in w.p. no. 657 of 1995 dated 14th October 2003.

For and on behalf of
GUJARAT POLLUTION CONTROL BOARD

(Smt. U.K. Upadhyay)

Senior Environment Engineer

NO: GPCB/CCA-Kutch-39(7)/ID-17739/ 625051

Issued to:

M/s. Adani Ports & Special Economic Zone,

Plot no. 169/P, At Navinal Island,

Tal: Mundra,

Dist: Kutch - 370 421

Date:- 9/3/2022

Clean Gujarat Green Gujarat

Annexure – 2

2021-22

Annual Report

CSR Kutch

Adani Foundation

Adani House, Port Road, Mundra – Kutch 370 421
[info@adanifoundation.com] [www.adanifoundation.com]

adani
Foundation



Our journey

Corporate Social Responsibility in India is going through an accelerating phase where the need for community centered impact is increasingly becoming more crucial 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.

Mundra is now Industrial and employment hub. Tremendous development is expected in upcoming years. In Year 2021-22, **Uthhan Project expanded its wings from 17 Primary schools to 35 Primary schools with MOU with Education Department.** Sustainable Agriculture Initiatives i.e. Natural Farming, Home biogas, Drip Irrigation, Vermi compost, Tissue Culture and Various type of fodder growing are started as a mission with Capacity Building with **5500+ Farmers and 3500+ cattle owners.** Mangroves costal biodiversity, water harvesting structures and Home Biogas promotion is ongoing sustainable project with proper documentation and demarcation. Adani Vidya Mandir has proven best in education by reaching to its apex level of Quality Education through digital technology. It is nurturing fisher folk community students by enabling them access to Tablets to prepare them techno-savy.

Under the guidance of leadership team, Community Resource Centre is developed as a systematic model for empowering rural community with an aim to bridge the gap between underprivileged community who need support and government schemes. Adani Foundation firmly believes to carry all its project by involving community in its operations. The involvement of Fisherman community and women provides real-time feedback and leads to successful projects.

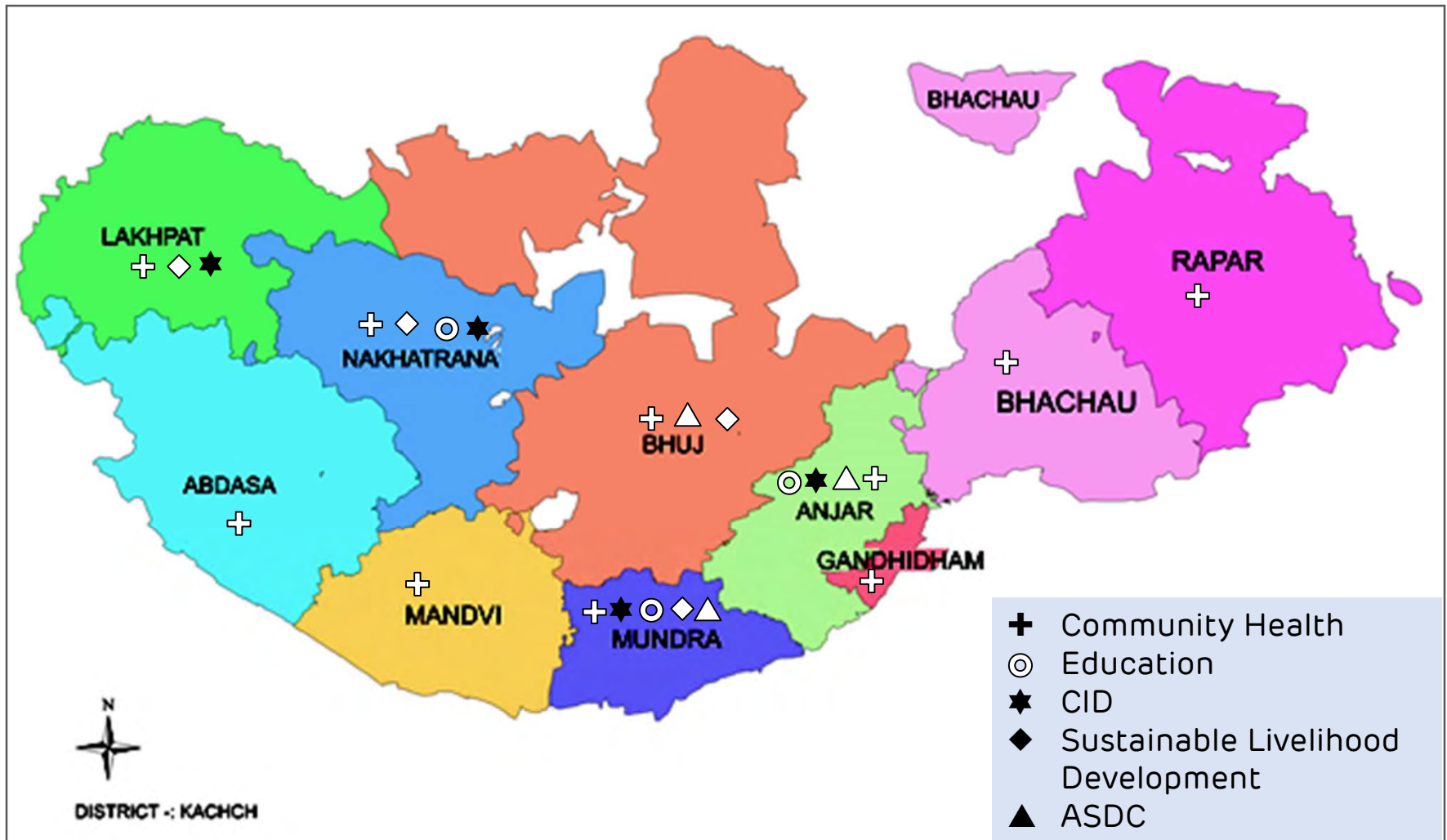
'Technical Training Program' by Adani Skill Development Centre for Fisher Folk community youth is a flagship program to provide them with a platform to get skilled and carve their future into new career options. The ASDC is committed to the cause of the deprived and underprivileged to generate employment through enhancing skills. It has been working relentlessly which resulted in rapport building with District Administration Kutch also.

Respected Shri Dr. Priti G. Adani, Chair Person, Adani Foundation with her charismatic leadership has transformed millions of lives through sustainable development initiatives. Along with her, Rakshit Shah, Executive Director, APSEZ has been a great mentor and involves himself thoroughly in all development initiatives. Mundra team would also like to acknowledge Shri Vasant Gadhvi, Executive Director, Adani Foundation for cultivating great ideas and guidance to the team. We are also grateful to Respected Gowda Sir (COO, AF) for being a source of motivation.

AF Mundra team acknowledges CEO - APSEZ, Human Resource Department- APSEZ, Finance Department-APSE for continuous support and facilitation.

Towards Growth with Goodness, Adani Foundation presents highlights of FY 2021 in this Annual Report!

Our Presence in Kutch



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Education (SDG - 4/4.a)



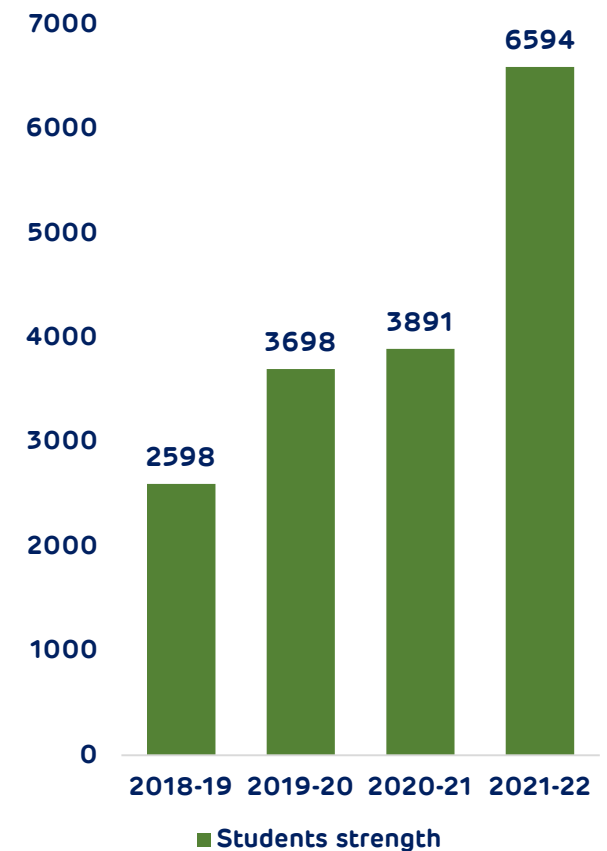
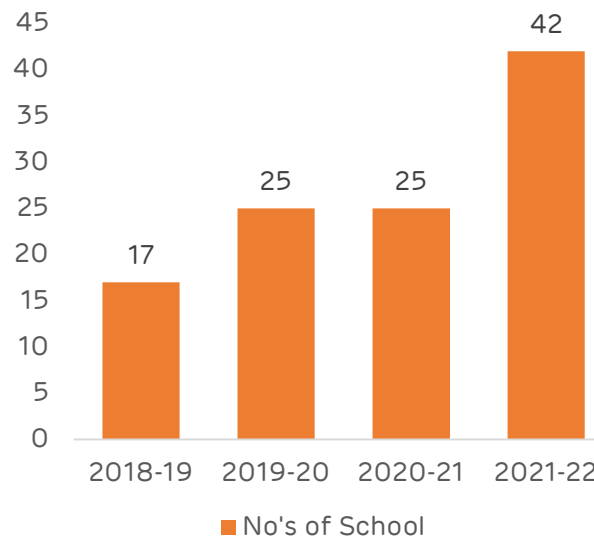
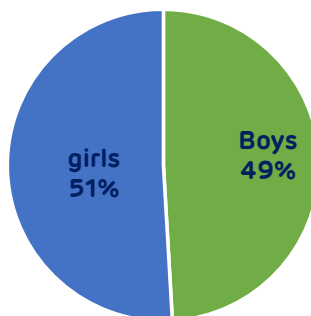
Education Projects

To foster students' learning abilities and achieve better learning outcomes at the grassroots, Adani Foundation charted an innovative intervention in Year 2018-19 through Project Utthan.

This comprehensive intervention entails:

- ✓ Adopting government primary schools
- ✓ Tutoring Priya Vidyarthi's (progressive learners)
- ✓ Arresting dropout rates
- ✓ Collaborating for teachers' capacity building
- ✓ Creating joyful learning spaces

Gender Ratio



Annual Achievement

- Introducing English as a third language.

Though talent has no barriers to success yet often rural community children and youth are devoid of higher education and better job opportunities only because of lack of command over English language. However, getting equipped with International language expands horizon of a student by opening wide communication mediums for them to learn and grow.

In Gujarat, The language gets introduced from Class4 whereas under the Project Utthan, Adani Foundation initiated to provide basics of English from class 1 with a structured syllabus. Utthan assisted 3,246 students to learn English from Class 1.

Table shows the result of Gunotsav of year 2021-22 for 18 Schools (24 Schools Results are awaited)

Academic year	Gunotsav Result				
	Numbers of school in grade				
	A+	A	B	C	D
2020-21	1	0	30	11	0
2021-22	2	8	7	1	0

Utthan assisted

3246

students to learn English from Class 1

Class	Students are able for....
I 62 %	<ul style="list-style-type: none"> ✓ Standing line, sleeping line, Left Slanting line, Right Slanting line, Left Curve, Right Curve, Up Curve, Down Curve ✓ Writing capital letter of A to Z, Identification of alphabet, Match alphabet with object
II 64 %	<ul style="list-style-type: none"> ✓ Writing capital and small letters ✓ Vowel and consonant ✓ Week, month, and numbers up to 30
III 73 %	<ul style="list-style-type: none"> ✓ Differentiate between capital and small letters ✓ Recite rhymes ✓ Numbers 1-50, English name of shapes, fruit, vegetable, and stationary items ✓ Action words: Sit down, stand up, Run, Walk, Jump
IV 76 %	<ul style="list-style-type: none"> ✓ Capital and small letters ✓ Body parts, Golden words ✓ Self-introduction in 5-7 sentences



IT ON WHEELS

Benefited 3418 students



Digital literacy in early schooling is the first step to addressing access disparities in this evolving digital environment which is not feasible for rural students. This impedes their development.

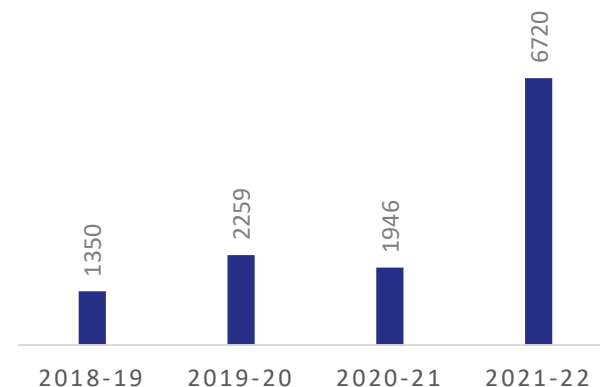
IT on wheel program is run to teach them Basic emphasizes elementary school digital literacy.

Highlights

- ✓ 40 laptops + 2 IT instructor + 01 Van with customize basic syllabus
- ✓ Catering students from classes: 4-8
- ✓ IT on Wheel visits fortnightly to each school under project Utthan.

Annual Mother's meet

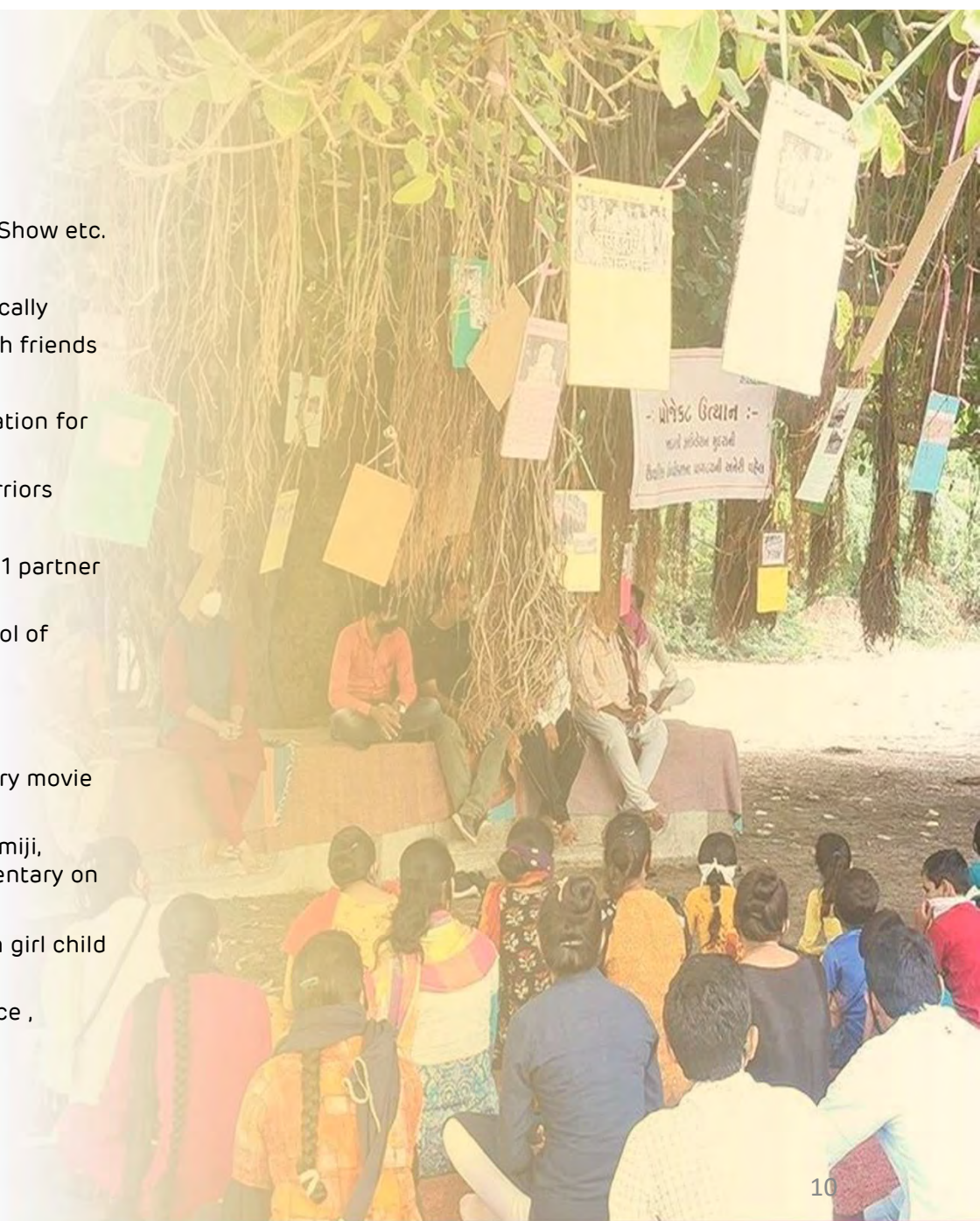
A child's maximum growth occurs in initial years of education where involvement of teacher as well as mother plays a key role in nurturing their character and personality. Many of the students are first generation learners with uneducated parents, in such case, Mother's meet helps mother and teacher are both in sync towards child's education. Moreover, mothers feel empowered and valued and gets insight of the school activities regularly.



Celebration/competition

Activities performed

World Book Day	▪ Virtual Group Reading, Puppetry Show etc.
Mother's Day	▪ Letter to supermom
International Yoga Day	▪ Performing Yoga Virtually + Physically
World emoji day	▪ Preparing emoji + exchanging with friends
Azadi ka Amrut Mahotsav	▪ Poster making competition
Rashtra Gaan	▪ Certificate from Ministry of Education for 'Recitation of Rashtragaan'.
Raksha Bandhan	▪ Eco Friendly Rakhi for Corona warriors
Teachers' day	▪ Gratitude wall for teachers
ISLM Participation	▪ Digital bookmark exchange with 11 partner schools from 5 countries
Virtual connection around the World	▪ Live connected with partner school of Croatia
Children's Day	▪ Paint party
World computer literacy day	▪ Restart of 'IT on Wheel'
National Maths Day	▪ Match Competition & Documentary movie on Shri Ramanujan.
National Youth Day	▪ Character sketch, Speech on Swamiji, Quote Competition ,Short documentary on Swamiji.
National Girl Child Day	▪ Contribution of Savitribai Phule in girl child education
National Science Day	▪ Girl/Women noble laurels in science , Model making
International Women's Day	▪ Documentary on Raman effect
	▪ Women's Day with 1000 Mothers



Healthy competition inspires kids to exhibit their maximum potential. When students compete, they will become more inquisitive, research independently and learn to work with others. They will strive to do more than is required. These abilities prepare children for future situations of all kinds. Due to pandemic students were away from multiple competitions and celebrations were planned in school. Which helps them for-

- Improving teamwork and collaboration
- Enhancing social and emotional learning
- Increasing intrinsic motivation
- Facilitating growth mind-set
- Building mental toughness
- Virtual celebrations and competitions to engage students during lockdown period.

Capacity Building Program

To make the project sustainable, Utthan closely **works with block resource coordinators to organize monthly training sessions for Government teachers + Utthan sahayaks on various subjects.** Entire academic year teachers training is focused on National Education Policy 2020.



Utthan's outreach strategies to support children's learning

- 100 hours capacity building programs for Utthan sahayaks and school Teachers
- 90% students were involved in various activities under Aazadi ka Amrit Mahotsav
- 6600 hours were given in 'SAMAYDAAN'
- 100 % participation in 100 days reading campaign
- Project is in alignment with NIPUN Bharat: FLN
- Dedicatedly 80 hours provided for preparing JNV and NMMS examination. 19 number of students qualified for JNV and NMMS.

100% Utthan Schools are equipped with:

- ✓ Smart classrooms
- ✓ LED TV
- ✓ Library cupboard with 350 books
- ✓ Annual subscription of 07 magazines
- ✓ Sports materials
- ✓ Music instruments
- ✓ BALA Painting
- ✓ TLMs focusing language and numeracy
- ✓ Kitchen garden – 4200 plants planted

Reaching out to students with no smartphones at home

24,748 Voice messages sent to create awareness regarding Precautions during Covid19

All students taught during sheri shikshan by Utthan sahayaks

74% progressive learners virtually connected on various platform



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 1st Admission was done.



AVMB –Adani Vidhya Mandir, Bhadreswar is accredited By NABET under 'Quality Council of India'

SDG

- ✓ ***Quality education - 4***
- ✓ ***GenderEquality - 5***
- ✓ ***Reduced Inequality - 10***

National Accreditation Board for Education and Training is a constituent Board of Quality Council of India.

NABET is offering accreditation program for Quality School Governance in the Country, with a view to provide framework for the effective management and delivery of the holistic education program aimed at overall development of students.

State level First Gujarati Medium school accredited by NABET



Adani Vidya Mandir Bhadreswar Gujarat Board Standard 10th Examination Result is 100% (27 students have passed the examination out of 27). Adani Foundation took complete 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.

But We did not Give-up and reached out to our students to pursuit educational through virtual platform by various initiative.

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

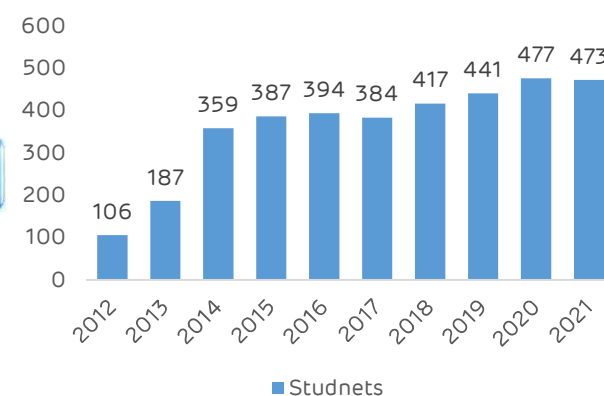
Project Activity

- Balwadis started in 2010, for students in age group of 2-5 yrs. In 2013, this school was built on a donated land
- Cost 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

- **473 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

AVMB STD - 10 SE BATCH RESULT Year 2021-2022		
SR NO	GRADE	STUDENTS
1	Above 80 %	01
2	Above 70 %	00
3	Above 60 %	07
4	Above 50 %	07
5	Above 35 %	12
TOTAL		27



- Street Education popularly known as 'Sheri Shikshan' was initiated for the students who could not attend sessions online.
- Offline education was started for Class 10 students under the Covid19 Guidelines.
- 'Fit India week' celebrated by arranging various sports events, Elocution, Written and Drawing competition for class 9 and 10 students.
- Covid Vaccination drive for Class 10 students in coordination with GKGH, Bhuj Hospital.
- Various National and International day celebrations at School level with learn and fun activities as well as conducted Motivation Sessions.
- Motivating Girl Child from fisherfolk families for Education after 10th Standard.



Community Health Projects

Good Health is extremely important, invaluable and indispensable. A Healthy body paves the way for a healthy mind. Adani Foundation team at Kutch works towards better health of community and access to easy consultation with expert doctors in collaboration with G.K General Hospital, Bhuj and Adani Hospital, Mundra. For more than a decade, Community care is provided through Mobile Health Care Units, Rural Clinics and Health Cards for senior citizens.

In span of 6 years, there are number of cases reported for Kidney related diseases. Under those circumstances, periodic and special health camps are scheduled to address this issue, provide them necessary treatment support. We also conduct awareness camps for preventive measures against kidney problems.

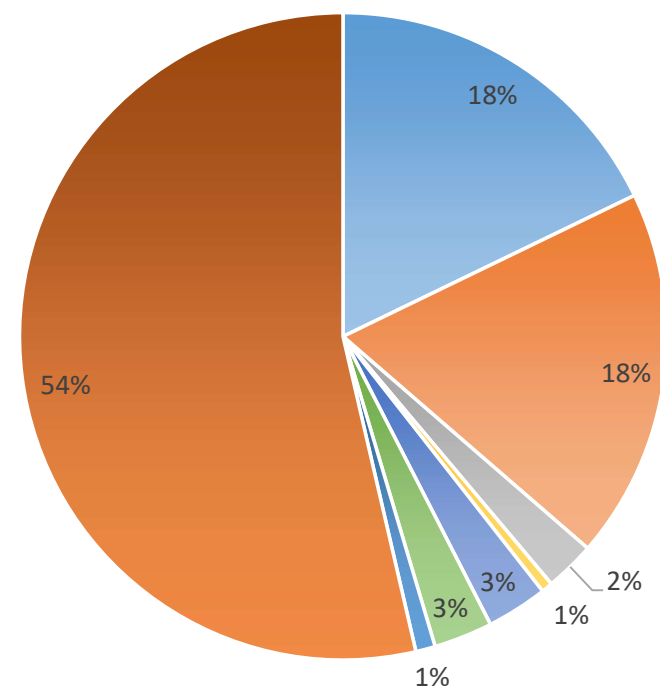


It is health that is real Wealth , not a piece of Gold and silver.

Preventive and curative healthcare are critical to sustaining community health and promoting economic prosperity. The objective is to find the proper balance that will lead to a long, healthy, and fulfilling life journey for that AF



Direct Beneficiaries (%)



Medical Mobile van Rural Clinic Medical Supports
 Dialysis Supports General Health camp Spe. Health camp
 COVID-19 AHMPL AHMPL-OPD & IPD

Project	Direct Beneficiary	In-Direct Beneficiary
Medical Mobile van	10043	39844
Rural Clinic	10439	41436
Medical Supports	1409	5532
Dialysis Supports	314	30
General Health camp	1715	6852
Spe. Health camp	1655	6624
COVID-19 AHMPL	554	2770
AHMPL-OPD & IPD	31291	90573
Total	57420	193661

Rural Clinic & Mobile Health Care unit

Health is the most basic prerequisite for community development and in order to transform rural healthcare landscape Adani Foundation has initiated '**Mobile Health Care**' and '**Rural Clinic Service**' to providing primary, preventative and curative healthcare services accessible in inaccessible areas which is being executed since a decade. Adani Foundation has acted as catalyst to reduce health disparity and hardship of medical expenses among community.



- ✓ Time saving
- ✓ Reduce Medical expenses
- ✓ diagnosis and treatment
- ✓ Preventive health screenings
- ✓ Early disease diagnosis
- ✓ Chronic disease management
- ✓ Health education & Counseling

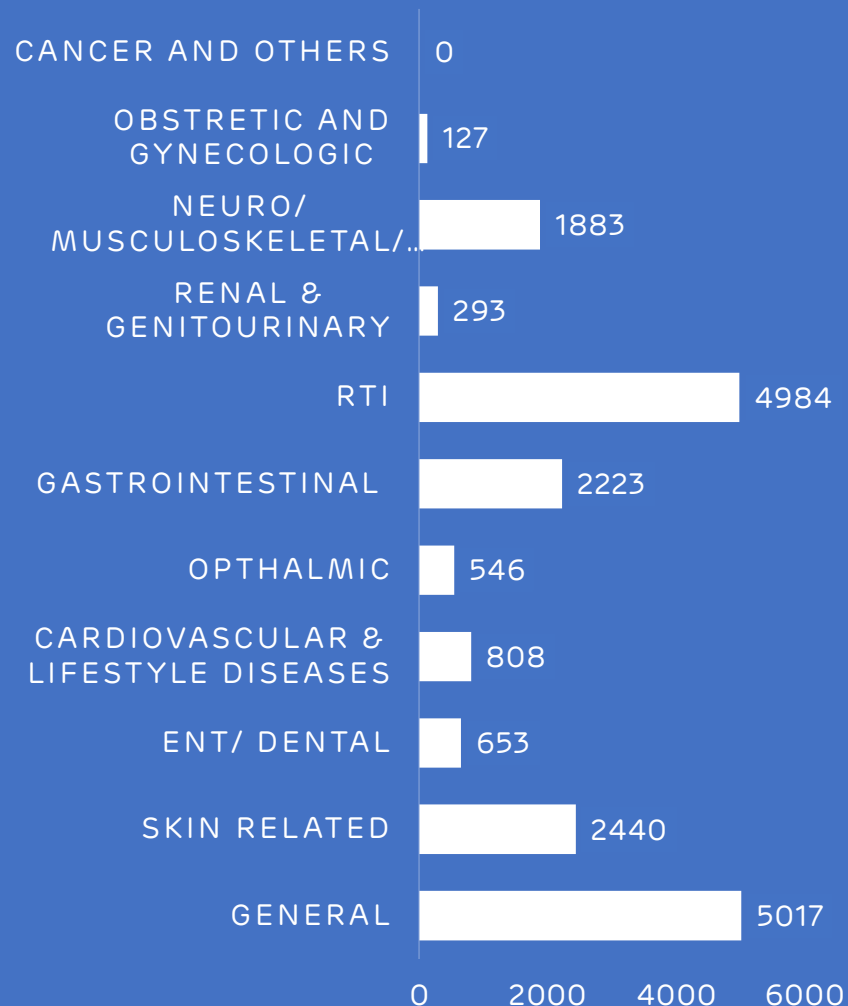
The mobile health care unit is operated by Medical officer and health care assistant and equipped with various integrated medical devices that allows Medical staff to conduct preliminary check up. more than 90 types of general life saving medicines are available in MHCU and covered 29 villages and 07 fishermen settlements population. MHCU and Rural Clinics are providing services of Blood pressure checking, Sugar testing and ECG as well,

Similarly rural clinics are serving at **9 Villages of Mundra 3 Villages of Anjar Block and Mandavi Block.**

The MHCU and Rural Clinics services are available with Token Charges Rs. 20 per patient.



DISEASE WISE DATA OF MHCU & RURAL CLINIC



Under the '**Preventive Health Care**' programme, specific screening and questionnaire are developed for Non communicable disease(NCD) like **Blood pressure, Sugar, Thyroid** and suspected patients are referred for secondary examination at Adani Hospital, Mundra.

More than **110 Patients** are diagnosed with NCD and are cured before patient reaches to severity stage.



Support to Vulnerable Patients

Adani foundation provide financial assistance to the most economically challenged patients who are suffering from life threatening diseases related to heart, liver, kidney and cancer cases with Minimum Participation.

In the current year total **1409 patients from Mundra, Mandavi and Anjar Block were supported in Adani Hospital Mundra.**

Dialysis Support

Patients with kidney disorders must undergo periodic dialysis, which is expensive and lends financial burden to family.

Adani Foundation has initiated a dialysis program to support foremost needy patients .

Till date 5 patients with critical and severe condition has been supported for dialysis with token charge of Rs. 150 per session. Regular dialysis has improved patients condition prolonging their life.



Senior Citizen Project

Adani Foundation has launched Senior citizen project with the aim to provide access for Promotive, Preventive and Curative health service to more than **8500+** elderly people of Mundra since 2011 to 2020 – A Decade.

After 2021 to make the project sustainable, Linkages with Government Schemes and senior citizens are initiated. Total **61 Senior citizens has been Facilitated with Senior Citizen and Widow Pension Scheme Rs. 1250/Month in 2021.** Till more than **750+ Senior citizens ARE Linked with Gov.schmes..**



Health camps

Getting the right health screenings and treatments is the key to living longer and better.

Major Activities

- Under Dignity of workforce program, weekly medical camps organized at labour colonies.
- General health check up of work force plus deaddiction counselling done by Medical Officers.
- Motivational sessions by “**Prajapita Brahmakumaris**” are also organized to make them strong against addiction.
- General Health camps, Specialty camps, Pediatric camp especially for Malnourished children are organized frequently to provide health care treatment to the community.

In this year **total 5200+ People are diagnosed and treated accordingly.**





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 examining patients with severe conditions and providing them immediate relief.
- AHMPL, Mundra was converted into Covid Hospital with 100 bed Facilities with oxygen to extend treatment to Covid patients. All related coordination done by our team for more than **350+ OPDs and IPDs**.
- Provided Oxygen Concentrators to home isolated patients to safeguard their lives during pandemic.
- Provide hearses to shift Covid deceased patients to Crematorium with all dignity.
- Precautionary voice message dissemination through '*Awaj de*' voice message service **Over 11000+** Community.
- Sanitized villages, Distribution of Vitamin C tablet to **2300+people**
- Adani Foundation employees volunteered for providing service in G K General Hospital, Bhuj during pandemic.



Machhimar Ajivika Uparjan Yojana

The availability of water for personal and domestic hygiene has been found to be an important factor in decreasing the rates of water-related diseases such as ascariasis, diarrhea, schistosomiasis, and trachoma. **2091 female beneficiaries** at nine fisherfolk vasahats.

- To Reduce women drudgery to get water at fisherfolk settlement
- To Reduce Water borne disease

Sr. No	Vashat	Family	Requirement	Remarks
1	Luni	116	15000	9 Months
2	BavdiBandar	107	17500	9 Months
3	RandhBandar	245	25000	9 Month
4	KutdiBandar	118	-	Linkages with MSPVL
5	ZarapraVasahat	90	-	Linkages with Port
6	Virabandar	80	-	Linkage with GWIL
7	Junabandar	160	-	Linkage with Mundra GP
8	GhavarvaroBanada	60	-	Linkage with GWIL
9	Zaraprachacha	55	-	Linkages with Port GWIL
Total		1031		

Adani Foundation Team has initiated coordination with GKGH hospital since 2015 and established a reception area for the smooth patient coordination.

- GKGH Hospital is Covid Care Hospital since 22nd March 2020. in the second wave of Covid Adani Foundation staff members supported in patient counselling, coordinating and supporting for dead body Covid care van.

- Total **7826** Covid patients got treatment from overall Kutch with satisfaction.

- Dead body medical van –Dignity to death is one of the noble initiatives taken up by the Adani Foundation. If any death occurs in GKGH, dead bodies are shifted to the native village of the concerned in the Kutch District free of cost. Total 1163 dead bodies privileged till now to different locations in Kutch including Covid Patients.

- Mahiti Setu, A Platform at GKGH to Guide and Assist to get Government health scheme benefit. Through Mahiti Setu 6923 beneficiaries are sourced and more than 947 beneficiaries are linked with Ayushman Yojna and MAA Yojna.

Facilitation of Government Bal sahay Yojna- Rs.50000 Financial support to **527 family** who had lost their members due to covid-19.

Patient Care and Coordination at GKGH Bhuj to avail proper treatment and Guide for 100% satisfaction.

Gujarat Adani Institute of Medical Science (GAIMS) - Bhuj



Environment Sustainability

Environmental sustainability involves making decisions and taking actions that are in the interests of protecting the natural world, with particular emphasis on preserving the capability of the environment to support human life. It is an important topic at the present time, as people are realizing the full impact that businesses and individuals can have on the environment.

Sustainable development has many important facets/components like social, economic, environmental, etc. these components are closely interrelated and mutually re-enforcing. Under Corporate Environmental responsibility 10 km radius villages from SEZ Boundaries.

To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, In year 2017-18 project "Sanrakshan" was launched in coordination with GUIDE. MOU has been signed with Dr. Vijay Kumar – GUIDE for conservation of five species of mangroves.



Miyawaki-Nana Kapaya

Miyawaki is a technique pioneered by Japanese botanist Akira Miyawaki, that helps build dense, native forests. The Miyawaki method of reconstitution of "indigenous forests by indigenous trees" produces a rich, dense and efficient protective pioneer forest in 20 to 30 years. The approach is supposed to ensure that plant growth is 10 times faster and the resulting plantation is 30 times denser than usual. It involves planting dozens of native species in the same area, and becomes maintenance-free after the first three years.

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 Bavaretc. Shrubs species like-Akadoand Aavarare also predominant close to site; while, grasses like Chhabarand Dhrabare 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.





Smriti van

Smriti van 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.

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 59th 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 .

All Corporate of Kutch has supported fund for the same. APSEZ has done monitory support under CSR and Adani Foundation is coordinating for monitoring.



Coastal Bio diversity

Mangrove is a tropical tree or shrub that grows in swampy areas and has tangled roots located above ground. Mangroves, seagrass beds, and coral reefs work as a single system that keeps coastal zones healthy and provide essential habitat for thousands of Flora and Fauna.

Mangrove cover in India is 4992 km² which is around 3% of global distribution and 0.15% of the country's total geographical area. With the second-largest mangrove cover in India, mangroves cover in Kutch increased from 794.77 km² to 798.44 km² With dominant species of *Avicennia marina*, *Rhizophora*, *Ceriops*, *Aegiceros* For the past two decades and APSEZ, Mundra is actively involved in mangrove conservation and management activities.

Adani Foundation contemplated to establishment of multi-species Mangrove Biodiversity Park to help disseminate knowledge on the mangrove ecosystem and simultaneously conserve the species with collaboration of Gujarat Institute of Desert Ecology (GUIDE), Bhuj, Kachchh.

Total 12 hector area have been developed with multi-species Mangrove plantation of ***Avicenna Marina***, ***Rhizophora Mucronata***, ***Ceriops Tagal***, ***Ceropos decandra*** at Luni Coast as phase wise in the year 2018-2019 (Phase-I). & Phase-II (2019-2020) with good survival rate.

So, to develop that as Bio- diversity park ,another 03 ha area coastal stretches have been planted with selected true mangrove species.



Fisheries Diversity

Mudskippers and bivalves were found near the waterfront. The gastropod, *Pirenella cingulata* few crabs, Dead razor clams were also found inside the plantation site, A few crabs of *Scylla serrata* species and mud-skippers (*Periophthalmus waltoni*) were found in the cultivation site. In addition, catfish and mullets also occurred at the intertidal zone that the fisherman collected.

Macro Fauna

- *Gelasimus tetragonon*
- *Austruca variegata*
- *Periophthalmus waltoni*
- *Tubuca dussumieri*
- *Calidris pugnax*
- *Ardea cinerea*
- *Recurvirostra avosetta*
- *Larus fuscus*
- *Pirenella cingulata*
- *Solen sp.*
- *Painted strock*

- ✓ reduce carbon sequestration by 3 T per hector annually in early five years
- after it reduces up to 20-25 T per hector
- ✓ provide alternate livelihood to fisherman by providing 3500 person days employment annually .
- ✓ Provide natural Habitat for Flora and Fauna.



Water Conservation (SDG 6/6.6)



At the turn of millennium, the state watched with growing alarm the steady depletion of its ground water and launched massive drive to achieve water security in Mundra region.

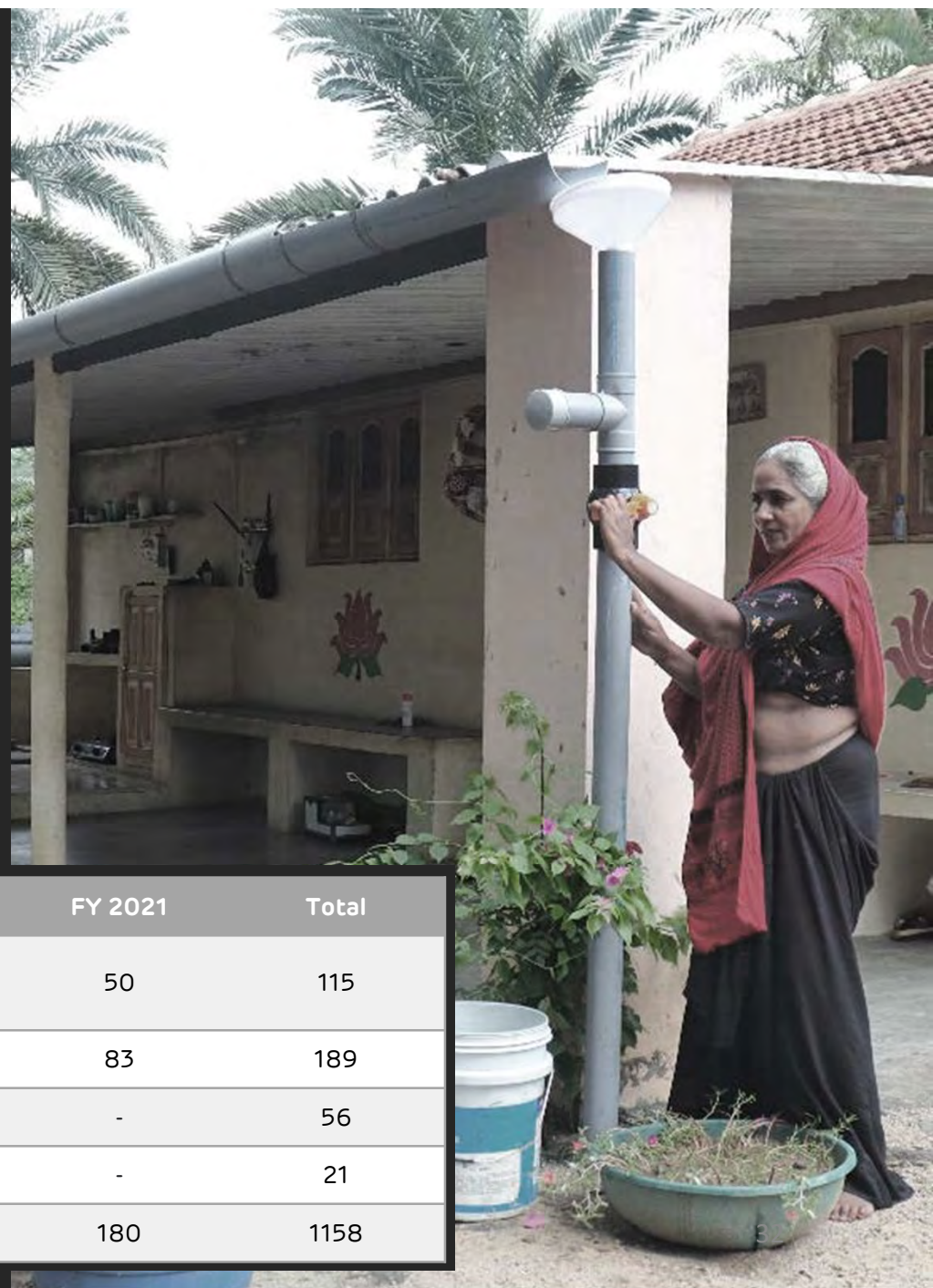
As a part of pre monsoon activities due to negligible rainfall we are getting less outcome of this intervention.

The Foundation's Water Conservation program, Swajal, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of the country. Devising eco-friendly and cost-efficient methods of water body rejuvenation, the project works to revive existing water resources, plan sustainable infrastructure for protection of natural water bodies and improve ecological conditions around the area. Interventions are focused on groundwater recharge, sustainable agriculture and boosting livelihoods post stream rejuvenation.

Total 110 Roof Top Rain Water Harvesting, 190 Recharge Borewell and 56 Pond Deepening carried out in up to year.

Impact

- ✓ 218500 men, women, children and elderly impacted by this initiative.
- ✓ Total Dissolved Solids (TDS) in the ground water down by 16.7%.
- ✓ Ground water table up by 4.2 ft. over the last 5 years.
- ✓ In four villages water levels have increased by 15-20 ft. through bore-well recharging facility
- ✓ Storage capacities of check dams and ponds increased by 106.44 MCFT. Total area benefited 2857 hectors.
- ✓ Annually 10000 Liters of water saved and up to INR 10000 saved per family.
- ✓ 80% reduction in money spent on labour.
- ✓ Up to 20% less money spent on electricity bills.
- ✓ 50% less water used as compared to conventional methods.
- ✓ Potable water available at doorstep. Earlier on an average women used to walk 1.3 kms to fetch water.
- ✓ On an average there has been up to 25% decrease in expenses on healthcare.
- ✓ Water availability has also ensured safety, security and overall well-being of women and children in the area.
- ✓ Initiatives and efforts made under water projects by Adani Foundation continues to provides sustainable solutions for community for their improved farming and ease of living.



Initiative	FY 2021	Total
Roof Top Rain Water Harvesting	50	115
Bore & well recharge	83	189
Pond Deepening	-	56
Check dams	-	21
Drip Irrigation	180	1158

Drip Irrigation Project (SDG 2/2.4)

The fragile economy of Kutch is hampered by the salinity ingress and higher saline ground water which consequently impact on cultivation area and farmers yields as well.

Hence, To Conserve the Water. It is necessary to bring the land under '**Micro Irrigation System**' by allowing water to drip slowly to the roots of the plants, either from above the soil surface or buried below the surface we have started project Drip irrigation to Provide Financial support to adopt & Install Drip irrigation system.

This year **More than 180** farmers are supported with 15% Amount of Total Cost for maximum Rs.0.40lac.

Till the date Total **2229 acre of land are covered under Drip system by 1158 farmers** impacted to save their Money ,time and water and electricity as well.

The process to availing Benefits

- Farmers have to apply in the prescribed form of Adani foundation with photographs _
- Inspection and verification will be by AF representative.
- Ration card, work order of GGRC, 7/12 certificate, and all bills must be attached.
- Solutions to Queries .
- Primary information about farmer land will be recorded.
- Farm visit within 10 days of receipt of application and verified installation of the system as per map and material.
- Feedback from farmers.

Farmers selection Criteria

- Farmer should belong to the intervention villages of AF (Adhar Card) within Mundra block
- Small/marginal farmer – having maximum 3 hectors total family land were considered.
- Submit copy of application and copy of approval certificate from GGRC for drip irrigation .

- Consent to contribute and participate as per the provision of the AF scheme.
- Spot check/ field visit at the farmer's farmland by AF team before and after setting up the drip irrigation system and regular monitoring visit.
- Opening a bank account (the financial assistance was provided only through cheque).



Grassland Ecosystem Restoration project - Guneri

Lakhpat taluka is bestowed with rich mineral resources, lignite being the most important. Additionally, the area is also known for presence of tropical thorn forest. The region exhibits a great correlation between floral and faunal species and many rare and threatened species including *Helichrysum cutchicum* (endemic species), *Cistanche tubulosa*, *Campylanthus ramoissimus*, and *Sida tiagii* hence area is a proposed Biodiversity Heritage Site. However, the stress on this biological pool is constant, which arises primarily due to dynamic environmental conditions culminating in frequent droughts.

- With this background, and as a part of Biodiversity initiatives, to conceptualizing the landscape ecology and social-ecological systems together, by taking grassland restoration as its epicenter, 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 collaboration with Gujarat Ecology Society (GES) – A Nonprofit Organization, based in Vadodara, Gujarat.



Grassland Ecosystem Restoration project - Guneri

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 faunal survey was initiated in the month of December and continued till February 2022. This time is suitable to record the migratory birds. The survey highlights the presence of 9 threatened species based on IUCN (2021) viz., Monitor Lizard Black tailed Godwit, Black-headed Ibis, Common Pochard, Tawny Eagle, Steppe Eagle and White-backed Vulture were sighted in the area.

MILESTONES ACHIEVED

- Restoring the grasslands in the Gauchar lands.
- Preparatory phase for plantation activity.
- Capacity building of the locals in the ecological monitoring process and process of documentation and observation of changes.
- faunal Survey Mambles-07 species ,Reptiles-04 Species Birds-59 Species ,Threatened species-09 Species were Found.
- On Soil day celebration, An expert session was presented by Dr. Jayendra Lakhmapurkar for the APSEZ staff, students and farmers.
- International Wetland day was celebrated on 2nd February jointly by Adani port and logistics and GES with the theme "**Action on wetlands for people and nature**". Key note speaker Dr. Deepa Gavali took insightful session to create awareness.



Sustainable Livelihood Projects

Empowering lives and broadening their scope for economic opportunities, Adani Foundation's initiatives introduced under 'Sustainable Livelihood Development Program', is formed to empower and uplift community towards better living and better livelihood.

At Mundra Taluka, several communities are economically side-lined and depend on a sole income source or are unemployed.

Sustainable livelihood projects have been launched to cater financial independence through building local partnerships, providing diverse livelihood avenues, inculcate the attitude to establish savings, equipping to earn and updating local skills by making use of existing resources to encourage self-reliant lifestyles. Participation is encouraged by launching specific projects for fishermen communities, farmers and cattle owners, youth and women.

A comprehensive program for Fishermen community is developed with holistic approach to improve their Education, health, economic status, Employment opportunities, Infrastructure and social awareness.





With support of Adani Foundation, Education Scenario is changing in fisher folk community which wasn't a cake walk but with the hard work and commitment Adani Foundation has created miracles to motivate this vulnerable students to pursue Education for their bright future .

To inculcate Education in first generation learners – **SMART Balwadis** are set up with an aim to provide quality education, scholarship support to girl child along with transportation facility.



SMART Balvadi

A child's early years experience provide strong base for their lifelong learning. A Balvadi center for their holistic development was set up at Four fishermen vasahat where trained Balvadi teachers looks after Children's Physical, cognitive, Emotional and Social development.

Initiatives taken to provide Study Material and Cycle are the distributed to keep fisher folk children motivated to continue their study as well as reduce financial burden of their parents.

68 fisher folk children studying in 9th to 12th standard were provided with educational material and stationary material and Cycle support to Juna bandar secondary school going students.

Economic Empowerment is necessary for "ATMA NIRBHAR BHARAT" and Skill Development is the base of comprehensive growth. To Develop various technical and Non-Technical Skills in youth - training was conducted for Fisher Youth and Women.

Digital literacy and spoken English class:- Basic computer and spoken English training for 152 Fisherfolk students of Zarpara and Luni Vasahat which will help them to grow with confidence.



sewing training given to 26 fisher women of Juna bandar to make them Self-reliance. Planning industry tie-ups to provide them with livelihood opportunities.

Awareness programs For fisherwomen :

Fisherfolk women are still living in 19th Century, due to lack of education they are having issues of addiction, hygiene and independence.

More then **1250+ women** participated in various sessions awareness workshop at Fisherfolk settlements periodically.


Process for livelihood support to Fisher folk
39 Fisher Youth were interviewed in various industries among that 12 are selected.

Mangroves Nursery Development

Optional livelihood provision during Two-month Fishing Offseason is taken care by Mangrove Planation and maintaining at Luni Hamiramora site.

Till the date 162 hector area have been planted with Avacinia marina mangrove species which provided **46247 person days** and create environment Sustainability as well.

Years	Mandays
2012-13	6943
2013-14	1480
2014-15	3240
2015-16	3533
2016-17	3125
2017-18	3666
2018-19	7539
2019-20	6261
2020-21	5020
2021-22	5440
Total	46247



Project Fish

Skill Enhancement of Fisher folk Youth

Objectives

To Promote long-term socio-ecological effectiveness through focused interventions like employment through Skill enhancement.

Engage more than 500 fisher folk youth in Skill Development Training to provide consistent scope of income

Alternative incomes mean fishers are less pressured to go out to fish especially when the weather is bad

Skill Enhancement in technical sector will motivate them for Education provision in future generations

Livelihood interventions to improve fisheries dependent households and also reduce risk during open sea fishing

Project Goal

To develop new livelihoods opportunities for more than 500 fishing families and therefore to helping with family finances this leads to an increased sense of empowerment and confidence.



Pre-launch Activities

Brewing Big

Fish project ideation bring into existence after researching and analyzing the existing situation of Fisher folk youth and challenges they face due to which the future of the community was at stake.

The future of any community depends upon its youth. Considering this phenomenon, Adani Foundation targets fishermen youth at remotest location of Kutch district covering villages like Zarpara, Navinal, Mundra, Shekhadiya and others.

The key activities conducted before the launch were:

Mobilization - Team reaches out to villages to created awareness regarding the purpose of project and providing detailed information about training and the employment opportunities provided to them.

Counselling - A regular Interaction with every potential beneficiary to understand their educational background and interest areas along with mental and emotional capabilities. On the basis of individual's educational background and capabilities, counsellor suggests best fit course to the beneficiaries.

1 Jan'
2022

Project Launch

Getting started

Project 'FISH' was inaugurated with an aim to enable fishermen community youth in 3 trades
Assistant Electrician, Mason and Digital Literacy.

52 aspirants from community were given an opportunity to get holistic skilled development environment by Adani Foundation under Adani Skill Development Centre. The certified training program of ___months. The expert trainers of ASDC acts as a catalyst to develop not just technical skills but to provide trainees a holistic learning platform to develop their personality and to make them industry ready.

Job Roles

- Mason General
- Bar Bender & Steel Mixer
- Assistant Electrician

11 Jan'
2022

10 April
2022

Training & Beyond

Skill journey of Beneficiaries

Life at Skill Centre

Once beneficiary enrolls in a skill training program, he undergoes various modes and methods of training to develop his overall personality during his technical skill journey.

The training cycle started with theory sessions and practical sessions in respective job roles. Post that, Soft skills sessions and activity based learning sessions were conducted to boost their confidence. Though, beneficiaries start career at entry level, to grow themselves further ASDC prepares them with well with sessions like communication skills and Digital literacy.





I am happy that I am getting chance to get skilled and choose to make a living doing other occupation and no more dependent on just fishing. When my trainer appreciated my drawing skills for project and grasping power, I got determined to study dedicatedly to score maximum in my assessment.

- Rahim Bhatti

In 3 months of training, I feel immense confidence in myself. My changed personality is even witnessed by my family and friends. Post training session, I even do home study and discuss queries with trainers regularly to get myself prepare for my first job.

- Ayub Vagher



Initially I was hesitant to speak in class and also struggled in theory sessions. But our trainer is so supportive and helped me to understand better through practical. I am looking forward to start my career post skill training and all set to enter into an occupation to make my parents and fishermen community proud.

- Abdullah Vagher

Transforming Lives

Home like meal service by SHG members

One of the interesting initiative of project the 'Fish' is the involvement of SHG group women named 'Saheli Gruh Udhyog' in the successful training of fishermen youth in the form of providing freshly cooked meal for the beneficiaries and arranging their lunch at training centre.

Adani Skill Development centre has given a meal service contract to SHG member and bears complete cost of beneficiaries meal and supporting SHG members in expanding their services.

About 'Saheli Gruh Udhyog'

It's a group of 10 members among whom, some are widows. They are making active efforts to run their SHG group by providing meal services for their sustenance.

Getting a chance to serve 52 young men for 3 months proved as a big achievement for their SHG group. *Moreover, food quality is appreciated by trainees and they express their gratitude by saying 'the food reminds them of home as it tastes like home'.*



Sustainable Livestock Management

The inadequate rainfall and high saline ground water acts as a threat for agriculture practices. Also, cattle sustenance is the main cause of concern due to dry arid region in lean months. Adani Foundation contributed its exceptional efforts in Mundra block for consistent betterment in livelihood sector.

The organization has carried out remarkable activities in the agricultural and animal husbandry sectors i.e. Cattle Health care, Natural Farming, Soil health enhancement, Fodder sustainability etc.



Pashudhan : Fodder Support Programme, Individual Fodder Cultivation

- ❑ Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattle's / 3008 farmers and hence enhancing cattle productivity. Fodder support is of prime importance for sustaining the cattle in dry months.
- ❑ Fodder Cultivation- To made fodder sustain villages - 25 Acre Gaucher land of Siracha village is being cultivated for the same.
- ❑ Fodder support MOU- with Gram panchayat at Zarpara, Nana Kapaya, Borana, Mangara, Sadau, Shekhdiya , tuna , Rampar, Dharab, Navinal, Luni, Gundala, hamiamora , Raga.
- ❑ Individual Farmer fodder cultivation supported for Maize seed and NB21 to more than 200 farmers which has created revenue of Rs. 27 Lacs.

Preventive Health Care

- ❑ Adani foundation and Government Animal hospital jointly organizing Cattle awareness camps total 22 villages .
- ❑ Vaccination of susceptible animals against foot-and-mouth disease (FMD) is a well established strategy for helping to combat the disease. Traditionally, FMD vaccine has been used **to control a disease incursion in countries where the disease has been endemic rather than in countries considered free of the disease.**
- ❑ Foot-and-mouth disease (FMD) and Deworming done with 1883 cattle owner benefitted to 15700 cattle.
- ❑ Sheep and goats have weakened immune systems when they are sick with other diseases, are quite young or old, and during highly stressful events such as lambing. Deworming strategies should seek to protect these higher at-risk groups, controlling parasite levels in all animals to prevent visible effects of parasitism.
- ❑ Special Camps organized at Kira Dungar Nakhatrana for camel which benefitted 525 camels.



કચ્છના સ્ત્રીઓનું આશ્રયણ
ABHIYAN

બ્રુસેલોસિસ કંટ્રોલ પ્રોગ્રામ
Brucellosis Control Program

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

બ્રુસેલોસિસ રોગના લક્ષણો...

આ ભયંકર ચોપી ગર્ભપાત રોગ મનુષ્યમાં પણ ફેલાઈ શકે છે.

જક/મેલી તથા ચોપી રોગનાં સંપર્કમાં આવવાથી

મનુષ્યમાં યક-ઉત્તરનો તાવ આવવો, સાંધા જકડાઈ જવા અને વૃષણમાં રોગો આવવો વગેરે લક્ષણો જોવા મળે છે.

મનુષ્ય જાતિમાં આ રોગનું નિદાન કરવું અને તેની સારવાર કરવી શકી ભણી તેમજ ખર્ચાલ છે અને આ રોગને અટકાવવા કોઈ રસી પણ નથી.

‘કુલત પાનના પશુઓમાં આ રોગ વેગપર ફેલાઈ નવા પશુ તેવી સારવાર વાગ્ય નથી પણ રોગી પશુઓથી અન્ય પશુઓમાં આ રોગ ફેલાતો અટકાવવો અશક્ય છે.

એક માત્ર ઉપાય : રસીકરણ

પશુને બચાવવા માટે એક જ ઉપાય છે : જ મનુષ્ય થી એટી વાકસીનેશન અને પાટીએને રસી મુકાવવી. રસી મુકાવ બચાવવાનું કાર્ય વાર્ષિક/બેઝીક આગવ રાખવું ફરિયાદ છે. તેથી બોલમ અને કાનમાં રેસ/કાટી વગરની પુનઃ જરૂરી છે.

શું તમે તમારી જ મનુષ્ય થી એટી વાકસીનેશન અને પાટીએને રસીકરણ કરાવવું છે? અન્ય રોગથી સંકરણ પશુઓનું નિદાન કરાવવું છે? જો ના કરાવવું હોય તો : તમારા ગામના ‘પશુપાલક મિત્ર’ નો સંપર્ક કરો...

સહયોગ
adani
Foundation

સંપર્ક માહિતી
મુખ્ય સંપર્ક : મ. 96011 57148
સહાયક સંપર્ક : મ. 95093 99740
મોબીલ નંબર : મ. 97379 55362
ફોન નંબર : મ. 97277 68819

આયોજક
કુલત પાનના પશુઓના રોગોના નિયંત્રણ માટે

To protect Cattles against **Bovine Brucellosis** zoonotic disease, Awareness and vaccination program is ongoing with Kutch fodder fruit & Forest development trust (KFFT) in our 13 Villages , Last year 287 families 2132 Animals benefited. In 2021, In **Total 666 families 5083 animal benefited.**

Bovine brucellosis is a chronic infectious disease of cattle that causes abortion, the birth of weak or dead calves, infertility and, as a consequence, reduced milk production. Cattle and buffaloes of all ages are susceptible, and infection can persist for many years. In females, abortion is the major clinical sign, typically occurring between five and seven months of gestation. Most infections result from ingestion of bacteria either from diseased animals or contaminated feed. Infection may also be acquired by respiratory exposure and by contamination of abraded skin and mucosal surfaces. Infected bulls can spread the disease through semen. This disease is also zoonotic (a disease that can be transmitted from animals to people or, more specifically, a disease that normally exists in animals but that can infect humans). Under this project following activities were carried out so far,



- Meeting with Gram Panchayat, Farmers and Livestock Owners.
- Development and Distribution of the Awareness Materials among the stakeholders.
- Mass Level awareness by pasting the poster and meetings with Village Leaders and Gram Panchayats.
- Primary Survey and Sample Collections i.e. Milk Ring Test, Blood Collection and testing.
- Brucella Vaccination and Ear Tagging etc.



Sustainable Agriculture

Sustainable agriculture is to protect the environment, public health, communities, and the welfare of animals. Sustainable agriculture also promotes economic stability for farms and helps farmers to better their quality of life.

Soil Enrichment, Crop Pattern, Agro Cover, Natural Farming, Orchard Development, Tissue Culture, Water Harvesting Practices, Replacement of chemical fertilizers and pesticides, Bio intensive Integrated Pest Management are the main parameters of Sustainable Agriculture Practices.

Sustainable Agriculture benefits are:

1. Contributes to Environmental Conservation
2. Saves Energy for Future
3. Prevents Soil Erosion
4. Enriches Soil quality
5. Biodiversity
6. Sustainable Livestock management
7. Economically Beneficial For Farmer
8. Quality Food to consumers



Home biogas

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.

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

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 cigarettes.

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.

Sustainable agriculture Project is revolving around Home biogas which is not just utilized for cooking gas but its by product is bio slurry which is replacement of chemical fertilizers and promotes soil enrichment.

Adani Foundation has supported for **223 Home biogas system** till date with 20% participation by the community.

As per SORI use of biogas each farmer can save Rs.23399/-year. Total 223 farmers can save Rs.5217977/- in a year.



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. Pre testing and post testing is carried out for designing carbon content management of soil.

Implementation

- Survey and identification of farmers to adopt Natural farming –**Total 150 Farmers were selected as criteria in first phase of the Project.**
- Arranged Workshop & Hands on training for them which was conducted by Agri expert ,KVK and Progressive farmers with 700+ farmers.
- **23 vermi compost unit have been set-up** to give guidance n training to other farmers. This units are provided Which is facilitated through Government with farmer Contribution.
- **150 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 in which more than 700 farmers participated.
- Four Farmers Groups is registered with **ATMA –Agricultural technology management Agency – it will leverage Government schemes.**





Promotion of Horticulture : Kutch Kalptaru FPO

Kutch Kalptaru 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 350 shares of 280 holders, 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.

In Coordination with KKPC, Adani Foundation has supported for Dates Offshoot plants to 100 farmers. It will start fruiting from 4th year and matured from 7th year. 4th year



expected yield is 50 Kg. and Minimum fetch rate is 50 per Kg so each farmer will produce 1000 Kg high quality dates and Rs.50000/- income from it and all 100 farmers will produce 100000 Kg dates and income will be generate Rs.50 Lacs in first fruiting year.

It will increasing year by year till 7th year, when dates plants matured and after that 2000 plants produced 300000 Kg expected high quality dates and expected income will 1.5 Cr. Approx.

Five farmers are cultivating Dragon Fruits in 2 acre each – Total 11000 plants.



Women Empowerment Projects

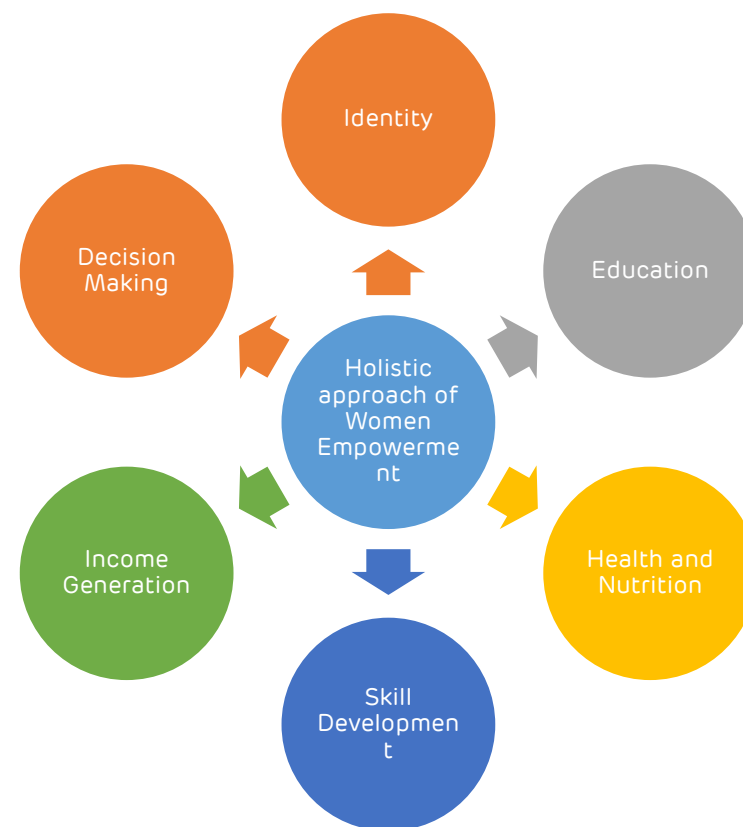
Women are central to the entire development process, be it in an individual family, village, state or to a nation. Adani Foundation provides platform to community women to break the ceiling and move out as a change makers in their communities and among societies keeping their traditions intact. A considerable change has been witnessed in Mundra in terms of development of women beneficiaries in various fields of occupation like farming, self entrepreneurship, agriculture, etc. Adani Foundation has a special focus on empowering rural women and uplift by providing sustainable livelihood support resulting socio-economic shifts in rural population.



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 focuses on is all parameters as a part of holistic approach towards empowering Women.

- Education – **More than 1200** girls are impacted under project Utthan. Project promotes girl child education, Creating awareness through various Govt schemes like Vahali Dikri Yojana, Sukanya Samriddhi Yojana and others.
- 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 groups** 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 **115** Roof Top Rain Water Harvesting is supported for hassle free household chores. **1057** families are supported for Potable water at Fisherfolk settlement to reduce drudgery of women.





Total 15 Active SHG Groups are engaged as mentioned in table Income generation activity. We facilitate them capacity building training for quality ,Marketing Finance and team work to made them self sustain.

Major Achievements:

- Saheli Swa Sahay Juth have **completed order of 15000 Sanitary pad** from District Health Department.
- **"Shraddha Saheli Sva sahay Juth"** has won 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.
- Shraddha Saheli & Jay Adhar Saheli have been registered in FSSAI (Food safety and standards Authority of India.
- Turn over of Tejaswi Saheli, Shraddha Saheli and Meghdhanush Saheli is **@ 40 Lacs till date.**

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, Stiching	13
6	Jay Momay Saheli Swa Sahay Juth	Tie & Die, Stiching	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	Stiching	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	Stiching	10
			168 Members in Group



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: 20721013000245		
1. Name and permanent address of Food Business Operator (FBO)	JAY AADHAR SAHELI SVA SAHAY JUTHI BAROI, Baroi, Mundra, BHUJ(KUTCHH), Gujarat-370421	
2. Address of location where food business is to be conducted / premises	BAROI, Baroi, Mundra, BHUJ(KUTCHH), Gujarat - 370421	
3. Kind of Business	General Manufacturing	
4. Photo Identity Card	N/A	
<small>This Registration Certificate is issued under and is subject to the provisions of FSS Act, 2006 all of which must be complied with by the petty food business.</small>		
Place /	BHUJ(KUTCHH)	Registering Authority
Issued On /	12-03-2021 (New Registration)	
Valid Upto:	11-03-2022 (For details, refer Annexure)	
Annexures: 1. Product Annexure 2. Validity Annexure 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://foscos.fssai.gov.in) with your user id and password or call us at 1800112100 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 Resource Center

Adani foundation acting as bridge between Government and needy beneficiaries to facilitated government scheme leverages since 2015. and after our efforts and observation, we decided to established Community resource center, where people can have easy access for Guidance and complete all necessities document for Government Scheme.

CRC is Located just near to Mundra Bus stand and known to all People.

In the year of 2021-22 Total 667 people have benefitted through CRC center.

Total 2243 beneficiaries have been benefited and get support through Government and Adani Foundation. Among them more than 712 people have been getting financial support as Monthly base that is. Rs16.Lacs.



Scheme Detail	Beneficiaries 2021-22	Remarks	Total Beneficiaries	Revenue Convergence (Rs)
Senior Citizen	10	Rs.750/ Month	104	78000
Online Application	13		13	
Widow Pension	289	Rs.1250/ Month	526	657500
Medical Certificate	59		59	
AF Support	32		32	
Divyang pension	2	Rs.1000/ Month	7	7000
E-Shram CARD	8		8	
Divyang Job	14		14	
Sukanya	123		123	
Vahali Dikri	23		23	
Bal Yog Yojna	51	Rs.2000/ Month	51	102000
Covid -Support	13	Rs.50000/ one time	13	650000
Aditya birla Scholarship	30		30	
palak mata pita		Rs.3000/ Month	9	27000
sanakat Mochan		Rs.40000- One Time	2	80000
Tool and Kits Support by through Government			1057	
Support By AF (Widow and Divyag)			159	
Ration support To Widow and Niradhar			13	
Total	667	0	2243	1601500

Project Swavlamban

Project Swavlamban Launched with an aim to make **differently abled people of MUNDRA TALUKA self sustainable.**

Our objectives:

- To increase awareness about Government schemes for Divyang people, widows and senior citizens and coordinate them with Social Welfare Department, Government of Gujarat.
- After getting income generation equipment support - Proper training provision to make them self-reliant in true sense!!
- Adani Foundation is playing key role as facilitator in case of tie up with Government Scheme for Widows, Senior Citizens and Handicapped people. The identity cards are issued for the handicapped in coordination with Bhuj Samaj Suraksha Khata which is beneficial for them to get specific kit for their disability type. This year **154 beneficiaries** linked up with pension scheme.
- The financial benefit of the senior citizen Yojana is Rs. 500 per month and the widow scheme is of Rs. 1250 per month. Jilla Samaj Suraksha Officer and team remain present every time.



Community Infrastructure Development

Building a strong community relationship is the key to progress of Adani Foundation. The programs such as Education, Health and Sustainable livelihood development play a very important role in building this strong relationship with the community. These three programs are incomplete without the inclusion of the Rural Infrastructure Development program.

This year on path of sustainability, we have taken some steps as follows...

Under Fisherfolk Development Project, Adani Foundation has constructed 46 shelters at Randh Bandar with pre cast structure. Fisherfolk Community cum Training center is the biggest project of current year and will also create impact as a boon for fisherfolk youth for various trainings.

Balwadi development work at Bandar and Shed for Adani Skill Development Center for technical trainings will also improve quality of many lives in true sense.



- 23 Fishermen of Randar bandar are benefitted to Pakka House constructed under AF Fishermen Avasa yojna
- Renovation and Up-gradation of Check Dam & River Rejuvenate work at siracha and Bhupur villages.
- RRWHS & Bore well recharge Construction at Various Villages.
- Basic amenities and maintenance and repairing work at all Fishermen vasahat.
- Community gathering and training Center construction at Different villages
- LED Street Light and Sky Lifter Structure at Municipality Mundra Baroi.
- Supply & Fixing of Hi Mask Tower at Gundala village work.

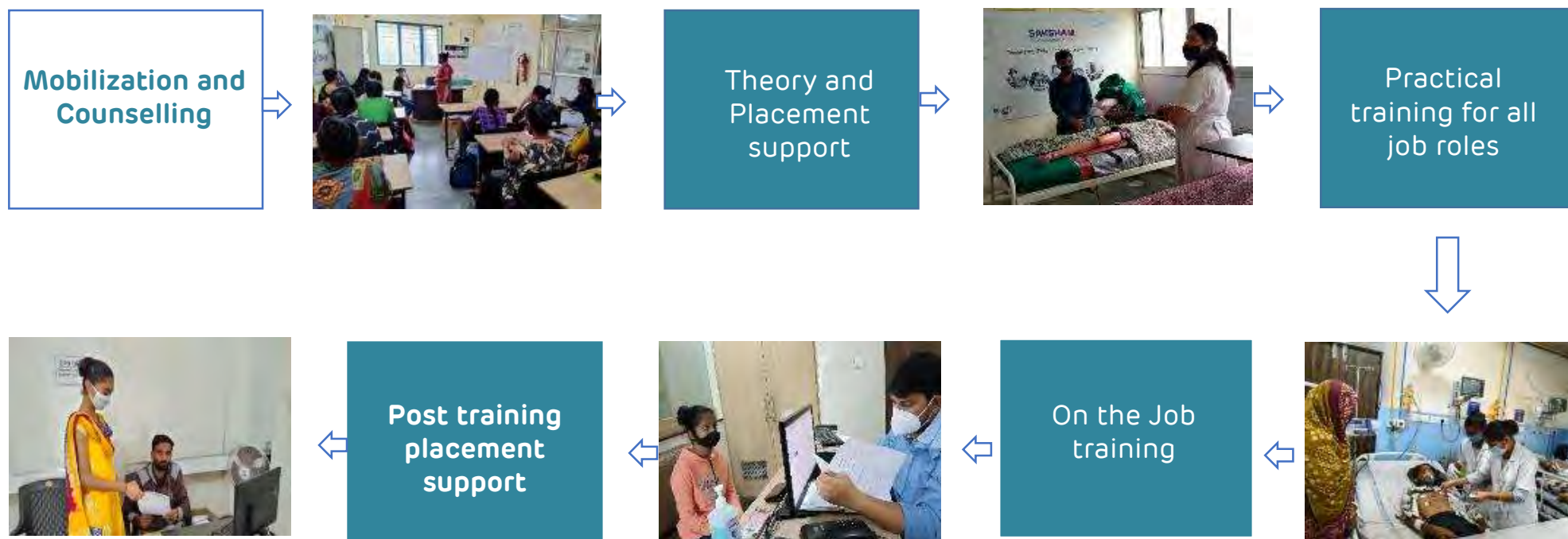


Adani Skill Development Centre

A section 8, not-for-profit company, registered on May 16, 2016, 'Adani Skill Development Centre' is an initiative of Adani Foundation. ASDC focuses on skill development activities to contribute towards nation building by bridging the skill gap demand & supply, in line with Government of India's Skill India Mission.

"SAKSHAM" is an ideology of the Adani Skill Development Centre to make youth of India 'SAKSHAM' (capable) of achieving their goals in life by becoming skilled professionals.





A strategic model of skill training is implemented by ASDC in which Mobilisers visit remotest locations to encourage youth and women to get skilled, Counsellors provide in-depth information and assist in suggesting need based course, Certified trainers with expertise provides theory and practical training. Trainees are provided with soft skills sessions and interview preparation sessions to make them employable and industry ready. For each batch, ASDC team will arrange Panel Interviews and Campus Interviews for trainees to get directly selected as soon as they complete training.



Practical Training : As a training part we are conducting other activities. We have conducted Learn with Fun activities, Parents Meeting, Certificate distribution program, Preparation for Interview etc.



Women's Day Celebration : Conducted 7 days seminar to empower female candidates in line with International Women's Day theme. More than 60 women participated.



Educational Exposure Visit of GDA candidates (DDU-GKY) at K. D. Hospital Ahmedabad. 21 candidates visited.



Guest session organised for trainees to provide them soft skills training and make them industry ready with a dose of motivation.



Certificate distribution to GDA batch Students

Course wise Admission Bhuj

Name of Trade	Total
General Duty Assistant	90
Digital Literacy	42
Financial Literacy	45
GST with Tally	169
Frontline Health Worker	11
Welding Technician	1
Basic Functional English	5
Beauty Therapist	5
Logistics & Supply Chain Management	1
Junior Crane Operator	3
Occupational Safety and Health Administration	1
Pedicurist and Manicurist	2
Domestic Data Entry Operator	2
Diet & Nutrition	41
First Aid	81
Total Admission	499

Name of Trade	Bhuj	Kutch University	Chanakya College	DDU-GKY	Total
Total Admission	97	179	191	32	499

Name of Trade	Total Trained	Placement	Self-Employed	Upskilled
General Duty Assistant	32	10	0	22
Digital Literacy	38	0	0	38
Financial Literacy	20	0	0	20
GST with Tally	92	0	0	92
Beauty Therapist	3	0	3	0
Junior Crane Operator	3	1	0	2
Pedicurist and Manicurist	1	0	1	0
Domestic Data Entry Operator	1	0	0	1
Diet & Nutrition	41	0	0	41
First Aid	41	0	0	41
Total	272	11	4	257

Name of Trade	Mundra
Basic Functional English	170
Digital Literacy	152
Self Employed Tailor	120
Pedicurist and Manicurist	107
Junior Crane Operator	54
Mason General	42
Bar Bender and Steel Fixer	42
Dori Work	22
Mud Work	18
Assistant Electrician	10
General Duty Assistant	6
GST with TALLY	5
Beauty Therapist	2
Data Entry Operator	3
Checker	1
5S	1
Total Admission	755

Placement Details for the F.Y. of 2021-22 (Mundra)

Name of Trade	Total Trained	Placement	Self-Employed	Upskilled
General Duty Assistant	6	0	0	6
Digital Literacy	99	0	0	99
GST with TALLY	5	0	0	5
Mud Work	18	0	18	0
Basic Functional English	105	0	0	105
Dori Work	22	0	22	0
Junior Crane Operator	46	25	1	20
Data Entry Operator	3	0	0	3
Pedicurist and Manicurist	27	0	27	0
Self Employed Tailor	29	0	29	0
Total Admission	360	25	97	230

CSR Nakhtrana

Adani Green Energy(MP) Limited (AGEMPL) proposes to setup an integrated wind energy project as Green Energy Works which includes Limestone 750 Mw, Through approx. **1250 windmill** at Dayapar to Nakhtrana in District Kutch (Gujarat).

- Socio economic survey of Widow women and than linked with Government Widow pension scheme Rs.1250 /Month. Total **246 widow women have been facilitated with Widow pension scheme** with convergence of Rs.307500 /Month on Regular basis.
- **Till the date 22 Bore well** were recharged at Ugedi and Deshalpar Villages. Two pond deepening work and **4 Old check dams** were repaired. Tree Plantation at Jinjay & Ugedi Villages Primary schools.
- **Government Scheme Awareness Session** was held at Deshalpar village on the silver Jubille of Foundation day .
- **Distribution of 1000+ Mangoes Sapling** to farmers of Ugedi and Deshalpar Villages for promotion of Horticulture farming.



CSR Lakhpat

Adani Cementation Limited (ACL) proposes to setup an integrated cement project as Lakhpat Cement Works which includes Limestone Mine in 251.9 ha area.

Main focus of Adani Foundation is to prevent community from life threatening diseases and provide basic healthcare services.

Activities:

- Barred land of the Kapurashi crematorium afforestation with **2222 different type of trees in collaboration of forest department and Bhagvati Gramaya Vikas trust**. Arranging **water pipelines to facilitate regular watering** of plants to ensure nurturing. Impact: Attracts peacocks and other birds at crematorium site.
- General health camp and specility health camp was arranged frequently at villages. More than **425 Patients were diagnosed and refer to GK General Hospital** for further treatment and operation if needed.
- Sewing machine training was conducted Kapurashi women. Main objective of the training was to empower women to boost their self confidence and thus financial independency,



CSR Tuna Port (AKBPTL)

Adani Kandla Bulk Terminal Pvt. Ltd. is joint venture of Adani Ports and SEZ Limited and handles all types of dry bulk cargo including coal, fertilizers, minerals, industrial salt and agriculture products.

Various activities were carried out for the community development under core areas of Education ,Health ,SLD & community Infrastructure of Tuna ,Ramapar Vandi villages and Fishermen vasahat

Rural clinic and MHCU

Basic health facilities is being facilitated through Rural clinic Rampar, vandi and MHCU to vira bandar.

Specialist health camp was arranged at Tuna Villages. More than **184 patients was diagnosed and treated** as well as suggest to GKGH for Further test and treatment.

Drinking Water

Potable water supply to Dhavlavaro and Vira bandar vandi villages impact on fishermen health to reduce water born disease.

Covid Vaccination camp

covid vaccination camp was held at AKBPTL for labors and security Staff through government health department.

Fodder support

Fodder scarcity is always remained prime need of farmers which is being resolve through Fodder supply intervention to Rampar and Tuna village from April to July -2021 which improved cattle health and milk quality.

26680Kg Dry fodder support

721855Kg green fodder support

Pond deepening and bund strengthen of Rampar village pond increase water storage capacity.

Construction of Community gathering center at vandi village provide access for community function and training as well.

Water pipeline installation near to Rampar village pond to Watering tree planation which was developed by villagers and maintain regularly.



CSR Bitta

One of the Largest single location solar power project was commissioned by the Adani Group at Bitta, in Gujarat in year 2011. It spans a vast area of 450 acres. The massive plant comprises 2 lakh solar modules, 73782 foundations, 4500 tons of structure, 2800 km of cables, 56 inverters and 33 transformers. And now fully operational mode as well as connected with the 66 kV GETCO substation of GETCO TO powering 16,326 homes in a suitable manner and for the Sustainable rural development various Activities was carried by AF as mentioned.

- Avail Dinking Water and drainage line facilities by availing pipeline connection to Dhufi village which reduce drudgery and lead toward 'Swachh village'.
- Repairing and maintenance Bavnipar village cricket ground to offer hassle free playing ground as well; crated strong repo with Youth.
- Cleanliness of village Pond inlet in the Bita Village which lead more storage capacity and Village. Pond bunding construction in Dhufi village.
- Support Bita Primary school with Four Solar Light which reduce Electricity consumption and nurture renewable energy concept.
- Pota container and LED light support at Mathla check post for security and safety purpose.
- Cleanliness awareness session was conducted with Cleanliness program with youth involvement to create my Village clean village concept.
- Panchayat Building construction was carried out by Adani Foundation's support and technical guidance.

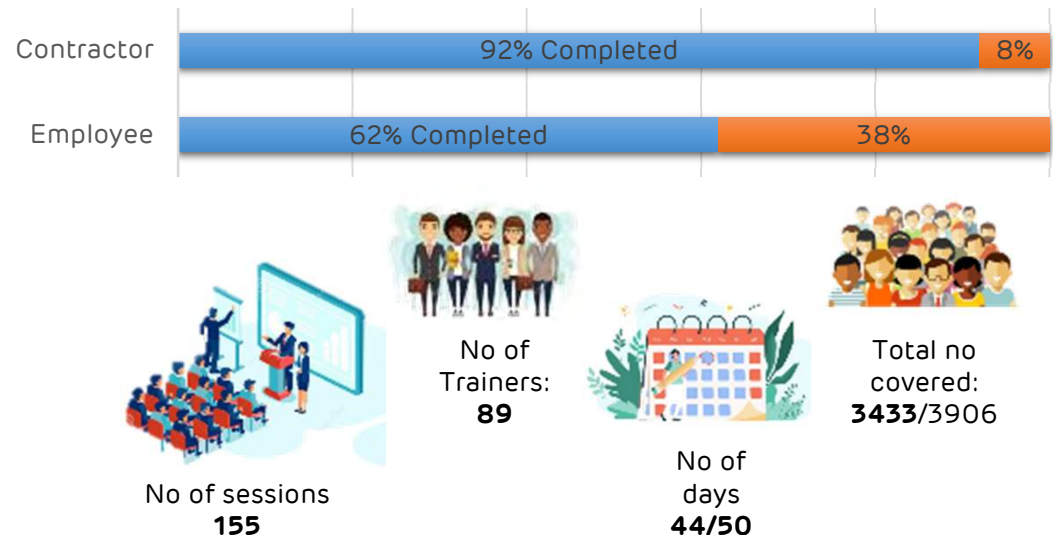


Dignity of Work Force Programme - EVP



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 galvanized 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 labors 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.

“जन जन को जगाना है, टीबी को भगाना है”



Dignity of Work Force Programe - EVP



"Joy of giving week" celebrated by employees of APSEZ and AWL by distributing clothes and stationary items to labour workforce of APSEZ.

More than 7500 Clothes distributed to 650 workers of Labor Colony.

Support to children Vallabh Vidyalaya

In year 2018-19 year Adani group employees has adopted **704 students** and in year 2019-20 adopted **800 students** who are from families of migrant labourers working in various industries in and around Mundra.

And in 2021, **997 students were registered and** to make employees connected with children Vallabh Vidyalaya regularly send progress report twice in a year. Current year Women group of Samundra Ladies has donated Rs. 55,000 for support activities of School and motivation to teaching staff in street education.



De-addiction Awareness Campaign is going on with "Prajapati 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. In this series of event 225+ labours remained present and 9 labours took pledge to leave liquor and Tabaco.

Events

Community Resource Inauguration

Inauguration of '**Community Resource Centre**' to support and facilitate community regarding various government schemes.

District Magistrate of Kutch Ms.Pravina D,K , IAS, District Development Officer was guest of Honour. Other dignitaries present was Mr Bhavya Verma – IAS ,Director, DRDA Mr Joshi , Director- Social welfare office Mr Arvind Rohadiya, Mr Chaudhary Sub Divisional Magistrate , Sarpach and volunteers from villages were remain present.

'**Schematic Guideline book super -51**' book launch on 3rd April . Book consists in-depth scheme information on , Health, Education, Fisher folk based schemes and Social welfare schemes.

All dignitaries along with National Rural Livelihood Mission (NRLM) **visited to Sanitary pad making unit**, ensuing support to create sustainable Group.



International Day of Persons with Disabilities

International Day of Persons with Disabilities is an international observance promoted by the United Nations since 1992. Since 2011 – **Adani Foundation Mundra is celebrating the day with enthusiasm and Zeal in coordination with District Social Welfare office** by planning various support to divyang people.

Adani Foundation has supported **more than 35 Divyang** to initiate their livelihood i.e. Stitching, Flour mill, Ration shop, E-Rickshaw, Gift Shop and Agarbatti making machine. In connection with this, current year Adani Foundation has organized '**Divyang Employment Fair**' in coordination with more than 14 Industries of Mundra on 1st December 2021. Same platform was utilized for distributing "**E-Shram Card**" with Labor Commissioner of GOG which will give benefit of Rs. 2 Lacs accidental Insurance and unique pension scheme (3000 INR per month for any Divyang after age of 60 years) for all Disable people of Mundra.

Total 28 Divyang had applied for interview and out of them 11 received confirmation for job. Apart from this 92 E-shram cards were developed.



World Wetlands Day programme

Adani Foundation, Mundra and Gujarat Institute of Desert Ecology (GUIDE), Bhuj-Kachchh has jointly organized the **World Wetlands Day programme on 2nd February 2022**

Shri. V. S. Gadhavi, IAS (Retd.) was the chief guest proceeded by Smt. Pankti Shah and officials from Adani Groups and Adani Foundation along with Dr. V. Vijay Kumar, Director, GUIDE and scientists from GUIDE were participated in the programme.

Eminent personalities; Prof. K. Padmakumar, Former PVC Kerala University of Fisheries and Ocean Studies, also Director, Centre for Marine Biodiversity, Department of Aquatic Biology and Fisheries, University of Kerala delivered an enlightening talk on "Mangroves Ecosystem – Global and Indian Perspectives".

Prof. I. R. Gadhvi, Head, Dept of Marine Sciences, Maharaja Krishnakumarsinhji Bhavnagar University delivered a talk on "Mangrove Scenario of Kachchh" and in his talk highlighted the increase of mangrove cover especially in Kachchh district.

Dr. Sheetal Pachpande, Mangrove Foundation, Mumbai delivered a talk on "Mangrove Interpretation Center" that highlighted replication of such centers in Mundra, Kachchh for enhancing the knowledge among students, naturalists and local inhabitants in mangroves and marine sciences.

Students from the HSC Science school of Mundra Block are Participated in Drawing competition and Students from Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar; Atmiya University, Rajkot Did paper presentation. Among them declared 1st winner for Paper presentation and 1st to 5th winner for Drawing competition as well Provide Precipitation certificate to all.

Apart Them Site Head and Adani foundation and All site head were remain present Virtually Program is conveyed by Mrs Panktiben Shah –UCH and concluded by Shri. V. S Gadhavi, in which he has pointed out the conservation and management of coastal and mangrove ecosystem and the need for the preparation of long-term action plan for the effective conservation of the same.



International Women's Day

Activities:

Bhuj

- Session on Gender Equality and Women Empowerment at G.K General Hospital, Bhuj. The guest of honour was Mr Nimaben Acharya, Speaker, Gujarat Vidhan Sabha.
- Felicitating **Disha Gada**, a woman pilot who rescued 275 students from Ukraine.

Mundra

- Session on Importance of Health and Hygiene for women organized in association with Rotary Club at Mundra.
- Honored 230 women of best two blocks of Anganwadi with certificate and memento for their successful contribution at work.

Nakhtrana

- General Health camp was organized at Nakhtrana Gram panchayat specially for women in collaboration with GKGH.
- Utthan
- Recreational activities for woman sahayaks, Educationalist, Principals, Sarpanch of 42 Utthan schools.

2059 Women participated in celebration of Women's Day week.





Fishermen Youth Employment Training

Inauguration of Technical Skill Development Training Program for the Fisher folk youth by Adani Foundation

Adani Foundation and Adani Skill Development Center had jointly inaugurated of the **"Technical Skill Development Training Program for Fisher folk youth on 10th January**. To Promote long-term socio-ecological effectiveness through focused interventions like employment through Skill enhancement and "To improve fisheries dependent households

In Phase I, 51 fish folk community youth will be skilled and certified in job roles like Assistant Electrician, Mason and Bar bender under 90 days training program supported by placements.



World Environment day Celebration

- Adani Foundation celebrated World Environment day on 5th June with Inauguration of Maiyawanki forest development.

Activities done on World Environment Day:

- **MOU with KSKV Kutch University** and Adani Foundation to provide technical guidance on **'Cow based'** natural farming.
- Conducted **training on 'Jivamrut' and 'Vermi compost preparation'** to farmers promote cow-based natural Farming with Home Bio-gas distribution.
- **Inauguration of Miyawaki forest developed at Nana Kapaya village** in 2.5-acre land with collaboration of Forest and Manrega Department and Gram Panchayat participation.
- **2000 trees have been planted with spreading awareness among people at various places of Mundra, Nakatrana and Tuna location.**



Adani Foundation Day

Silver Jubilee of Adani Foundation was celebrated on 11th August at Adani House Mundra. **11 women** were felicitated who have done Remarkable work in the their filed of Agriculture , Education , Entrepreneur, Government and having special recongnization among society and Communities for their work by Shree Rakshit Shah, Executive Managing Director- APSEZ and HR Head- APSEZ.

Also felicitated first fisherman youth- Shakil Manjaiya with Offer letter to work with APSEZ after completing Mechanical Diploma.



World water day celebration

World water day was celebrated on the Theme of "Groundwater, making the invisible visible" at Adani House auditorium **felicitating all progressive farmers with a memento** who have done remarkable work for water harvesting and management as an individual and at village level.

The event was graced by chief guest, Mr. Dipeshbhai Shroff, President of Kutch Nav Nirman, Mr. Rakshit Shah- EDM ,APSEZ , Mr. Yogesh bhai Jadeja Director of Arid Community and Technology, Mr. Niraj Kumar, Deputy director of NABARD ,Kutch.

Mr. Rakshit Shah, Executive Director, APSEZ expressed compliments to all **14** progressive farmers for their exceptional work for water conservation and management.



International Coastal Cleanup Drive

Indian Coast Guard, Adani Foundation team, NGO team, Students of SV Arts and Commerce College unanimously dedicated a day to clean Mandvi Beach and to create awareness among local community towards save guarding coastal areas by becoming responsible citizen towards clean ocean.



Utthan Second Phase Inauguration

Inauguration of Phase II of Utthan was inaugurated on 28th September spreading its impact to more 14 schools. On this occasion District Primary Education Officer, Utthan schools Principal and teachers have graced the occasion.

"Like an Oasis in a desert"

Dema ben's family has returned home from a neighbour country in 1971 war. Today Demaben is happy to be in her own country but prior to that she and her family faced lot of stress and underwent a lot of trauma living in a conflicted place away from home.

She lives with her Husband and daughters. Her one daughter is suffering from mental illness and completely dependent for care. Her husband is doing labour work in farms. He is sole bread earner of this vulnerable family. Being single earning person of the family doing labour work and a responsible father of a dependent daughter, his income is never sufficing which creates constant distress in family. Her willpower is strong, but all these did a toll on his health, and she suffered constant headache, Fatigue, High Blood Pressure, Nausea, etc.



Demaben Umed
Village Pragpar-2, Kutch

Dr. Mukesh Parmar, Adani Foundation inspected her condition, her BP was 197 /97 mmhg. He immediately started symptomatic treatment and later second follow-up, Dr started anti-hypertensive treatment and provided required medicines and advised her some lifestyle changes and list of food items to add in her regular intake of meals. On regular follow-up checkups and treatment, Dema ben followed her road to recovery. Dr has witnessed steady progress in her health, and she finally got a relief from a disease.

She expresses gratitude in her vernacular language expresses Adani Foundation as 'વિરાન જંગલ મા મીઠા જલ ની વિરડી સમાન' meaning 'Sweet water well in barren Jungle'.

"Live many more years Chacha!"

Ramzan Adam Chacha lives with his family at Juna Bandar. For the last 8 years he is the victim of Kidney Failure. He needs to go for dialysis regularly. However, the treatment facility was only available in Bhuj which compelled him to travel to Bhuj for 2 days in a week. He had to skip his work for the days, if there is any delay in his dialysis routine, which is very difficult situation for a fisherman whose income depends on daily catch, he need to skip his work to rest. Moreover, in his thin financial position, it was difficult for him to arrange money for the treatment and transportation too was a big issue. Learning about dialysis centre at Adani Hospital Mundra, he approached for aid from Adani Foundation.



Ramzan Adam Chacha
Village Shekhdiya, Kutch

In no time Adani Foundation team planned a routine dialysis for him against no cost. Earlier he used to visit thrice in a week and from the last two years, he is coming twice in a week. "Watching him every year is the biggest source of inspiration for not just me but our whole team. I wish Chaha to live many more years" says Manharbhai, Adani Foundation Employee.

"Mari toh umer vadhari didhi Adani Foundation e, treatment ma sahay kari," chuckles Ramzan Chacha in his local language. Meaning "Adani Foundation has prolonged my age by providing Dialysis support for the last 8 years".

: 'Hands are softer than a stick'

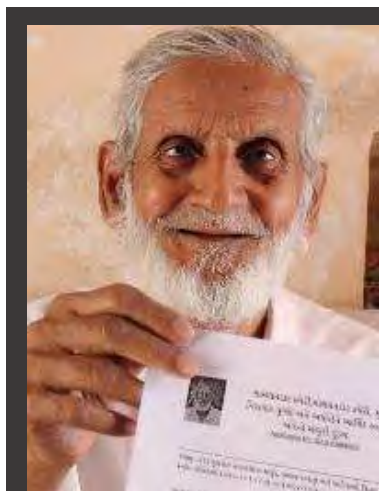
A senior citizen named Suleman bhai hails from Pragpar village. Father of 6 girls out of which 5 got married. He lives with her wife and 1 daughter. Both Suleman bhai and his wife are senior citizens. Being a father of 6 girls, Suleman bhai was concerned about his financial situations, this did not stop him from giving best life to his daughters. 5 of them got married and youngest one is graduated. Suleman bhai and his wife along with daughters used to work as house helps and did labour work to earn living.

Due to their slim economic condition and constant labour work, Suleman Bhai's health started deteriorating. He started having blur vision, watery eyes and constant discomfort in his eyes. On consulting doctor, he got to know that he needs to undergo cataract surgery for both his eyes. It was heart wrenching to know for the family as the cost of surgery was too high. Someone recommended him to consultant Doctor from whom he got to know about 'Adani Vadil Swasth Yojana' under which Adani provides necessary health care support to senior citizens who are from underprivileged families. He inquired about the scheme and immediately completed all the necessary procedures to avail benefit of the scheme.

After completion of necessary formalities, He got his cataract surgery done for both the eyes on pro bono basis. He and his family were overjoyed that the surgery happened on time, saving his eyes from complete loss of vision. From here, Sulemanbhai stayed in constant touch with Adani Foundation team as a family.

He was also counselled about Vrudh Pension Yojana scheme of government by concerned Adani Foundation employee under which seniors above the age of 60 receives Rs. 750/- monthly in the form of pension. Adani Foundation has a dedicated group of employees working for rural senior citizens providing liasoning support to avail benefit of schemes to support the community. Under 'Vrudh Pension Scheme' both Sulemanbhai and his wife received Rs.1500/- every month. It might not be suffice but for them, it's like a shade of tree from scorching heat.

On receiving amount for the first time, they contacted AF and expressed gratitude. He also encouraged his daughter Ruksana to spread awareness about these schemes to fellow villagers so that they can also get benefit from these schemes.



Suleman Mamad
Kevar
Village : Pragpar

A naturalistic learner, shines bright in the class!

We have been fascinated to see how the holistic development took place in Seda Malshree Karaman, studying in class 5. An introverted student transforming into a dynamic learner is not only surprising to us but also to her family members. Mr. Mahendrasingh Solanki, School Principal of Zarpara Shala no. 3 says "I would like to congratulate Utthan team and Utthan Sahayk named Rajendra Chauhan for his commendable work in empowering progressive students and bringing them in line with average and above average performance level."

Malshree's story of transformation began during the pandemic period when schools were shut, and education was made available for the students at their doorstep under the title 'Sheri shikshan' provided by the Government of Gujarat. Seda Malshree Karaman was in class 4 in 2020. However, she is finding difficulties with the minimum level of learning.

During the home visit, Rajendra(Utthan Sahayak) met Seda Malshree. Initially, dealing with an introverted child was challenging. But slowly, within 10 days, he could boost her confidence.

On mentoring her regularly, Sahayak identified that she was a 'Naturalistic learner'. From the very next day, he started teaching Malshree with multiple natural resources which are easily available at her residence lived in 'Wadi'(backyard). This was observed by her parents too. Slowly and steadily, Malshree took an interest in language and arithmetic. Gradually, Mr. Rajendra measured her learning outcomes by conducting a timely assessment. Her academic growth inspired other students too to give a lot of attention during classes. Today she is in class 5 where she can read, write, and do basic arithmetic calculations.



Name: Malshree Seda
School: Zarpara Shala No. 3



Hanif Mohammad
School: Deshalpar Group Shala

As Sunflower faces Sun, Progressive students always look forward to Sahayaks

Hanif, a small child was abandoned by his parents. Such young boy might even don't know what happened to him and why his parents left him. Hanif might not ask these questions today as he is too young to absorb all of it but it did affect him mentally and emotionally. It was obvious to feel isolated and different from other fellow student.

On one side, he is dealing with this somber transformation in life and adapting to living life with his uncle and aunt, and on other side, he has this immense interest and curiosity towards knowledge but lacked direction in life and also in academics. Under project Utthan, the purpose is to identify and uplift progressive students and bring them at par with fellow students. To do that, it's the duty of Sahayak to know a student inside out and that's what happened to Hanif.

On regular interaction, Uthhan sahayak motivated Hanif and taught him to start reading and practice writing skills. With consistent efforts Sahayak managed to make Hanif regular in school and made sure he does his homework daily. Not just that, Sahayak shared inspiring stories and motivated him to participate in 'Bal Mela Program' in which Hanif with the support of Sahayak prepared a Wind Mill from the waste. The project was successfully exhibited receiving appreciation from the visitors at Mela.

It is said that 'Distraction heals Pain' and in Hanif's case, he has completely changed his focus from pain towards his passion for learning. Hanif is rejuvenated to learn in this new academic year holding Utthan Sahayak's hand.



Anju Chauhan
Village : Zarpara

Uplifting progressive students

Little Anju studies in class 4th of Zarpara Primary School. She was in 2nd Class when the lockdown declared. Unlike urban schools, rural students do not get a chance to immediately start learning through online platforms. In such situation, Utthan Sahayak initiated online teaching and mentoring and tried to reach out to rural students who do not have access to mobile phones in their families.

Anju could not cope up with her education for 2 years and when she resumed school, she found out to be a progressive student due to her inability to read, write and count. School teachers noticed Anju's poor performance and handed over her case to Utthan Sahayak. It took few months, where one to one mentoring and teaching sessions were arranged for Anju and dedicated Utthan Sahayk made rigorous efforts to improve Anju's performance till examinations, preventing her from failing in class.

"Hard work and consistent efforts of Anju is appreciable. Yes, the start was tough but I was determined to bring Anju out of progressive students zone to average learner and we did it successfully." Says Bindya, Utthan Shayak

Adani Foundation as 'Moonbeem in Valima's lightless life.'

Valima is a senior citizen with disability (blind with both eyes) residing at Gurjarvas of Kutch District. Living in extremely poor condition. Her story is heart wrenching. She has proved to be an epitome of strength. She is a strong woman and even stronger as a mother who is taking care of her divyang and mentally challenged daughter who is 30 years old as of 2021.

One could get goose bumps to witness how this old blind mother takes care of her divyang daughter. Valima's two sons got married and started new life leaving mother and sister to suffer and survive on their own. With no vision but only pain in her eyes, Valima has fulfilled all responsibilities but now she is old. Adani Foundation's encounter with Valima was a beginning of the end of her problems. Earlier when her husband was alive, he used to make arrangements for family's survival. But now, Valima being blind and living in remote area is unaware of any of the schemes which can ease her living. Moreover, to get support from any of the rural development scheme, one needs identity proof and documents. Kanta, her daughter was not even having her identity proof, Valima was unaware of her widow pension rights and the support provided to divyang by government.

Here comes the role of Adani Foundation, to support the most needy and vulnerable who is completely devoid of information and their rights. Under project swavlamban, Adani Foundation provides end to end support to senior Citizens, Divyang and Widows. Adani Foundation team assisted Valima to get necessary documents first. Starting from Ration card, Adhar Card, Voter Id, Disability card and Bank account was requested for her daughter and mother from respective departments. Post completion of all necessary compliances for documents, Valima started receiving 'Senior Citizen Pension', 'Widow Pension' and got free 'Bus Pass' for their ease of mobility.



Name: Valima L.
Sibhi
Gurjarvas, Mundra



Narpant Singh Jadeja
Village Hatadi, Ta. Mundra

Overshadowing disability with his ability to make living.

Narpat singh resides in outskirts of Mundra. He lives a simple life. He, being Divyang, is unable to walk. Before few years, Adani Foundation provided him wheelchair for his ease of life. That's when he met Foundation team and stayed connected. His life was in routine before pandemic. He used to run flour mill and earn basic livelihood. At times, the mill does not work and creates problem. In those situations, Narpatbhai himself juggled with spare parts and repair it.

In 2021, His flour mill stopped working. He tried repeatedly but could not repair it by himself. Due to his less mobility, he was not able to move out and explore other options to repair it. With damaged machine, his income also stopped, and he got worried for his living. He contacted Adani Foundation again for the support. On inspecting his machine's condition, Adani Foundation decided that it does not require repairing, it requires total replacement.

Narpat Singh took a breath of relief as he was provided with new flour mill. 70% cost of flour mill was borne by Adani Foundation and 30% by Narpat Singh. Hearing about his new flour mill, villagers again started visiting Narpatsingh and his earning rose to 8000/- from 6000/- monthly.



Shakil Manjaliya
Village : Luni, Ta. Mundra

"From AVMA to APSEZ, Fishermen communities pride"

"From fishing to studying, from helping to hold a pencil to helping to have a social position, from my first book to my first offer letter, Adani has played a key role in my life." Proudly states Shakil

Shakil, A first generation learner of a fisherman community has studied in Adani Vidya Mandir School. It is an initiative of Adani Foundation to establish a school to provide free education to underprivileged and economically challenged community children providing best in class education for their bright future.

Hailing from fisherman community whose income mostly depends on daily wages, it was impossible for his parents to bare the cost of his education. Learning about Adani Vidya Mandir school, they applied for his admission. They fulfill the criteria of a deserving family and shakil's journey of change began by studying in school. He got 78percentage in 10th standard, which motivated him to pursue engineering stream. He then, successfully completed Mechanical Engineering Diploma course and applied to APSEZ.

His intelligence and hard work surpassed his poor financial conditions. All the struggles he and family faced due to low income have come to an end. Shakil says "I used to dream in Adani Vidya Mandir that one day I will work and earn enough to change my family condition."

It's a fruit of his continuous sowing of hard work and dedication that he reaps employment in APSEZ. He got his first offer letter from Mr Rakshit Shah, EDM, APSEZ. Not just his family but even his teachers of Adani Vidya Mandir are proud of him today to see him grown so far and starting his career as first generation learner of his family who has managed to get livelihood in the form of job. Small steps taken for years will now lead to an socio-economic shift for all those fisher folk young boys and girls who have completed their education and will enter into a professional world with a dream to bring out community from a difficult living to an improved standard of living.



Ishaq
Village : , Ta. Mundra

"There is no greater disability in society, than the inability to see a person as more." – Robert M. hensel

Ishaq is a young 29-year-old responsible husband and a sole bread winner of a family. He was 14, when he got hit by Polio. He managed to complete his schooling and got H.S.C cleared successfully. He also achieved computer diploma degree to cope up with the present work scenario. Hailing from a Fisherman community, he is a first-generation individual who dreams to get employment. He always dreamt of working with Adani but never applied as he thought he is not ready yet. Therefore, He decided to get work experience for couple of years and apply confidently.

On one occasion where Adani Foundation organized 'Divyang Rojgar Mela' where Ishaq applied in an interview and showcased his knowledge, skills and dedication towards work. *Looking at his zeal and agility towards work and his preparedness, he was offered a job as a weight-bridge operator Job in APSEZ.*

Ishaq elated receiving an offer let his dream company and made his community extremely proud.

With open arms, Adani always welcomes Talent Divyang and Energetic Fisherman community to join hands for nation's growth with goodness.



Dipak Maheshwari
Village :

Getting back on track with Sheri Shikshan !

Dipak Maheshwari is a student of Muru Primary School. Losing his father at an early age has made him numb and inattentive in class. At first, he showed no interest in studies and slowly he started skipping lessons. His irregularity was concerning his school teachers where Utthan Sahayaks are contributing their mentorship and guidance to progressive student.

The root of his loss of interest in academics and difficulty to cope up with academics has started when his father was constantly keeping unwell and losing him has made Dipak vulnerable. He lost hope and was tired of making efforts to balance his emotions and studies. He chooses to remain at home.

On learning about Dipak's situation, Utthan Sahayak visited him to check on his mental and emotional condition. When Utthan Sahayak visited his place, Sahayak decided that it was not the right time to push Dipak to attend school, therefore he planned to teach Dipak under Sheri Shiksha teaching methodology (Study at home under the guidance of Sahayak).

Dipak found comfort and developed great understanding with Shayak and was able to grasp Foundation Learning Numeracy. Sometimes with written and other time by activities, Dipak used to study well. When he resumed his confidence and zeal back on track, Sahayak encouraged him to start his schooling again.

Utthan Sahayak keeps close contact with his family and still keeps a track on his academic performance.



Rasilaben Goyal

Right treatment at a right time !

Rasilaben is a 28year old woman from Fechariya village, Kutch. She has 6 sisters and 1 brother. Her father died due to cancer. Family's financial condition was stressful because they have incurred lot of expense for father's treatment but couldn't save him. Rasila, being the eldest among all sibling took all responsibilities on her shoulders. Loosing husband and a father of 7 children, Rasila's mother suffered a huge shock. She could not come out from the trauma and started keeping unwell. Unfortunately, her mother died in just few months after the father's demise. Situation could not get more worse than this for the family. Rasila had her uncle who used to run a small tea shop, he used to help family a bit as per his own capacity.

In 2013, Rasila started facing some health issues. She used to complaint of trouble in her stomach and also was facing gynecological problems. On her visit to hospital, she came to know that she has ulcers in her intestine. Her world had turned upside down, her siblings were not prepared to hear this devastating news. She started her treatment with a hope but continued to manage household chores and responsibilities of her siblings. But, the cost of treatment was 3,000 to 4,000 monthly, which is too much for a family to manage on their own. In such critical situation, they were in dilemma as to how to manage the cost of treatment when they don't have sufficient funds with them.

One her visit to G. K General Hospital, Rasila got satisfactory treatment but some of the medicines prescribed were supposed to be bought from pharmacy. She was not having enough money to purchase medicine regularly, therefore she approached Adani Foundation expecting some relief to support her in completing her treatment and medicines. Her issues were immediately taken into consideration, her medicines were arranged and provide to her for free.

For the past 2 years, Rasila's medicine expenditure is taken care by Adani Foundation observing fair improvement in her condition.



Ankita Bhatt
Beauty Therapist

'Smile on my client's face is my final touchup'

Ankita bhatt hails from Bhuj, kutch. She runs her own beauty parlor for the last 5 years now. Though her beauty treatment skills were good, she used to do selective basic treatment. Ankita believes, gone are the days, where we used to think this is a small service. Now, it's a booming industry where every year there is something new and advanced techniques comes up daily in beauty industry. Keeping up with industry is not an easy task.

Ankita's beauty skills were limited and stagnant and that's when she decided to take her profession seriously and master her beauty treatment skills and understanding through proper training. Also, the Covid years hit badly to small scale, self-entrepreneurs and service providers. She decided to utilize the no-rush time in developing new skills.

In Adani Skill Development Centre, online training program was a big hit in rural areas which enable women and girls to get trained just by sitting at home without Hustle. Post covid, all trainees were invited to complete their practical training at ASDC Bhuj Centre where Ankita cleared the program with flying colours and started earning better than before giving a new look to her parlour at home.

From Failures, one only gets better for the future!

"It was my mother's dream to see me working in Healthcare Industry. Even after ample efforts to get admission in GNM course to pursue dream, I didn't make it due to inadequate percentage. My confidence broke, thinking I will never get another chance to study further and will always remain a 12th pass.

I never knew any other way to fulfill my mother's dream until I learned about *GDA training course provided by Adani Skill Development Centre under DDUGKY scheme*. I decided to grab this moment to visit ASDC Centre. On my visit, I got amazed to see a hospital like setup which they call it as Practical Lab. I was well explained regarding the GDA training contents, systematic training methodology and as soon as I got to know that they are providing On the Job Training (OJT) with placement support, I got prompted to join immediately.

Unlike regular training centres, ASDC provides a lot more. *Regular guest sessions, activities and soft skills training helped us become industry ready*. Post completion of GDA course, it was the time to appear for interviews. I was confident not just because of the knowledge I gained but also because of my successful OJT period organized by ASDC. After undergoing GDA training, I became certified GDA , my lost confidence is back and I am determined to update and advance my health care skills to climb more ladders in future.

After 6 months of rigorous GDA training, OJT and placement support by ASDC, *my career kick started as Patient Care Assistant at Dr. Rashmi Shah Hospital, Kutch. I will never forget the moment when I hugged my mother and informed about my selection*.

ASDC has paved way for my successful career journey!" shares Hetal .



Hetal Purabiya
General Duty
Assistant



Hiral S. Darad
Beauty Therapist

From a next-door beautician to a professional one

"I am a 12th pass self-employed Beautician; I do beauty treatments at home. With no professional degree or certification, I never got a chance to take this work to the next level. Also, self-learning was not enough, I was looking for a training program, where I could get a mentor and practical training. In my locality, there was no option to learn beautician course and its difficult to learn from random videos. I am glad that I got recommendation from my friend about Adani Skill Development Centre, where Beauty Therapist training is provided in the form of certified course along with the planned theory and practical sessions. I got so happy thinking I will finally get to attend a professional training program which will add value to my basic skills and bring me close to my dream to become expert beautician.

It gave me lot of joy to see so many young girls and women coming to ASDC Centre while undergoing training at Centre, even housewives, working women joins courses as per their interest. In many of the cases, they have developed interest and became self-employed. One of the main reasons I love ASDC Centre is to see fellow friends/batch mates and develop a network of people with similar interests in our small town. Making friends and networking with trainees is very empowering. The reason is, we got to know stories of many women and how they are utilizing skills post completion of training course.

As I was also running beauty parlour before joining course, my aim was clear that I need to master beauty treatment skills and become professional. Not just me, but even my clients have witnessed a huge transformation in my beauty treatment methodologies post training. My training journey has been a most memorable one. Post completion of the course, my income increased significantly and the number of my clients rose to a level that most days I remain busy. "

Knowledge gives Degree, Skill gives employment.

"I am a resident of Naliya village, Kutch district. I completed my Graduation and also did ITI. Coming from a village location, I couldn't find enough of job opportunities with me. Most youth of our locality, move out of hometown in search of job but this is not an option for many of us because of the responsibilities.

Khushal adds, "as much as I loved attending GDA sessions, I also thoroughly enjoyed my On-the-Job experience because we got to experience working directly under expert nurses and learnt that patient care which is the most critical and crucial element in any hospital. It was an overwhelming experience on initial days of OJT when we had to deal with lot of patients, managing time and serving patients with right kind of care in case-to-case basis. *No wonder why Health Care Providers are called as 'Warriors'. OJT was no less than a Healthcare training camp where me and my fellow batch mates were prepared to become Warriors to provide best of care to the patients.*"

The major impact of GDA course run by ASDC Bhuj is that many young graduates who are from Bhuj and are looking for employment are preferring to come to the Centre because they don't have to move out of Bhuj to get skilled.

ASDC has provided a platform to get skilled under various courses and supports in placement which helps local residents to stay in their hometown and generate livelihood."



Khushal Pargadu
General Duty Assistant

Awards



Adani Foundation received CII National Award for Excellent in Water Management 2021 for 'Water Conservation Project' on 7th January 2022 under National Competition for Water Management 2021. The Award ceremony was announced by Union Jal Shakti Minister in virtual presence of dignitaries from CII and nominees from other industries.



Adani Foundation awarded for CSR in water conservation at 3rd National Water Awards from the Ministry of Jal Shakti in the category of Best Industry for CSR activities, on 29 March 2022.

The award ceremony was conducted in the presence of President Shri Ramnath Kovind, Minister of State for Jal Shakti and Food Processing Industries, Shri Gajendra Singh Shekhawat, and Minister of State for Jal Shakti and Tribal Affairs, Shri Bishwesar Tudu.

Beneficiaries Data F.Y. 2021-2022

Sr.No	Program	Direct	Indirect	Remarks
1	Education	6585	26340	Utthan , Mundra & Nakhtrana
2	AVMB-Vidhyamandir	473	2365	AVMB Students
3	Community Health-Mundra	26129	193661	Rural clinic, MHCU,Health camp, AHMUPL
4	Community Health-Bhuj	16261	65044	Medical Support , Mahiti setu, Patients Care & Co-ordination
5	AHMUPL	31291		OPD and IPD Patients
6	SLD-Women	780	3900	SHG Group & Individual Incoem Generation
7	SLD-Agri & Animal Husbandry	7398	29731	Drip,Fooder,Home bio gas,Farmers training
8	SLD -Fisherfolk	6114	5490	Education, Mangrove, Water and Livelihood
9	CRC-Gov Schemes	667	3272	Government Schmes
10	CID	138174	189617	Fishermen Amenities & Shelter & Other Amenties
11	Nakhtrana	1428	5712	Utthan, Governemnt schems
12	Tuna	6601		Fodder,Health , Pond deepning
13	Bitra	2150		CID & Pond deepning
14	Lakhpata	2455		women training and palnttaion
15	ASDC	1374	6870	soft skill and DL .GDA & Online Training
	Total	247880	657166	

Summary - Budget Utilization F.Y. 2021-2022

Rs. In lacs

Sr No	Particulars	Budget 2021-22	Utilization(LE) 2021-22	% of utilization
A.	General Management and Administration	76.12	79.27	104%
B.	Education	172.05	110.38	64%
B1	Utthan-Education -Mundra & Anjar	149.51	99.88	67%
B2	Utthan : Fisherfolk	22.54	10.50	47%
C.	Community Health	330.38	323.51	98%
D.	Sustainable Livelihood Development	426.28	453.84	106%
E.	Community Infrastructure Development	141.35	130.71	92%
F.	EDM Recommended Projects	100.00	82.01	82%
G.	COVID 19 Support	25.00	22.16	89%
	Total AF CSR Budget :	1,271.18	1,201.89	95%
[I]	Adani Vidya Mandir-Bhadreshwar	189.84	117.86	62%
[II]	Project Udaan-Mundra	167.42	66.85	40%
	TOTAL Budget with AVMB & UDAAN :	1,628.45	1386.60	85%
	Project "FISH"		106.00	
	GRAND TOTAL :	1,628.45	1,492.60	92%

Media coverage

adani અદાણી ફાઉન્ડેશનનો મંત્ર : સેવાનું ઉત્તરદાયિત્વ

વિશ્વ દિવ્યાંગ દિન નિમિત્તે અને અદાણી ફાઉન્ડેશન દ્વારા દિવ્યાંગોને રોજગારી પૂરી પાડી દિવ્યાંગ દિવસની ઉજવણી કરાઈ

વિશ્વ દિવ્યાંગ દિન નિમિત્તે અને અદાણી ફાઉન્ડેશન દ્વારા દિવ્યાંગોને રોજગારી પૂરી પાડી દિવ્યાંગ દિવસની ઉજવણી કરાઈ

આ પ્રસંગે અદાણી પોર્ટ અને સેડના એક્ઝિક્યુટિવ ડાયરેક્ટર રહિત

મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

મુંદરા, તા. ૨૦ : અહીંના માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

મુંદરા, તા. ૨૦ : અહીંના માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

પ્રજાલક્ષી કાર્યોમાં અદાણી ફાઉન્ડેશન હંમેશાં અગ્રેસર

માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

મુંદરા, તા. ૨૦ : અહીંના માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

કોરોના સામેના જંગમાં અદાણી શુપના પ્રયાસો

મુંદરામાં કોવિડ હોસ્પિટલ વિકસાવવા રહી છે, સીટી સ્કેન મશીન પણ સ્થપાશે : સોશિયલ નેટવર્ક કોટી હવેલી કરવા અનેક દેશોથી પુરવઠો મેળવવા ચક્રો ગતિમાન

મુંદરા, તા. ૧ : કોરોનાની આઘાતમારીબ આગુત્તર પુરવઠો હાઈને જળજળન ઉપર પાણી ભરવા કોરોના સુધે ભયનક વાતચત હિતો કરી છે, જેનાથી અગ્રેસર અદાણી ફાઉન્ડેશન મુંદરામાં કોવિડ હોસ્પિટલ વિકસાવવા રહી છે, સીટી સ્કેન મશીન પણ સ્થપાશે : સોશિયલ નેટવર્ક કોટી હવેલી કરવા અનેક દેશોથી પુરવઠો મેળવવા ચક્રો ગતિમાન

વિશ્વ દિવ્યાંગ દિન અદાણી ફાઉન્ડેશન દ્વારા મુંદરામાં ૧૪ દિવ્યાંગને રોજગારી પૂરી પાડી દિવ્યાંગ દિવસની ઉજવણી કરાઈ

વિશ્વ દિવ્યાંગ દિન નિમિત્તે અને અદાણી ફાઉન્ડેશન દ્વારા દિવ્યાંગોને રોજગારી પૂરી પાડી દિવ્યાંગ દિવસની ઉજવણી કરાઈ

આ પ્રસંગે અદાણી પોર્ટ અને સેડના એક્ઝિક્યુટિવ ડાયરેક્ટર રહિત

કચ્છ પત્રિકા અદાણી ફાઉન્ડેશન અને તાલુકા હેલ્થ ઓફીસના સંયુક્ત ઉપક્રમે “ટી.બી.હારેગા દેશ જીતગા” અંતર્ગત કાર્યક્રમ યોજાયો

મુંદરા, તા. ૨૦ : અહીંના માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

અદાણી ફાઉન્ડેશનના પશુ વિકાસ કાર્યક્રમ અંતર્ગત પશુઓને રસીકરણ, કૃમિનાશક દવા તથા સારવાર

૧૨ ગામોના ૧૮૦૦૦ થી ૨૦૦૦૦ નાના અને મોટા પશુઓને આવરી લેવાના લક્ષ્યાંક સાથે શરૂઆત

મુંદરા, તા. ૨૦ : અહીંના માનવ કલ્યાણ ટ્રસ્ટ સંચાલિત સાર્વજનિક ભવનમાં મુંદરા એસઇએડ ઔદ્યોગિક વિવિધતાની ઓળખ

‘જોય ઓફ ગિવિંગ’ અંતર્ગત ૭૫૦ જરૂરતમંદોને અદાણી શુપના કર્મચારીઓ દ્વારા કપડાં અને રમકડાંનું વિતરણ કરાયું

‘જોય ઓફ ગિવિંગ’ એટલે કે કંઈ આપવાના આનંદની ઉજવણી કરતા અદાણી શુપના કર્મચારીઓએ અદાણી ફાઉન્ડેશનની માધ્યમની ત્રણ ત્રમિક વસાહતના ૭૫૦ જરૂરિયાતમંદ લોકોમાં કપડાં અને રમકડાંનું વિતરણ કર્યું હતું.

કોપોરેટ અઈસ

અદાણી ફાઉન્ડેશનને CSIR પ્રવૃત્તિ માટે એવોર્ડ

કેન્દ્રીય જળ શક્તિ મંત્રાલય દ્વારા જાહેર કરાયેલા વિવિધ એવોર્ડ પૈકી ગુજરાત અદાણી ફાઉન્ડેશનને બેસ્ટ ઈન્ડસ્ટ્રી ફોર સીએસઆર એક્ટિવિટી માટે પ્રથમ નંબરના એવોર્ડની જાહેરાત કરાઈ છે. જળશક્તિ મંત્રાલય દ્વારા ૧૧ વિવિધ શ્રેણીઓમાં રાજ્યો, સંસ્થાઓ અને વ્યક્તિઓ વગેરેને પુરસ્કાર અપાય છે.

Thank You

Annexure – 3



TEST REPORT FOR AMBIENT AIR QUALITY MONITORING

QF/7.8/19-AQ

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT – NAVINAL ISLAND,

TAL. –MUNDRA, DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0976**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O.**

Location of Sampling : **ADANI PORT – CT-3 RMU-2**

GPS Location : **N 22° 44.20.57' E 069°42.0.59'**

Date of Sampling : **As per table** Protocol (purpose) : **Ambient Air Quality Monitoring**

Sampling By : **Pollucon Laboratories Pvt. Ltd.** Lab Id : **As per table**

RDS: EnvirotechM.No.-APM 460 BRUSHLESS S.R.-2758 DTH-2014

Instrument Used : **FDS: POLLTECH PEM-ADS-2.5/10 , I.NO.20714**

Gas Asse. Model No.TECI B1,Sr.No.4613 RotameterSr No.PT/28/13

RESULT TABLE

SR. NO	TEST PARAMETER	UNIT	RESULT								LIMIT#	METHOD OF MEASUREMENT
			Date of Sampling	04/10/2021	07/10/2021	11/10/2021	14/10/2021	18/10/2021	21/10/2021	25/10/2021		
Lab ID			AMA/2110 [A - G]								100	IS 5182 (Part-23) 2017
			05	18	31	44	57	70	83	96		
1	Particulate Matter (PM ₁₀)	µg/m ³	77.57	85.38	90.44	81.31	72.47	82.45	91.55	76.43	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	43.54	40.38	55.39	45.37	41.50	47.33	51.32	42.67	60	CPCB guidelines for AAQM (Vol. I, NAAOMS/36/2012-13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	13.55	24.34	19.55	8.64	21.55	16.49	22.68	17.51	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NO _x)	µg/m ³	16.59	33.41	26.50	17.59	34.53	27.60	36.43	22.49	80	IS 5182 (Part-6) 2014
5	Carbon Monoxide as (CO)	mg/m ³	0.53	0.42	0.70	0.22	0.73	0.61	0.50	0.39	4.0	IS 5182 (Part-10)
6	Hydrocarbon as CH ₄	mg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	Not Specified	SOP: HC: GC/Gas analyzer
7	Benzene (C ₆ H ₆)	µg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	5.0	IS 5182 (Part-11) 2017

LIMIT#: Industrial, Residential, Rural and other Area Notification Dated 18th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

ND*:NotDetected, Detection Limit.: Hydrocarbon in µg/m³:50, Benzene as C₆H₆ (µg/m³): 2.0

Ravi Jariwala

Ravi Jariwala
Sr. Environmental Scientist

Dr. Arun Bajpai

Dr. Arun Bajpai
Lab Manager (Q)

Note: This report is subject to terms & conditions mentioned overleaf.

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TEST REPORT FOR AMBIENT AIR QUALITY MONITORING

QF/7.8/19-AQ

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT – NAVINAL ISLAND,

TAL. –MUNDRA, DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0977**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O.**

Location of Sampling : **ADANI PORT – TUG Berth 600 KI Pump House**

GPS Location : **N 22° 44.19.97' E 069° 42.37.06'**

Date of Sampling : **As per table** Protocol (purpose) : **Ambient Air Quality Monitoring**

Sampling By : **Pollucon Laboratories Pvt. Ltd.** Lab Id : **As per table**

RDS: EnvirotechM.No.-APM 460 BRUSHLESS S.R.-2772 DTH-2014

Instrument Used : **FDS: POLLTECH PEM-ADS-2.5/10 , I.NO.20614**

Gas Asse. Model No.TECI B1,Sr.No.5214 RotameterSr No.PT/34/14

RESULT TABLE

SR. NO	TEST PARAMETER	UNIT	RESULT								LIMIT#	METHOD OF MEASUREMENT
			Date of Sampling									
			04/10/2021	07/10/2021	11/10/2021	14/10/2021	18/10/2021	21/10/2021	25/10/2021	29/10/2021		
Lab IDAMA/2110 [A - G]			06	19	32	45	58	71	84	97		
1	Particulate Matter (PM ₁₀)	µg/m ³	68.36	59.31	52.42	73.54	58.26	63.63	76.55	69.35	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	26.46	33.53	30.37	39.44	25.38	28.37	40.23	34.70	60	CPCB guidelines for AAQM (Vol. I, NAAQMS/36/2012 -13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	20.63	17.56	22.46	15.28	19.28	24.64	10.50	21.48	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NOx)	µg/m ³	32.47	25.13	29.54	33.64	30.49	35.67	20.83	26.48	80	IS 5182 (Part-6) 2014
5	Carbon Monoxide as (CO)	mg/m ³	0.62	0.76	0.41	0.48	0.74	0.52	0.40	0.72	4.0	IS 5182 (Part-10)
6	Hydrocarbon as CH ₄	mg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	Not Specified	SOP: HC: GC/Gas analyzer
7	Benzene (C ₆ H ₆)	µg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	5.0	IS 5182 (Part-11) 2017

LIMIT#: Industrial, Residential, Rural and other Area Notification Dated 18th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

ND*:NotDetected, Detection Limit.: Hydrocarbon (µg/m³):50, Benzene as C₆H₆(µg/m³): 2.0.

Ravi Jariwala

Ravi Jariwala
Sr. Environmental Scientist

Dr. Arun Bajpai

Dr. Arun Bajpai
Lab Manager (Q)

Note: This report is subject to terms & conditions mentioned overleaf.

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TEST REPORT FOR AMBIENT AIR QUALITY MONITORING

QF/7.8/19-AQ

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT – NAVINAL ISLAND,

TAL. –MUNDRA, DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0978**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O.**

Location of Sampling : **ADANI PORT – NEAR FIRE STATION**

GPS Location : **N 22° 44.991' E 069° 42.232'**

Date of Sampling : **As per table** Protocol (purpose) : **Ambient Air Quality Monitoring**

Sampling By : **Pollucon Laboratories Pvt. Ltd.** Lab Id : **As per table**

RDS: POLLTECH RDS-8 NL /1913

Instrument Used : **FDS: POLLTECH PEM-ADS-2.5/10 , I.NO.19313**

Gas Asse. Model No.TECI B1,Sr.No.5013 RotameterSr No.PT/39/13

RESULT TABLE

SR. NO	TEST PARAMETER	UNIT	RESULT								LIMIT#	METHOD OF MEASUREMENT
			Date of Sampling									
			04/10/2021	07/10/2021	11/10/2021	14/10/2021	18/10/2021	21/10/2021	25/10/2021	29/10/2021		
	Lab IDAMA/2110 [A - G]		07	20	33	46	59	72	85	98		
1	Particulate Matter (PM ₁₀)	µg/m ³	41.55	68.34	62.63	56.36	66.58	50.35	70.32	61.57	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	18.65	28.61	24.34	21.58	34.25	25.64	31.66	38.60	60	CPCB guidelines for AAQM (Vol. I, NAAQMS/36/2012 -13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	8.64	12.63	14.40	6.53	11.62	13.58	15.85	9.57	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NOx)	µg/m ³	14.35	19.33	24.30	15.66	18.69	25.76	28.38	16.35	80	IS 5182 (Part-6) 2014
5	Carbon Monoxide as (CO)	mg/m ³	0.50	0.64	0.18	0.58	0.47	0.56	0.29	0.19	4.0	IS 5182 (Part-10)
6	Hydrocarbon as CH ₄	mg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	Not Specified	SOP: HC: GC/Gas analyzer
7	Benzene (C ₆ H ₆)	µg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	5.0	IS 5182 (Part-11) 2017

LIMIT#: Industrial, Residential, Rural and other Area Notification Dated 18th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

ND*:NotDetected, Detection Limit,: Hydrocarbon in (µg/m³):50, Benzene as C₆H₆ (µg/m³): 2.0.

Ravi Jariwala

Ravi Jariwala
Sr. Environmental Scientist

Dr. Arun Bajpai

Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR AMBIENT AIR QUALITY MONITORING

QF/7.8/19-AQ

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT – NAVINAL ISLAND,

TAL. –MUNDRA, DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0979**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O.**

Location of Sampling : **ADANI PORT – PUB/ADANI HOUSE**

GPS Location : **N 22° 46.537' E 069° 41.030'**

Date of Sampling : **As per table** Protocol (purpose) : **Ambient Air Quality Monitoring**

Sampling By : **Pollucon Laboratories Pvt. Ltd.** Lab Id : **As per table**

RDS: POLLTECH RDS-8 NL /2013

Instrument Used : **FDS: POLLTECH PEM -ADS-2.5/10 ,I.No.15613**

Gas Asse. Model No.TECI B1,Sr.No.5414 RotameterSr No.PT/30/14

RESULT TABLE

SR. NO	TEST PARAMETER	UNIT	RESULT								LIMIT#	METHOD OF MEASUREMENT
Date of Sampling			04/10/2021	07/10/2021	11/10/2021	14/10/2021	18/10/2021	21/10/2021	25/10/2021	29/10/2021		
Lab ID AMA/2110[A - G]			08	21	34	47	60	73	86	99		
1	Particulate Matter (PM ₁₀)	µg/m ³	52.61	63.42	70.42	51.34	62.52	58.31	64.51	50.36	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	30.48	24.50	34.53	26.55	31.27	23.45	28.47	21.20	60	CPCB guidelines for AAQM (Vol. I, NAAQMS/36/2012 -13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	17.61	21.63	12.30	10.52	16.33	11.56	13.63	15.69	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NO _x)	µg/m ³	26.58	29.50	20.38	23.48	27.58	18.57	25.47	19.39	80	IS 5182 (Part-6) 2014
5	Carbon Monoxide as (CO)	mg/m ³	0.31	0.26	0.32	0.38	0.36	0.23	0.44	0.54	4.0	IS 5182 (Part-10)
6	Hydrocarbon as CH ₄	mg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	Not Specified	SOP: HC: GC/Gas analyzer
7	Benzene (C ₆ H ₆)	µg/m ³	ND*	ND*	ND*	ND*	ND*	ND*	ND*	ND*	5.0	IS 5182 (Part-11) 2017

LIMIT[#]: Industrial, Residential, Rural and other Area Notification Dated 18th Nov.2009 as per national Ambient Air Quality Standards, CPCB New Delhi.

ND*:NotDetected, Detection Limit,: Hydrocarbon (µg/m³):50, Benzene as C₆H₆(µg/m³): 2.0.

Ravi Jariwala

Ravi Jariwala
Sr. Environmental Scientist

Dr. Arun Bajpai

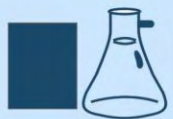
Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 1

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1000**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O**

Description of Sample : **ETP Inlet (Liquid Terminal)**

Sampling Date : **06/10/2021**

Quantity/No. of Samples : **02 Lit/One**

Sampling By : **Pollucon Laboratories Pvt. Ltd.**

Sampling Procedure : **Grab**

Sample Receipt Date : **07/10/2021**

Lab ID : **AM/2110/17**

Packing/ Seal : **Sealed**

Test Parameters : **As per table**

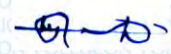
Date of Starting of Test : **07/10/2021**

Date of Completion : **13/10/2021**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	RESULTS	TEST METHOD
			Liquid Terminal	
1	Colour	Co-pt	40	IS 3025 (Part – 4) 2017
2	pH	--	7.32	IS 3025 (Part – 11) 2017
3	Temperature	°C	30.0	IS 3025 (Part-9) 2017
4	Total Suspended Solids	mg/L	149	IS 3025 (Part – 17) 2017
5	Total Dissolved Solids	mg/L	1178	IS 3025 (Part-16) 2017
6	COD	mg/L	413	APHA (23 rd Edition 2017) 5220
7	BOD (3 Days @ 27 °C)	mg/L	87	IS 3025 (Part-44) 2019
8	Chloride as Cl	mg/L	406	IS 3025 (Part – 32) 2019
9	Oil & Grease	mg/L	5.9	APHA (23 rd Edition 2017) 5520
10	Ammonical Nitrogen as NH ₃	mg/L	21.76	IS 3025 (Part-34) 2019

#As per GPCB Consent Order No. AWH- 79311 Issue Date: 02/06/2016 Upto 07/04/2021.


H. T. Shah
Lab. Manager

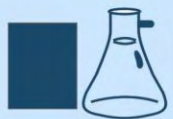

Dr. Arun Bajpai
Lab Manager (Q)

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 Email: pollucon@gmail.com, info@polluconlab.com



TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 1

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1001**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O.**

Description of Sample : **ETP Water Sample**

Sampling Date : **06/10/2021**

Quantity/No. of Samples : **02 Lit/One**

Sampling By : **Pollucon Laboratories Pvt. Ltd.**

Sampling Procedure : **Grab**

Sample Receipt Date : **07/10/2021**

Lab ID : **AM/2110/18**

Packing/ Seal : **Sealed**

Test Parameters : **As per table**

Date of Starting of Test : **07/10/2021**

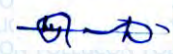
Date of Completion : **13/10/2021**

RESULT TABLE

SR. NO.	PARAMETERS	UNIT	GPCB Limit [#]	RESULTS	TEST METHOD
				Liquid Terminal ETP Outlet	
1	Colour	Co-pt	100	20	IS 3025 (Part - 4) 2017
2	pH	--	6.5 to 8.5	7.59	IS 3025 (Part-11) 2017 Electrometric Method
3	Temperature	°C	40	30.2	IS 3025 (Part-9) 2017
4	Total Suspended Solids	mg/L	100	23	IS 3025 (Part - 17) 2017
5	Total Dissolved Solids	mg/L	2100	1376	IS 3025 (Part-16) 2017
6	COD	mg/L	100	82	APHA (23 rd Edition 2017) 5220 B Open Reflux Method
7	BOD (3 Days @ 27 °C)	mg/L	30	16	IS 3025 (Part-44) 2019
8	Chloride as Cl	mg/L	600	372	IS 3025 (Part-32) 2019 Argentometric Method
9	Oil & Grease	mg/L	10	3.6	APHA (23 rd Edition 2017) 5520 B
10	Sulphate as SO ₄	mg/L	1000	294	IS 3025 (Part-24) 2019 Turbidimetric method
11	Ammonical Nitrogen as NH ₃	mg/L	50	10.4	IS 3025 (Part-34) 2019 Nesslerization Method
12	Phenolic Compound	mg/L	1.0	Not Detected	IS 3025 (Part-43) 2019 Aminopyrine Method
13	Copper as Cu	mg/L	3.0	Not Detected	APHA (23 rd Edition 2017) 3111 B
14	Lead as Pb	mg/L	0.1	Not Detected	APHA (23 rd Edition 2017) 3111 B
15	Sulphide as S	mg/L	2.0	0.094	APHA (23 rd Edition 2017) 4500 S2 F Iodometric method
16	Cadmium as Cd	mg/L	2.0	Not Detected	APHA (23 rd Edition 2017) 3111 B
17	Fluoride as F	mg/L	2.0	0.23	APHA (23 rd Edition 2017) 4500 F D SPANDS Method
18	Residual Chlorine	mg/L	0.5 min	0.8	APHA (23 rd Edition 2017) 4500 Cl G DPD Colorimetric method

#As per GPCB Consent Order No. AWH- 79311 Issue Date: 02/06/2016 Upto 07/04/2021.

Detection Limit, Phenolic compounds as C₆H₅OH: 0.01 mg/L, Copper: 0.02 mg/L, Lead : 0.02 mg/L, Cadmium as Cd: 0.004 mg/L.


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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Phone : 0261-2635750, 0261-2635751, 0261-2635775, 0701660511 Page 160 of 110 lab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1008**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

Description of Sample : Marine Water (M2 Mouth of Bocha&Navinal Creak)	
Sampling Date : 21/10/2021	Quantity/No. of Samples : 10 Lit/Two
Sampling By : Pollucon Laboratories Pvt. Ltd.	Sampling Procedure : Grab
Sample Receipt Date : 22/10/2021	Lab ID : AM/2110/53 & 54
Packing/ Seal : Sealed	Test Parameters : As per table
Date of Starting of Test : 22/10/2021	Date of Completion : 01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M2 Mouth of Bocha & Navinal Creak		TEST METHOD
			N 22°44'239" E 079°43'757"		
			Surface	Bottom	
1	pH	--	8.21	8.15	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.7	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	113	95.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.4	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	6.0	5.90	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.14	35.96	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition)2017) 5520 B
8	Nitrate as NO ₃	μmol/L	2.73	2.60	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	μmol/L	0.98	0.85	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	μmol/L	2.51	2.37	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	μmol/L	2.24	2.18	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	μmol/L	6.22	5.82	--
13	Petroleum Hydrocarbon	μg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36740	36982	IS 3025 (Part-16) 2019
15	COD	mg/L	11.76	8.20	USEPA 410.3 1978
Continue...					

Continue...


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1008**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M2 Mouth of Bocha&Navinal Creak		TEST/SAMPLING METHOD
			N 22°44'239" E 079°43'757"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.32	2.25	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.59	1.44	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	152	123	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus sp.</i>	<i>Navicula sp.</i>	APHA (23 rd Edition 2017) 10200 F
			<i>Biddulphia sp.</i>	<i>Nitzschia sp.</i>	
			<i>Thalassiothrix sp.</i>	<i>Melosira sp.</i>	
			<i>Skeletonema sp.</i>	<i>Pinnularia sp.</i>	
			<i>Rhizosolenia sp.</i>	<i>Fragillaria sp.</i>	
Continue...					


H. T. Shah
 Lab. Manager


Dr. Arun Bajpai
 Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1008**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M2 Mouth of Bocha&Navinal Creak	TEST/SAMPLING METHOD
			N 22°44'239" E 079°43'757"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ / 100 m ³	22	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Chaetognaths	APHA (23 rd Edition 2017)10200 G
			Gastropods	
			Mysids	
			Polychaetes	
17.3	Total Biomass	ml/100 m ³	2.05	APHA (23 rd Edition 2017) 10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2520	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1009 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	: Marine Water (M2 Mouth of Bocha&Navinal Creak)		
Sampling Date	: 21/10/2021	Quantity/No. of Samples	: 05 Kg/One
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Sampling Procedure	: Grab
Sample Receipt Date	: 22/10/2021	Lab ID	: AM/2110/55
Packing/ Seal	: Sealed	Test Parameters	: As per table
Date of Starting of Test	: 22/10/2021	Date of Completion	: 01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M2 Mouth of Bocha & Navinal Creak N 22°44'239" E 079°43'757"	TEST METHOD
			Sediment	
1	Organic Matter	%	0.45	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	613	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.96	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	132	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	659	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.87	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	51.24	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	39.86	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	112	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.14	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos(No and name of groups present, No and name of species of each group present)	--	Gastropods	APHA (23 rd Edition 2017) 10500 C
			Polychaetes	
			Crustaceans	
			Isopods	
6.2	MeioBenthos(No and name of groups present, No and name of species of each group present)	--	Nematodes	APHA (23 rd Edition 2017) 10500 C
6.3	Population	no/m ²	353	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1010**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

Description of Sample : Marine Water (M4 JUNA BANDAR)	Quantity/No. of Samples : 10 Lit/Two
Sampling Date : 21/10/2021	Sampling Procedure : Grab
Sampling By : Pollucon Laboratories Pvt. Ltd.	Lab ID : AM/2110/56 & 57
Sample Receipt Date : 22/10/2021	Test Parameters : As per table
Packing/ Seal : Sealed	Date of Completion : 01/11/2021
Date of Starting of Test : 22/10/2021	

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M4 JUNA BANDAR		TEST METHOD
			N 22°47'577" E 079°43'620"		
			Surface	Bottom	
1	pH	--	8.19	8.13	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	105	91.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.50	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.85	5.72	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.42	35.96	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.73	2.61	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.84	0.75	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.46	2.33	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.31	2.27	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	6.03	5.69	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36482	36984	IS 3025 (Part-16) 2019
15	COD	mg/L	12.14	9.2	USEPA 410.3 1978
Continue...					


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1010**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M4 JUNA BANDAR		TEST/SAMPLING METHOD
			N 22°47'577" E 079°43'620"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.34	2.06	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.74	0.41	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	135	106	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	Nitzschia sp.	Rhizosolenia sp.	APHA (23 rd Edition 2017) 10200 F
			Skeletonema sp.	Surirella sp.	
			Cyclotella sp.	Amphiprora sp.	
			Biddulphia sp.	Fragillaria sp.	
			Ceratium sp.		
Continue...					

Continue...


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1010**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M4 JUNA BANDAR	TEST/SAMPLING METHOD
			N 22°47'577" E 079°43'620"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ / 100 m ³	25	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes	APHA (23 rd Edition 2017)10200 G
			Gastropods	
			Decapods	
			Ostracods	
17.3	Total Biomass	ml/100 m ³	2.25	APHA (23 rd Edition 2017)10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2610	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1011 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	: Marine Water (M4 JUNA BANDAR)	Quantity/No. of Samples	: 05 Kg/One
Sampling Date	: 21/10/2021	Sampling Procedure	: Grab
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AM/2110/58
Sample Receipt Date	: 22/10/2021	Test Parameters	: As per table
Packing/ Seal	: Sealed	Date of Completion	: 01/11/2021
Date of Starting of Test	: 22/10/2021		

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M4 JUNA BANDAR	TEST METHOD
			N 22°47'57" E 079°43'620"	
			Sediment	
1	Organic Matter	%	0.43	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	624	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.82	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	129	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	608	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.73	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	56.42	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	39.8	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	107	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.58	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos(No and name of groups present, No and name of species of each group present)	--	Gastropods	APHA (23 rd Edition 2017) 10500 C
			Crustaceans	
			Amphipods	
			Bivalves	
6.2	MeioBenthos(No and name of groups present, No and name of species of each group present)	--	--	APHA (23 rd Edition 2017) 10500 C
6.3	Population	no/m ²	440	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1012 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	: Marine Water (M11 MPT T1 Jetty)	Quantity/No. of Samples	: 10 Lit/Two
Sampling Date	: 21/10/2021	Sampling Procedure	: Grab
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AM/2110/59 & 60
Sample Receipt Date	: 22/10/2021	Test Parameters	: As per table
Packing/ Seal	: Sealed	Date of Completion	: 01/11/2021
Date of Starting of Test	: 22/10/2021		

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M11 MPT T1 Jetty		TEST METHOD
			N 22°42'278" E 079°43'450"		
			Surface	Bottom	
1	pH	--	8.26	8.21	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	113	89.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.48	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.83	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.36	35.92	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.62	2.54	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.78	0.65	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.46	2.38	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.37	2.29	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	5.86	5.57	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36427	36942	IS 3025 (Part-16) 2019
15	COD	mg/L	10.42	7.56	USEPA 410.3 1978
Continue...					

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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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1012**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M11 MPT T1 Jetty		TEST/SAMPLING METHOD
			N 22°42'278" E 079°43'450"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.50	2.16	APHA(23 rd Edition 2017)10200 H
16.2	Phaeophytin	mg/m ³	1.15	0.33	APHA(23 rd Edition 2017)10200 H
16.3	Cell Count	No.x10 ³ /L	128	110	APHA (23 rd Edition 2017)10200 F
16.4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus sp.</i>	<i>Navicula sp.</i>	APHA (23 rd Edition 2017)10200 F
			<i>Skeletonema sp.</i>	<i>Nitzschia sp.</i>	
			<i>Cyclotella sp.</i>	<i>Rhizosolenia sp.</i>	
			<i>Ceratium sp.</i>	<i>Chaetoceros sp.</i>	
			<i>Pinnularia sp.</i>		
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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**TEST REPORT FOR MARINE WATER SAMPLE**

QF/7.8/19-WT


Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1012**Issue Date : **16/11/2021**Customer's Ref. : **AS Per W.O.****RESULT TABLE**

SR. NO.	TEST PARAMETERS	UNIT	M11 MPT T1 Jetty	TEST/SAMPLING METHOD
			N 22°42'278" E 079°43'450"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ /100 m ³	29	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Gastropods	APHA (23 rd Edition 2017)10200 G
			Polychaetes	
			Decapods	
			Mysids	
17.3	Total Biomass	ml/100 m ³	2.64	APHA (23 rd Edition 2017)10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2680	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1013 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	: Marine Water (M12 SPM)	Quantity/No. of Samples	: 10 Lit/Two
Sampling Date	: 21/10/2021	Sampling Procedure	: Grab
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AM/2110/61 & 62
Sample Receipt Date	: 22/10/2021	Test Parameters	: As per table
Packing/ Seal	: Sealed	Date of Completion	: 01/11/2021
Date of Starting of Test	: 22/10/2021		

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M12 SPM		TEST METHOD
			N 22°40'938" E 069°39'191"		
			Surface	Bottom	
1	pH	--	8.23	8.17	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	103	91.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.54	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.80	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.43	35.90	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition)2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.68	2.51	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.93	0.87	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.49	2.35	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.27	2.19	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	6.10	5.73	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36482	36914	IS 3025 (Part-16) 2019
15	COD	mg/L	12.34	8.9	USEPA 410.3 1978
Continue...					

Continue...


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1013**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M12 SPM		TEST/SAMPLING METHOD
			N 22°40'938" E 069°39'191"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.44	2.26	APHA(23 rd Edition 2017)10200 H
16.2	Phaeophytin	mg/m ³	0.62	0.24	APHA (23 rd Edition2017)10200 H
16.3	Cell Count	No.x10 ³ /L	138	110	APHA (23 rd Edition 2017)10200 F
16.4	Name of Group Number and name of group species of each group	--	<i>Synedra sp.</i>	<i>Nitzschia sp.</i>	APHA (23 rd Edition 2017)10200 F
			<i>Ceratium sp.</i>	<i>Chaetoceros sp.</i>	
			<i>Melosira sp.</i>	<i>Thalassionema sp.</i>	
			<i>Rhizosolenia sp.</i>	<i>Navicula sp.</i>	
			<i>Cyclotella sp.</i>	--	
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1013**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M12 SPM	TEST/SAMPLING METHOD
			N 22°40'938" E 069°39'191"	
C	Zooplanktons			
17.1	Abundance(Population)	noX10 ³ / 100 m ³	28	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes	APHA (23 rd Edition 2017)10200 G
			Gastropods	
			Decapods	
			Copepods	
17.3	Total Biomass	ml/100 m ³	2.76	APHA (23 rd Edition 2017)10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2540	IS 5405:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L, Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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**TEST REPORT FOR MARINE WATER SAMPLE**

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1014**Issue Date : **16/11/2021**Customer's Ref. : **AS Per W.O.**

Description of Sample : **Marine Water (M1 Left Side of Bocha Creak)**
 Sampling Date : **20/10/2021** Quantity/No. of Samples : **10 Lit/Two**
 Sampling By : **Pollucon Laboratories Pvt. Ltd.** Sampling Procedure : **Grab**
 Sample Receipt Date : **21/10/2021** Lab ID : **AM/2110/39 & 40**
 Packing/ Seal : **Sealed** Test Parameters : **As per table**
 Date of Starting of Test : **21/10/2021** Date of Completion : **01/11/2021**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M1 Left Side of Bocha Creak		TEST METHOD
			N 22°45'183" E 079°43'241"		
			Surface	Bottom	
1	pH	--	8.21	8.17	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.8	29.6	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	97.0	89.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.5	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.80	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.26	35.52	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition2017) 5520 B
8	Nitrate as NO ₃	µmol/L	3.06	2.80	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.98	0.79	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.56	2.41	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.37	2.25	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	6.60	6.0	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36328	36592	IS 3025 (Part-16) 2019
15	COD	mg/L	12.30	7.64	USEPA 410.3 1978
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1014**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M1 Left Side of Bocha Creak		TEST/SAMPLING METHOD
			N 22°45'183" E 079°43'241"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.43	2.21	APHA (23 rd Edition 2017)10200 H
16.2	Phaeophytin	mg/m ³	0.34	0.36	APHA(23 rd Edition 2017)10200 H
16.3	Cell Count	No.x10 ³ /L	156	102	APHA (23 rd Edition 2017)10200 F
16.4	Name of Group Number and name of group species of each group	--	Rhizosolenia sp.	Synedra sp.	APHA (23rd Edition 2017)10200 F
			Biddulphia sp.	Navicula sp.	
			Coscinodiscus sp.	Nitzschia sp.	
			Pleurosigma sp.	Melosira sp.	
			Stauroneis sp.		
Continue...					


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT


Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1014 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M1 Left Side of Bocha Creak	TEST/SAMPLING METHOD
			N 22°45'183" E 079°43'241"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ / 100 m ³	22	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Foraminiferans	APHA (23 rd Edition 2017)10200 G
			Polychaetes	
			Gastropods	
			Isopods	
17.3	Total Biomass	ml/100 m ³	1.90	APHA (23 rd Edition 2017) 10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2680	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1015 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	:	Marine Water Sample(M1 Left Side of Bocha Creak)			
Sampling Date	:	20/10/2021	Quantity/No. of Samples	:	05 Kg/One
Sampling By	:	Pollucon Laboratories Pvt. Ltd.	Sampling Procedure	:	Grab
Sample Receipt Date	:	21/10/2021	Lab ID	:	AM/2110/41
Packing/ Seal	:	Sealed	Test Parameters	:	As per table
Date of Starting of Test	:	21/10/2021	Date of Completion	:	01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M1 Left Side of Bocha Creak N 22°45'183" E 079°43'241"	TEST METHOD
			Sediment	
1	Organic Matter	%	0.49	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	628	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.82	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	139	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	658	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.92	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	50.8	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	37.42	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	129	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.56	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos(No and name of groups present, No and name of species of each group present)	--	Crustaceans	APHA (23 rd Edition 2017) 10500 C
			Polychaetes	
			Branchyurans	
6.2	MeioBenthos(No and name of groups present, No and name of species of each group present)	--	Foraminiferams	APHA (23 rd Edition 2017) 10500 C
			Nematodes	
6.3	Population	no/m ²	351	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1016**

Issue Date : **16/11/2021**


Customer's Ref. : **AS Per W.O.**

Description of Sample : Marine Water (M3 EAST OF BOCHA ISLAND)	
Sampling Date : 20/10/2021	Quantity/No. of Samples : 05 Kg/One
Sampling By : Pollucon Laboratories Pvt. Ltd.	Sampling Procedure : Grab
Sample Receipt Date : 21/10/2021	Lab ID : AM/2110/42 & 43
Packing/ Seal : Sealed	Test Parameters : As per table
Date of Starting of Test : 21/10/2021	Date of Completion : 01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M3 EAST OF BOCHA ISLAND		TEST METHOD
			N 22°46'530" E 079°41'690"		
			Surface	Bottom	
1	pH	--	8.24	8.15	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	115	93.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.56	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.80	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.36	35.94	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.97	2.75	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.82	0.63	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.31	2.20	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.43	2.35	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	6.10	5.58	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36428	36962	IS 3025 (Part-16) 2019
15	COD	mg/L	12.6	8.50	USEPA 410.3 1978
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1016**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M3 EAST OF BOCHA ISLAND		TEST/SAMPLING METHOD
			N 22°46'530" E 079°41'690"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.12	2.02	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.14	0.33	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	113	89	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	Thalassiosira sp.	Nitzschia sp.	APHA (23 rd Edition 2017) 10200 F
			Melosira sp.	Fragillaria sp.	
			Rhizosolenia sp.	Closterium sp.	
			Amphiprora sp.	Navicula sp.	
			Biddulphia sp.	Cyclotella sp.	
Continue...					

Continue...


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

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Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1016**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M3 EAST OF BOCHA ISLAND	TEST/SAMPLING METHOD
			N 22°46'530" E 079°41'690"	
C	Zooplanktons			
17.1	Abundance(Population)	noX10 ³ / 100 m ³	23	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Polychaetes	APHA (23 rd Edition 2017)10200 G
			Ostracods	
			Amphipods	
			Mysids	
17.3	Total Biomass	ml/100 m ³	2.2	APHA (23 rd Edition 2017)10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2550	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Present	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :

Test Report No. : **PL/AM 1017**
Issue Date : **16/11/2021**
Customer's Ref. : **AS Per W.O.**

Description of Sample	: Marine Water(M3 EAST OF BOCHA ISLAND)		
Sampling Date	: 20/10/2021	Quantity/No. of Samples	: 05 Kg/One
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Sampling Procedure	: Grab
Sample Receipt Date	: 21/10/2021	Lab ID	: AM/2110/44
Packing/ Seal	: Sealed	Test Parameters	: As per table
Date of Starting of Test	: 21/10/2021	Date of Completion	: 01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M3 EAST OF BOCHA ISLAND	TEST METHOD
			N 22°46'530" E 079°41'690"	
			Sediment	
1	Organic Matter	%	0.45	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	619	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.73	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	128	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	634	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.86	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	53.20	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	32.94	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	118	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.59	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos(No and name of groups present, No and name of species of each group present)	--	Gastropods	APHA (23 rd Edition 2017) 10500 C
			Crustaceans	
			Bivalves	
6.2	MeioBenthos(No and name of groups present, No and name of species of each group present)	--	Nematodes	APHA (23 rd Edition 2017) 10500 C
6.3	Population	no/m ²	350	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (O)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1018**

Issue Date : **16/11/2021**


Customer's Ref. : **AS Per W.O.**

Description of Sample : Marine Water Sample(M5 Towards Western Side of East Port)	
Sampling Date : 20/10/2021	Quantity/No. of Samples : 10 Lit/Two
Sampling By : Pollucon Laboratories Pvt. Ltd.	Sampling Procedure : Grab
Sample Receipt Date : 21/10/2021	Lab ID : AM/2110/45 & 46
Packing/ Seal : Sealed	Test Parameters : As per table
Date of Starting of Test : 21/10/2021	Date of Completion : 01/11/2021

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M5 Towards Western Side of East Port		TEST METHOD
			N 22°46'041" E 079°47'296"		
			Surface	Bottom	
1	pH	--	8.17	8.09	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.8	29.7	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	112	95.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.43	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.80	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.32	35.86	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition)2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.53	2.39	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.87	0.78	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.45	2.32	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.36	2.27	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	5.85	5.49	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36408	36892	IS 3025 (Part-16) 2019
15	COD	mg/L	11.84	9.32	USEPA 410.3 1978
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT

Page: 2 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1018**


Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M5 Towards Western Side of East Port		TEST/SAMPLING METHOD
			N 22°46'041" E 079°47'296"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.40	2.28	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.60	0.21	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	172	102	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	Skeletonema sp.	Cyclotella sp.	APHA (23 rd Edition 2017) 10200 F
			Pinnularia sp.	Amphiprora sp.	
			Coscinodiscus sp.	Nitzschia sp.	
			Thalassiosira sp.	Synedra sp.	
			Navicula sp.		
Continue...					

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H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR MARINE WATER SAMPLE

QF/7.8/19-WT


Page: 3 of 3

Customer's Name and Address :

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1018 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M5 Towards Western Side of East Port	TEST/SAMPLING METHOD
			N 22°46'041" E 079°47'296"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ / 100 m ³	23	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Foraminiferans	APHA (23 rd Edition 2017)10200 G
			Amphipods	
			Polychaetes	
			Decapods	
17.3	Total Biomass	ml/100 m ³	2.15	APHA (23 rd Edition 2017)10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2640	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit, BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 1


M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED C/O. ENVIRONMENT CELL, 3rd FLOOR, ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA, TALUKA-MUNDRA, DIST-KUTCH-370421	Test Report No. : PL/AM 1019 Issue Date : 16/11/2021 Customer's Ref. : AS Per W.O.
--	---

Description of Sample	: Marine Water (M5 Towards Western Side of East Port)	Quantity/No. of Samples	: 05 Kg/One
Sampling Date	: 20/10/2021	Sampling Procedure	: Grab
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AM/2110/45 & 46
Sample Receipt Date	: 21/10/2021	Test Parameters	: As per table
Packing/ Seal	: Sealed	Date of Completion	: 01/11/2021
Date of Starting of Test	: 21/10/2021		

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M5 Towards Western Side of East Port N 22°46'041" E 079°47'296"	TEST METHOD
			Sediment	
1	Organic Matter	%	0.46	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	613	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.73	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	135	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	612	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.96	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	31.70	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	46.38	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	152	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.76	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos (No and name of groups present, No and name of species of each group present)	--	Amphipods	APHA (23 rd Edition 2017) 10500 C
			Polychaetes	
			Crustaceans	
6.2	Meio Benthos (No and name of groups present, No and name of species of each group present)	--	--	APHA (23 rd Edition 2017) 10500 C
6.3	Population	no/m ²	469	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1020**
 Issue Date : **16/11/2021**
 Customer's Ref. : **AS Per W.O.**

Description of Sample : **Marine Water Sample (M7 East Port)**
 Sampling Date : **20/10/2021** Quantity/No. of Samples : **10 Lit/Two**
 Sampling By : **Pollucon Laboratories Pvt. Ltd.** Sampling Procedure : **Grab**
 Sample Receipt Date : **21/10/2021** Lab ID : **AM/2110/48 & 49**
 Packing/ Seal : **Sealed** Test Parameters : **As per table**
 Date of Starting of Test : **21/10/2021** Date of Completion : **01/11/2021**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M7 East Port		TEST METHOD
			N 22°47'120" E 079°47'110"		
			Surface	Bottom	
1	pH	--	8.23	8.07	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	107	85.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.45	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.95	5.80	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.36	35.82	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition) 5520 B
8	Nitrate as NO ₃	µmol/L	2.63	2.57	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.81	0.76	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.47	2.38	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.49	2.25	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	5.91	5.71	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017) 5520 F
14	Total Dissolved Solids	mg/L	36426	36832	IS 3025 (Part-16) 2019
15	COD	mg/L	11.8	9.2	USEPA 410.3 1978
Continue...					

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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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 2 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1020**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M7 East Port		TEST/SAMPLING METHOD
			N 22°47'120" E 079°47'110"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.30	2.13	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.75	0.38	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	152	106	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	Cyclotella sp.	Biddulphia sp.	APHA (23 rd Edition 2017) 10200 F
			Rhizosolenia sp.	Navicula sp.	
			Nitzschia sp.	Pinnularia sp.	
			Ceratium sp.	Thalassiothrix sp.	
			Gyrosigma sp.	Synedra sp.	
Continue...					

Continue...

H. T. Shah
Lab. Manager

Dr. Arun Bajpai
Lab Manager (Q)

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**TEST REPORT**

QF/7.8/19-WT

Customer's Name and Address :

Page: 3 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1020**Issue Date : **16/11/2021**Customer's Ref. : **AS Per W.O.****RESULT TABLE**

SR. NO.	TEST PARAMETERS	UNIT	M7 East Port	TEST/SAMPLING METHOD
			N 22°47'120" E 079°47'110"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ /100 m ³	26	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Ostracods	APHA (23 rd Edition 2017)10200 G
			Polychaetes	
			Gastropods	
			Mysids	
17.3	Total Biomass	ml/100 m ³	2.4	APHA (23 rd Edition 2017) 10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2740	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit,BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1021**
 Issue Date : **16/11/2021**
 Customer's Ref. : **AS Per W.O.**

Description of Sample : **Marine Water (M8 Right side of Bocha Creek)**
 Sampling Date : **20/10/2021** Quantity/No. of Samples : **10 Lit/Two**
 Sampling By : **Pollucon Laboratories Pvt. Ltd.** Sampling Procedure : **Grab**
 Sample Receipt Date : **21/10/2021** Lab ID : **AM/2110/50 & 51**
 Packing/ Seal : **Sealed** Test Parameters : **As per table**
 Date of Starting of Test : **21/10/2021** Date of Completion : **01/11/2021**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M8 Right side of Bocha Creak		TEST METHOD
			N 22°45'987" E 079°43'119"		
			Surface	Bottom	
1	pH	--	8.25	8.17	IS 3025 (Part – 11) 2019
2	Temperature	°C	29.9	29.8	IS 3025 (Part – 9) 2019
3	Total Suspended Solids	mg/L	113	95.0	IS 3025 (Part – 17) 2019
4	BOD (3 Days @ 27 °C)	mg/L	2.58	Not Detected	IS 3025 (Part – 44) 2019
5	Dissolved Oxygen	mg/L	5.97	5.83	IS 3025 (Part – 38) 2019
6	Salinity	ppt	35.56	35.98	ICMAM GOVT OF INDIA 2012
7	Oil & Grease	mg/L	Not Detected	Not Detected	APHA (23rd Edition2017) 5520 B
8	Nitrate as NO ₃	µmol/L	2.67	2.51	IS 3025 (Part 34) 2019
9	Nitrite as NO ₂	µmol/L	0.82	0.73	ICMAM GOVT OF INDIA 2012
10	Ammonical Nitrogen as NH ₃	µmol/L	2.39	2.25	ICMAM GOVT OF INDIA 2012
11	Phosphates as PO ₄	µmol/L	2.41	2.30	APHA (23rd Edition) 4500 P C
12	Total Nitrogen	µmol/L	5.88	5.49	--
13	Petroleum Hydrocarbon	µg/L	Not Detected	Not Detected	APHA (23rd Edition 2017)5520 F
14	Total Dissolved Solids	mg/L	36624	36982	IS 3025 (Part-16) 2019
15	COD	mg/L	12.80	9.14	USEPA 410.3 1978

Continue...


H. T. Shah
 Lab. Manager


Dr. Arun Bajpai
 Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 2 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1021**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M8 Right side of Bocha Creak		TEST/SAMPLING METHOD
			N 22°45'987" E 079°43'119"		
			SURFACE	BOTTOM	
B	Phytoplankton				
16.1	Chlorophyll a	mg/m ³	2.42	2.32	APHA (23 rd Edition 2017) 10200 H
16.2	Phaeophytin	mg/m ³	0.58	0.17	APHA (23 rd Edition 2017) 10200 H
16.3	Cell Count	No.x10 ³ /L	164	108	APHA (23 rd Edition 2017) 10200 F
16.4	Name of Group Number and name of group species of each group	--	Guinardia sp.	Rhizosolenia sp.	APHA (23 rd Edition 2017) 10200 F
			Cyclotella sp.	Synedra sp.	
			Biddulphia sp.	Skeletonema sp.	
				Pinnularia sp.	
			Melosira sp.	Ceratium sp.	
			Nitzschia sp.		
Navicula sp.					
Continue...					


H. T. Shah
 Lab. Manager


Dr. Arun Bajpai
 Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 3 of 3

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421

Test Report No. : **PL/AM 1021**

Issue Date : **16/11/2021**

Customer's Ref. : **AS Per W.O.**

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M8 Right side of Bocha Creak	TEST/SAMPLING METHOD
			N 22°45'987" E 079°43'119"	
C	Zooplanktons			
17.1	Abudance(Population)	noX10 ³ / 100 m ³	21	APHA (23 rd Edition 2017)10200 G
17.2	Name of Group Number and name of group species of each group	--	Amphipods	APHA (23 rd Edition 2017)10200 G
			Gastropods	
			Polychaetes	
			Decapods	
17.3	Total Biomass	ml/100 m ³	2.0	APHA (23 rd Edition 2017) 10200 G-I
D	Microbiological Parameters			
18.1	Total Bacterial Count	cfu/ml	2560	IS 5402:2018
18.2	Total Coliform	/ml	Present	IS 5401 (Part 2):2018
18.3	Escherichia coli	/ml	Absent	IS 5887 (Part 1):2018
18.4	Enterococcus species	/ml	Present	IS:15186:2005
18.5	Salmonella species	/ml	Absent	IS 5887 (Part 3):2018
18.6	Shigella species	/ml	Absent	IS 5887 (Part 7):2018
18.7	Vibrio species	/ml	Absent	IS 5887 (Part 5):2018
Note: Detection Limit,BOD: 1.0 mg/L, Oil & Grease: 2.0 mg/L. Petroleum Hydrocarbon:1.0 µg/L .				


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT

QF/7.8/19-WT

Customer's Name and Address :

Page: 1 of 1

M/s. ADANI PORT AND SPECIAL ECONOMIC ZONE LIMITED
C/O. ENVIRONMENT CELL, 3rd FLOOR,
ADANI HOUSE NAVINAL ISLAND, VILLAGE-MUNDRA,
TALUKA-MUNDRA, DIST-KUTCH-370421


Test Report No. : **PL/AM 1021**
Issue Date : **16/11/2021**
Customer's Ref. : **AS Per W.O.**

Description of Sample	: Marine Water (M8 Right side of Bocha Creek)	Quantity/No. of Samples	: 05 Kg/One
Sampling Date	: 20/10/2021	Sampling Procedure	: Grab
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AM/2110/52
Sample Receipt Date	: 21/10/2021	Test Parameters	: As per table
Packing/ Seal	: Sealed	Date of Completion	: 01/11/2021
Date of Starting of Test	: 21/10/2021		

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	M8 Right side of Bocha Creek	TEST METHOD
			N 22°45'98" E 079°43'119"	
			Sediment	
1	Organic Matter	%	0.42	IS 2720 (Part -22) 2015
2	Phosphorus as P	µg/g	603	IS 5305 2020
3	Texture	--	Sandy	Soil manual of india Department of Agriculture & Cooperation ministry of Agriculture Government of India
4	Petroleum Hydrocarbon	µg/g	Not Detected	SOP/INS/HW/07
5	Heavy Metals			
5.1	Aluminum as Al	%	4.76	USEPA 3050 B 1996
5.2	Total Chromium as Cr ⁺³	µg/g	120	USEPA 3050 B 1996
5.3	Manganese as Mn	µg/g	614	USEPA 3050 B 1996
5.4	Iron as Fe	%	4.89	USEPA 3050 B 1996
5.5	Nickel as Ni	µg/g	53.20	USEPA 3050 B 1996
5.6	Copper as Cu	µg/g	41.49	USEPA 3050 B 1996
5.7	Zinc as Zn	µg/g	94.2	USEPA 3050 B 1996
5.8	Lead as Pb	µg/g	2.13	USEPA 3050 B 1996
5.9	Mercury as Hg	µg/g	Not Detected	USEPA 7471 B 2007
6	Benthic Organisms			
6.1	Macro benthos (No and name of groups present, No and name of species of each group present)	--	Amphipods	APHA (23 rd Edition 2017) 10500 C
			Crustaceans	
			Bivalves	
6.2	Meio Benthos (No and name of groups present, No and name of species of each group present)	--	Foraminiferams	APHA (23 rd Edition 2017) 10500 C
			Turbellarians	
6.3	Population	no/m ²	499	APHA (23 rd Edition 2017) 10500 C

Note: Detection Limit, Petroleum Hydrocarbon: 1.0 µg/g, Mercury as Hg: 1.0 µg/g.


H. T. Shah
Lab. Manager

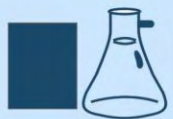

Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

**M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.
PLOT NO. 169/P, AT – NAVINAL ISLAND,
TAL. –MUNDRA, DIST. - KUTCH – 370421.**

Test Report No. : **PL/AM 0980**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O**

NOISE LEVEL MONITORING REPORT

Sampling Date : **As per table** Sampling By : **Pollucon Laboratories Pvt. Ltd.**
Test Method : **IS 9876 : 2013 / IS 9989 : 2014** Protocol (purpose) : **Noise Level Monitoring**
Instrument Used : **SLM-100 , 268 DTF 2014**

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
ADANI PORTS & SOUTH BASIN					06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00
					07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00
1	PUB/Adani House	N 22°46.537'	E 69°41.030'	05/10/2021	65.6	61.6	69.7	63.5	65.4	60.8	62.9	64.3
2	Nr. Fire Station	N 22°44.991'	E 69°42.232'	25/10/2021	63.6	60.1	63.3	67.0	67.7	70.2	69.5	70.4
3	T1 Terminal Nr.Marine Building	N 22°43.969'	E 69°42.347'	04/10/2021	62.6	68.3	64.2	69.8	62.2	68.8	67.2	62.5
4	CT-3 DG House	N 22°47.259'	E 69°33.898'	11/10/2021	60.9	66.5	68.4	61.8	67.4	61.1	63.9	69.9

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
ADANI PORTS & SOUTH BASIN					14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
					15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00
1	PUB/Adani House	N 22°46.537'	E 69°41.030'	05/10/2021	64.4	71.9	66.4	68.2	63.1	65.7	61.4	66.9
2	Nr. Fire Station	N 22°44.991'	E 69°42.232'	25/10/2021	68.6	67.3	62.8	68.7	63.8	65.1	62.3	65.0
3	T1 Terminal Nr.Marine Building	N 22°43.969'	E 69°42.347'	04/10/2021	67.1	61.5	66.8	70.1	68.1	65.2	64.1	61.2
4	CT-3 DG House	N 22°47.259'	E 69°33.898'	11/10/2021	72.1	70.5	69.4	66.1	62.4	65.5	62.1	64.8

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)		
ADANI PORTS & SOUTH BASIN					AVERAGE	MAX	MIN
1	PUB/Adani House	N 22°46.537'	E 69°41.030'	05/10/2021	65.1	71.9	60.8
2	Nr. Fire Station	N 22°44.991'	E 69°42.232'	25/10/2021	66.0	70.4	60.1
3	T1 Terminal Nr.Marine Building	N 22°43.969'	E 69°42.347'	04/10/2021	65.6	70.1	61.2
4	CT-3 DG House	N 22°47.259'	E 69°33.898'	11/10/2021	65.8	72.1	60.9

Ravi J.

Ravi Jariwala
Sr. Environmental Scientist

Arun B.

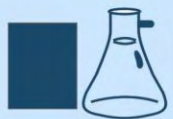
Dr. Arun Bajpai
Lab Manager (Q)

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TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.
PLOT NO. 169/P, AT – NAVINAL ISLAND,
TAL. –MUNDRA, DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0981**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O**

NOISE LEVEL MONITORING REPORT

Sampling Date : **As per table** Sampling By : **Pollucon Laboratories Pvt. Ltd.**
Test Method : **IS 9876 : 2013 / IS 9989 : 2014** Protocol (purpose) : **Noise Level Monitoring**
Instrument Used : **SLM-100 , 268 DTF 2014**

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)									
ADANI PORTS & SOUTH BASIN					22.00	23.00	24.00	01.00	02.00	03.00	04.00	05.00		
					23.00	24.00	1.00	02.00	03.00	04.00	05.00	06.00		
1	PUB/Adani House	N 22°46.537'	12/02/2021	05 & 06/10/2021	60.9	68.5	66.5	60.8	61.8	61.2	65.6	67.4		
2	Nr. Fire Station	N 22°44.991'	E 69°42.232'	25 & 26/10/2021	57.6	61.3	60.1	59.7	60.5	54.2	64.5	62.3		
3	T1 Terminal Nr.Marine Building	N 22°43.969'	E 69°42.347'	04 & 05/10/2021	63.2	67.5	65.2	62.1	66.8	59.4	60.2	64.2		
4	CT-3 DG House	N 22°47.259'	E 69°33.898'	11 & 12/10/2021	62.1	64.2	65.2	67.2	55.4	59.3	64.2	63.2		

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)			
					AVERAGE	MAX	MIN	
ADANI PORTS & SOUTH BASIN								
1	PUB/Adani House		N 22°46.537'	E 69°41.030'	05 & 06/10/2021	64.1	68.5	60.8
2	Nr. Fire Station		N 22°44.991'	E 69°42.232'	25 & 26/10/2021	60.0	64.5	54.2
3	T1 Terminal Nr.Marine Building		N 22°43.969'	E 69°42.347'	04 & 05/10/2021	63.6	67.5	59.4
4	CT-3 DG House		N 22°47.259'	E 69°33.8'	11 & 12/10/2021	62.6	67.2	55.4

Ravi Jariwala

Ravi Jariwala
Sr. Environmental Scientist

Dr. Arun Bajpai

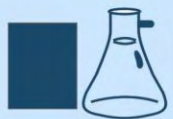
Dr. Arun Bajpai
Lab Manager (Q)

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, Navjivan Circle, Udhana Magdalla Road, Surat-395007, Gujarat, India.

Phone : 0261-2635750, 0261-2635751, 0261-2635775, 0701660511 Page 105 of 110 www.polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com



TEST REPORT FOR STACK GAS MONITORING

QF/7.8/19-ST

Page: 1 of 1

Customer's Name and Address :

**M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.
PLOT NO. 169/P, AT – NAVINAL ISLAND,
TAL. – MUNDRA, DIST. - KUTCH – 370421.**

Test Report No. : **PL/AM 0982**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O**

STACK DETAILS

Location of Sampling	: Hot Water System-1 (Liquid Terminal)	Sampling Procedure	: As per table
Date of Sampling	: 16/10/2021	Protocol (purpose)	: Stack Gas Monitoring
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AMS/2110/01 [A-C]
Sample Receipt Date	: 18/10/2021	Date of Completion	: 21/10/2021
Date of Starting of Test	: 18/10/2021	Fuel Used*	: Furnace Oil
Stack Temperature	: 122°C	Stack Velocity	: 4.83 m/sec
Stack Height [#]	: 30 meter		
Instrument Used	: Vayubodhan Stack Monitoring Sampler VSS 1 Sr. No. 930 DTO 11		

RESULT TABLE

SR. NO.	TEST PARAMETER	UNIT	RESULTS	GPCB LIMIT [#]	TEST/SAMPLING METHOD
1	Particulate Matter	mg/Nm ³	30.61	150	IS 11255 (Part-1): 2014
2	Sulphur Dioxide	ppm	5.55	100	IS 11255 (Part-2): 2017
3	Oxide of Nitrogen	ppm	34.62	50	IS 11255 (Part-7): 2014

**Details provided by customer, #As per CC & A No. AWH - 83561 Dated: 09/01/2017 Valid up to 20/11/2021.

Results on 11 % O₂ Correction when Oxygen is greater than 11 % and 12 % CO₂ Correction when CO₂ is less than 12 %

Ravi J.

Ravi Jariwala
Sr. Environmental Scientist

Arun B.

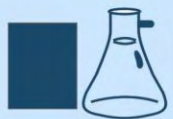
Dr. Arun Bajpai
Lab Manager (Q)

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Navjivan Circle, Udhana Magdalla Road, Surat-395007, Gujarat, India.

Phone : 0261-2635750, 0261-2635751, 0261-2635775, 0701660511 Page 106 of 110
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TEST REPORT FOR STACK GAS MONITORING

QF/7.8/19-ST

Page: 1 of 1

Customer's Name and Address :

**M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.
PLOT NO. 169/P, AT – NAVINAL ISLAND,
TAL. – MUNDRA, DIST. - KUTCH – 370421.**

Test Report No. : **PL/AM 0983**

Issue Date : **16/11/2021**

Customer's Ref. : **As Per W.O**

STACK DETAILS

Location of Sampling	: Thermic Fluid Heater (Bitumin-1)	Sampling Procedure	: As per table
Date of Sampling	: 16/10/2021	Protocol (purpose)	: Stack Gas Monitoring
Sampling By	: Pollucon Laboratories Pvt. Ltd.	Lab ID	: AMS/2110/02 [A-C]
Sample Receipt Date	: 18/10/2021	Date of Completion	: 21/10/2021
Date of Starting of Test	: 18/10/2021	Fuel Used*	: High Speed Diesel
Stack Temperature	: 106°C	Stack Velocity	: 5.80 m/sec
Stack Height [#]	: 30 meter		
Instrument Used	: Vayubodhan Stack Monitoring Sampler VSS 1 Sr. No. 930 DTO 11		

RESULT TABLE

SR. NO.	TEST PARAMETER	UNIT	RESULTS	GPCB LIMIT [#]	TEST/SAMPLING METHOD
1	Particulate Matter	mg/Nm ³	26.74	150	IS 11255 (Part-1): 2014
2	Sulphur Dioxide	ppm	4.45	100	IS 11255 (Part-2): 2017
3	Oxide of Nitrogen	ppm	29.37	50	IS 11255 (Part-7): 2014

**Details provided by customer, #As per CC & A No. AWH - 83561 Dated: 09/01/2017 Valid up to 20/11/2021.
Results on 11 % O₂ Correction when Oxygen is greater than 11 % and 12 % CO₂ Correction when CO₂ is less than 12 %

Ravi J.

Ravi Jariwala
Sr. Environmental Scientist

Arun B.

Dr. Arun Bajpai
Lab Manager (Q)

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“Half Yearly Environmental Monitoring Reports “



M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT - NAVINAL ISLAND, TAL. - MUNDRA, DIST. - KUTCH - 370421.

Monitoring Period: November – 2021 to March - 2022

Submitted By



UniStar Environment & Research Labs Pvt. Ltd.

White House, Near GIDC Office, Char Rasta, Vapi, Gujarat, India – 396195



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	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.00	7.81	7.98	7.92	8.03	7.99	8.12	8.02	8.08	7.98	IS 3025 (Part11)1983
2.	Temperature	°C	30	30	29.8	29.7	29.9	29.7	30.1	30	30.2	30.1	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	120	84	116	102	108	98	112	106	118	111	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.7	BDL	2.6	BDL	3.1	BDL	2.8	BDL	2.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.7	6.5	6.1	5.9	6.2	6.1	6.1	6	6	5.9	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35	33.4	35.41	35.64	35.38	35.94	35.28	35.82	34.89	35.14	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	2.59	1.7	2.59	2.16	3.02	2.15	2.37	2.15	2.59	2.15	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	BDL	BDL	0.077	0.064	0.095	0.086	0.11	0.103	0.121	0.112	APHA 23 rd Ed.,2017,4500NO2B
10.	Ammonical Nitrogen as NH ₃	µmol/L	11.34	10.4	7.32	6.89	3.23	3.02	1.94	1.51	2.33	2.15	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	24.6	23.7	15.51	14.22	9.7	9.05	4.01	3.19	5.34	5.17	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36820	31828	37360	37412	36844	36902	36124	36684	35894	36544	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	12.3	8.2	20.1	16.1	24.4	20.4	12.05	8.03	8.11	N.D.	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A													
1.	Chlorophyll	mg/m ³	2.87	2.45	2.44	2.63	2.58	2.47	2.38	2.89	2.2	2.36	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.98	0.86	0.52	0.74	0.69	0.81	0.71	0.78	0.36	0.63	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	153	76	109	69	110	71	154	90	148	100	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Pleurosig ma</i>	<i>Biddulphi a</i>	<i>Biddulphi a</i>	<i>Cyclotella</i>	<i>Rhizosole nia</i>	<i>Coscinodi scus</i>	<i>Pleurosig ma</i>	<i>Cyclotella</i>	<i>Rhizosole nia</i>	<i>Biddulphi a</i>	APHA (23rd Ed. 2017)10200 F
			<i>Cyclotella</i>	<i>Diplotella</i>	<i>Fragillari a</i>	<i>Pinnulari a</i>	<i>Fragillari a</i>	<i>Pinnulari a</i>	<i>Cyclotella</i>	<i>Pinnulari a</i>	<i>Fragillari a</i>	<i>Fragillari a</i>	
			<i>Ceratium</i>	<i>Odontell a</i>	<i>Odentella</i>	<i>Skeletone ma</i>	<i>Cyclotella</i>	<i>Thalassio thrix</i>	<i>Ceratium</i>	<i>Skeletone ma</i>	<i>Thalassio thrix</i>	<i>Odentella</i>	
			<i>Skeletone ma</i>	<i>Dinophys is</i>	<i>Grammat ophora</i>	<i>Thallassi osira</i>	<i>Grammat ophora</i>	<i>Ceratium</i>	<i>Skeletone ma</i>	<i>Thallassi osira</i>	<i>Grammat ophora</i>	<i>Grammat ophora</i>	
			<i>Thallassi osira</i>	<i>Surirella</i>	<i>Melosira</i>	<i>Thalassio nema</i>	<i>Melosira</i>	<i>Thalassio nema</i>	<i>Thallassi osira</i>	<i>Thalassio nema</i>	<i>Ceratium</i>	<i>Melosira</i>	
B													
Zooplankton													
1	Abudance(Popul ation)	noX1 03/ 100 m3	29		32		28		36		30		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Copepods</i>		<i>Copepods</i>		<i>Siphonephora</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Decapoda</i>		<i>Decapoda</i>		<i>Decapoda</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		
			<i>Gastropos Larvae</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		
			<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean</i>		<i>Crustacean</i>		
3	Total Biomass	ml/10 0 m ³	15.47		14.63		15.32		14.23		15.63		

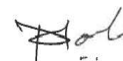
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RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

RESULTS OF MARINE WATER (MID LEFT SIDE OF DOCHA CREEK - N 22 45 10S E 065 45 E 12)													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological												
1	Total Bacterial Count	CFU/m l	220		230		212		202		198		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	32		68		40		54		42		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	25		35		28		12		18		IS :15185:2016
4	Enterococcus	/100ml	10		21		19		11		12		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021 SEDIMENT	DECEMBER 2021 SEDIMENT	JANUARY 2022 SEDIMENT	FEBRUARY 2022 SEDIMENT	MARCH 2022 SEDIMENT	TEST METHOD
1.	Organic Matter	%	2.15	1.54	1.12	0.94	0.81	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	544.3	560.7	544.2	496.4	542.2	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	1.62	1.86	2.12	2.36	2.68	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	19	31	33.4	55.4	64.4	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	360.13	412.6	428.8	488.6	512.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	1.52	1.85	2.24	2.64	2.89	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	21.14	22.25	26.31	28.62	30.12	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	16.61	16.52	15.84	20.25	25.41	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	31.7	40.2	44.4	60.2	66.85	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	5.88	5.46	6.12	5.16	4.86	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

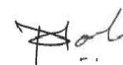
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RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021 SEDIMENT	DECEMBER 2021 SEDIMENT	JANUARY 2022 SEDIMENT	FEBRUARY 2022 SEDIMENT	MARCH 2022 SEDIMENT	TEST METHOD
D			Benthic Organisms					
1	Macrobenthos	--	<i>Bivalves</i>	<i>Decapod Larvae</i>	<i>Decapod Larvae</i>	<i>Isopods</i>	<i>Bivalves</i>	APHA (23rd Ed. 2017)10500 C
			<i>Gastropods</i>	<i>Gastropods</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Nemertine</i>	
			<i>Polychates</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	
			<i>Decapod Larvae</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Gastropods</i>	<i>Gastropods</i>	
2	MeioBenthos	--	<i>Turbellarians</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Turbellarians</i>	<i>Foraminiferan</i>	
			<i>Nematods</i>	<i>Polychates</i>	<i>Foraminiferan</i>	<i>Polychates</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	281	279	305	299	342	



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.97	7.93	7.96	7.86	8.11	8.07	8.06	7.98	8.11	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	30	30	30	29.8	29.8	29.7	29.9	29.7	30.1	30	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	112	76	118	94	112	102	118	106	116	109	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.2	BDL	2.8	BDL	2.6	BDL	2.9	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.7	6.4	5.9	5.7	6	5.9	5.9	5.8	5.8	5.7	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	34.1	33.6	35.11	35.36	35.88	36.12	35.64	36.16	35.43	35.98	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	2.2	2.6	2.59	2.59	2.15	1.72	2.84	2.37	3.02	2.59	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.073	0.068	0.108	0.103	0.129	0.121	0.112	0.108	APHA 23 rd Ed.,2017,4500NO2B
10.	Ammonical Nitrogen as NH ₃	μmol/L	10.3	9.5	6.89	5.17	3.66	3.45	2.15	1.94	3.02	2.59	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	25.3	23.6	14.22	10.77	10.99	10.34	4.44	4.01	6.94	5.95	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	31716	37340	37128	37392	37406	37742	36822	37128	36524	37192	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	10.3	6.3	16.1	12.1	16.3	12.2	16.06	12.05	16.22	12.17	APHA 23 rd Ed.,2017, 5220-B

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

SR. NO	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ₃	2.67	2.32	2.88	2.39	2.74	2.98	2.68	2.56	3.21	2.87	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ₃	0.87	0.94	0.78	0.69	0.85	0.84	0.59	0.7	0.84	0.69	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	137	76	132	84	125	90	106	102	120	130	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Cyclotella</i>	<i>Ceratium</i>	<i>Odontella</i>	<i>Diploneis</i>	<i>Odontella</i>	<i>Odontella</i>	<i>Cyclotella</i>	<i>Melosira</i>	<i>Pinnularia</i>	<i>Melosira</i>	APHA (23rd Ed. 2017)10200 F
			<i>Fragillaria</i>	<i>Melosira</i>	<i>Cyclotella</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Grammatophora</i>	<i>Fragillaria</i>	<i>Pinnularia</i>	<i>Biddulphia</i>	<i>Pinnularia</i>	
			<i>Diniphyss</i>	<i>Nitzschia</i>	<i>Pinnularia</i>	<i>Nitzschia</i>	<i>Pinnularia</i>	<i>Biddulphia</i>	<i>Diniphyss</i>	<i>Skeletonema</i>	<i>Navicula</i>	<i>Skeletonema</i>	
			<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	
			<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	
B	Zooplankton												
1	Abundance(Population)	noX10 ³ / 100 m ³	39		25		31		41		38		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Copepods nauplii</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Crustacean</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Decapoda</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Siphonophora</i>		<i>Oikoplura</i>		
			<i>Copepods</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean</i>		<i>Crustacean Larvae</i>		
			<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Oikoplura</i>		<i>Crustacean</i>		
		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>			
3	Total Biomass	ml/100 m ³	17.50		15.26		16.21		17.52		16.45		

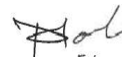
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RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

RESULTS OF MARINE WATER (121 MOUTH OF BOCHA & NAVARAL CREEK - N 22 44 255 - E 003 48 797)													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological												
1	Total Bacterial Count	CFU/ml	110		254		190		176		126		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		50		42		33		42		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	32		19		32		24		21		IS :15185:2016
4	Enterococcus	/100ml	12		9		12		8		15		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.9	0.94	0.82	0.72	0.59	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	606.5	610.21	586.4	602.1	584.3	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	1.22	1.66	1.84	2.12	2.38	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	16.07	15.86	17.85	48.6	55.6	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	361.51	355.2	384.4	444.2	462.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	1.18	1.78	2.04	2.22	2.41	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	19.41	18.15	19.14	26.21	31.22	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	11.14	12.1	14.21	22.31	28.33	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	34.44	31.7	29.82	36.84	40.24	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	3.51	3.14	3.56	3.42	3.12	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

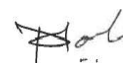
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RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
D			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
			Benthic Organisms					
1	Macrobenthos	--	<i>Decapod Larvae</i>	--	<i>Gastropods</i>	<i>Sipunculids</i>	<i>Gastropods</i>	APHA (23rd Ed. 2017)10500 C
			<i>Gastropods</i>	--	Decapods Larvae	Decapods Larvae	Decapods Larvae	
			<i>Isopods</i>	--	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	
			<i>Amphipods</i>	--	<i>Isopods</i>	<i>Isopods</i>	<i>Sipunculids</i>	
2	MeioBenthos	--	<i>Herpectacoids</i>	--	<i>Polychates</i>	<i>Foraminiferan</i>	<i>Polychates</i>	
			<i>Polychates</i>	--	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	325	--	296	303	269	



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Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.83	7.92	7.94	7.9	7.98	7.94	8.14	8.04	8.09	7.94	IS 3025 (Part11)1983
2.	Temperature	°C	30	30	29.9	29.8	29.9	29.8	30	29.9	30.1	30	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	116	88	104	78	92	82	114	96	122	108	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	2.7	BDL	3	BDL	2.9	BDL	3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.6	6.4	5.9	5.8	6	5.9	6.1	6	6	5.9	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.2	35.4	35.97	36.24	36.04	36.32	35.88	36.12	36.18	36.29	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	2.2	2.2	2.16	2.16	2.59	2.15	2.59	2.37	3.45	3.02	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.081	0.068	0.142	0.129	0.151	0.138	0.138	0.129	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	12.6	11.8	6.89	4.74	4.09	3.88	3.36	2.54	2.8	2.33	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	26.1	24.9	14.65	11.21	12.28	11.64	6.94	5.26	6.94	5.34	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36064	32952	35412	36164	36202	36844	35944	36438	36124	36748	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	12.3	8.2	8	4	8.2	4.1	20.08	16.06	16.22	8.11	APHA 23 rd Ed.,2017, 5220-B

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ₃	2.34	2.21	2.89	2.45	2.71	2.65	2.44	2.35	2.54	2.45	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ₃	0.87	0.82	0.96	0.65	0.82	0.75	0.69	0.56	0.86	0.78	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	125	70	102	71	121	68	115	74	106	98	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	Navicula	Surirella	Pinnulari a	Coscinodiscus	Pinnulari a	Coscinodiscus	Coscinodiscus	Surirella	Cyclotell a	Surirella	APHA (23rd Ed. 2017)10200 F
			Cyclotell a	Rhizosolenia	Biddulphia	Diploneis	Biddulphia	Pinnulari a	Diploneis	Rhizosolenia	Pinnulari a	Rhizosolenia	
			Pinnulari a	Nitzschia	Navicula	Rhizosolenia	Navicula	Rhizosolenia	Rhizosolenia	Nitzschia	Skeletonema	Nitzschia	
			Skeletonema	Thalassionema	Thallassosira	Dinophysis	Thallassosira	Dinophysis	Dinophysis	Thalassionema	Thallassosira	Thalassionema	
			Thallassosira	Pleurosigma	Skeletonema	Thalassionema	Skeletonema	Thalassionema	Thalassionema	Pleurosigma	Thalassionema	Pleurosigma	
B	Zooplankton												
1	Abudance(Population)	noX10 ³ / 100 m ³	21		22		32		29		30		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		Copepods nauplii		Copepods		Copepods		Copepods nauplii		Oikoplura		
			Oikoplura		Bivalve Larvae		Crustacean		Decapoda		Copepods		
			Crustacean Larvae		Crustacean		Siphonophora		Copepods		Crustacean Larvae		
			Crustacean		Egg(Fish and Shrimps)		Egg(Fish and Shrimps)		Crustacean		Crustacean		
3	Total Biomass	ml/100 m ³	Egg(Fish aNot Detected Shrimps)		Siphonophora		Oikoplura		Bivalve Larvae		Bivalve Larvae		
			18.0		12.48		13.62		14		13.95		

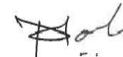
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RESULTS OF MARINE WATER [M3 EAST OF BOCHASLANOT DETECTED - N 22°46'53" E 069°41'690"]

RESULTS OF MARINE WATER [MS EAST OF BOCHAISSANO] DETECTED - N 22 48 556 E 665 41 036													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological										
1	Total Bacterial Count	CFU/ml	290		190		152		160		210		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	68		42		51		49		36		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	46		26		23		31		26		IS :15185:2016
4	Enterococcus	/100ml	20		16		20		26		19		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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Mr. Nitin Tandel
Technical Manager

RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHASLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	2.34	1.52	1.16	0.96	0.72	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	496.7	545.6	564.2	544.3	591.2	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	1.48	1.69	1.94	2.44	2.56	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	17.74	32	31.8	62.1	74.23	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	222.95	260.4	255.2	312.2	344.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	1.42	1.72	2.21	2.36	2.48	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	19.4	20.84	24.85	30.24	34.51	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	15.66	15.92	18.96	26.1	30.22	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	36.09	42.2	44.78	52.66	56.85	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	5.43	5.12	6.14	5.56	4.98	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

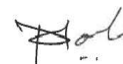
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RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHASLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
D			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
			Benthic Organisms					
1	Macrobenthos	--	<i>Sipunculids</i>	<i>Bivalves</i>	<i>Amphipods</i>	<i>Nemertine</i>	<i>Amphipods</i>	APHA (23rd Ed. 2017)10500 C
			<i>Nemertine</i>	<i>Nemertine</i>	<i>Decapod Larvae</i>	<i>Decapod Larvae</i>	<i>Decapod Larvae</i>	
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	
			<i>Amphipods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	
2	MeioBenthos	--	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	
			<i>Nematods</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Polychates</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	313	290	330	263	256	



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Mr. Nitin Tandel
Technical Manager

RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.97	7.5	7.82	7.78	7.99	7.93	8.06	8.01	8.14	8.06	IS 3025 (Part11)1983
2.	Temperature	°C	30	30	29.9	29.8	30	29.9	30.1	30	30.2	30.1	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	122	96	134	106	118	104	102	84	114	98	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.1	BDL	2.7	BDL	3.1	BDL	2.8	BDL	3.2	BDL	IS 3025(Part 4)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.5	6.3	6	5.8	6.1	6	6.1	6	6.2	6.1	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.1	36.3	35.85	36.06	35.94	36.12	36.14	36.46	35.86	36.21	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991,Amd.2
8.	Nitrate as NO ₃	μmol/L	2.2	1.3	2.59	2.16	3.02	2.59	3.23	2.8	3.02	2.59	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.06	BDL	0.129	0.121	0.099	0.095	0.121	0.112	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	10.6	10.2	6.89	5.6	3.66	3.23	3.62	3.36	3.23	3.02	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	1.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	24.3	23.3	14.22	12.07	10.99	9.7	7.41	6.94	7.46	6.94	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	32184	36108	34636	35440	35222	35984	35864	36534	35712	36310	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	14.3	8.2	12.1	8	28.5	24.4	20.08	16.06	24.34	20.28	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. N O.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ₃	2.74	2.53	2.84	2.42	2.41	2.36	2.74	2.59	2.54	2.75	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ₃	0.89	0.92	0.93	0.73	0.53	0.74	0.63	0.66	0.86	0.65	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	120	71	121	63	132	71	142	87	132	98	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Cyclotella</i>	<i>Coscinodiscus</i>	<i>Rhizosolenia</i>	<i>Melosira</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	<i>Cyclotella</i>	<i>Ceratium</i>	<i>Diploneis</i>	<i>Ceratium</i>	APHA (23rd Ed. 2017)10200 F
			<i>Fragillaria</i>	<i>Diploneis</i>	<i>Fragillaria</i>	<i>Pinnularia</i>	<i>Fragillaria</i>	<i>Coscinodiscus</i>	<i>Fragillaria</i>	<i>Melosira</i>	<i>Rhizosolenia</i>	<i>Melosira</i>	
			<i>Navicula</i>	<i>Nitzschia</i>	<i>Thalassiothrix</i>	<i>Skeletonema</i>	<i>Thalassiothrix</i>	<i>Cyclotella</i>	<i>Navicula</i>	<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Nitzschia</i>	
			<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Cyclotella</i>	<i>Dinophysis</i>	
			<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Ceratium</i>	<i>Thalassionema</i>	<i>Ceratium</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	
B	Zooplankton												
1	Abundance(Population)	noX10 ³ / 100 m ³	36		27		22		30		36		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Crustacean</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean</i>		
			<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		
			<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		
			<i>Oikoplura</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Oikoplura</i>		
		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>			
3	Total Biomass	ml/100 m ³	14.08		14.12		15.36		15.32		14.35		

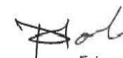
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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

RESULTS OF MARINE WATER (M4) SODAS NOT DETECTED (BARN 22 47 577 E 005 45 000)													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological												
1	Total Bacterial Count	CFU/ml	228		248		220		198		186		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	69		46		35		32		40		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	23		30		29		21		19		IS :15185:2016
4	Enterococcus	/100ml	31		22		15		14		9		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.6	0.55	0.62	0.44	0.48	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	584.1	602.4	620.4	634.1	602.2	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	1.49	2.03	2.28	2.54	2.86	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	11.86	18.4	22.8	36.2	42.92	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	234.64	270.3	310.4	334.2	351.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	1.43	1.98	2.35	2.42	2.68	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	15.14	18.69	22.46	33.24	38.22	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	9.02	11.28	14.74	19.28	23.45	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	19.57	24.1	25.5	32.14	38.94	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	5.33	4.89	5.14	4.86	4.65	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
D			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
			Benthic Organisms					
1	Macrobenthos	--	<i>Bivalves</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	APHA (23rd Ed. 2017)10500 C
			<i>Gastropods</i>	Decapods Larvae	Decapods Larvae	Decapods Larvae	Decapods Larvae	
			<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	
2	MeioBenthos	--	<i>Nematods</i>	<i>Polychates</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	
			<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	363	374	298	270	321	



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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.78	8.08	7.9	7.86	7.86	7.81	7.92	7.84	7.99	7.89	IS 3025 (Part11)1983
2.	Temperature	°C	30	30	29.8	29.7	29.9	29.8	29.9	29.8	30	29.9	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	114	82	122	104	138	116	126	114	104	92	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.0	BDL	2.6	BDL	2.9	BDL	2.6	BDL	2.4	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.6	6.5	6	5.9	6.2	6.1	6.1	6	6	5.9	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.5	35	35.67	35.88	35.55	35.72	35.62	35.89	35.55	35.92	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd.2
8.	Nitrate as NO ₃	μmol/L	2.2	1.3	2.59	2.16	2.59	2.15	3.02	2.84	2.59	2.15	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.064	0.056	0.151	0.142	0.134	0.121	0.147	0.138	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	11.2	10.2	6.46	6.03	4.09	3.97	1.72	1.51	3.45	3.22	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	25.1	24.4	13.36	12.49	12.28	11.9	3.53	3.19	7.93	7.46	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	34940	36916	35736	35812	35248	35946	35566	36242	35248	35890	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	14.3	8.2	8	4	20.4	16.3	16.06	12.05	12.17	8.11	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ³	2.79	2.58	2.74	2.22	2.65	2.32	2.7	2.41	2.7	2.39	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.70	0.83	0.69	0.88	0.59	0.72	0.5	0.56	0.68	0.58	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	118	74	102	66	112	72	100	63	68	74	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Grammatophora</i>	<i>Coscinodiscus</i>	<i>Grammatophora</i>	<i>Coscinodiscus</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	APHA (23rd Ed. 2017)10200 F
			<i>Fragillaria</i>	<i>Pinnularia</i>	<i>Dinophysis</i>	<i>Thalassionema</i>	<i>Dinophysis</i>	<i>Thalassionema</i>	<i>Fragillaria</i>	<i>Diplotella</i>	<i>Fragillaria</i>	<i>Diplotella</i>	
			<i>Odontella</i>	<i>Skeletonema</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Odontella</i>	<i>Odontella</i>	<i>Odontella</i>	<i>Odontella</i>	
			<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Fragillaria</i>	<i>Dinophysis</i>	<i>Skeletonema</i>	<i>Fragillaria</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	
			<i>Melosira</i>	<i>Thalassionema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Melosira</i>	<i>Surirella</i>	<i>Melosira</i>	<i>Surirella</i>	
B	Zooplankton												
1	Abundance(Population)	noX10 ³ / 100 m ³	24		35		41		52		29		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Copepods</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Oikoplura</i>		<i>Copepods nauplii</i>		
			<i>Decapoda</i>		<i>Siphonophora</i>		<i>Siphonophora</i>		<i>Crustacean</i>		<i>Decapoda</i>		
			<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean Larvae</i>		<i>Copepods</i>		
			<i>Egg(Fish and Shrimps)</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Crustacean</i>		<i>Crustacean</i>		
			<i>Oikoplura</i>		<i>Bivalve Larvae</i>		<i>Egg(Fish and Shrimps)</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		
3	Total Biomass	ml/100 m ³	15.21		15.62		16.24		18.23		16.75		

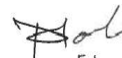
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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

RESULTS OF MARINE WATER (MS) TOWARDS WESTERN SIDE OF EAST PORT N 22 48 541 E 003 47 236													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological										
1	Total Bacterial Count	CFU/ml	280		274		250		236		186		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	74		50		36		28		30		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	26		36		29		18		22		IS :15185:2016
4	Enterococcus	/100ml	30		26		24		11		10		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part VI):1976



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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	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.46	0.48	0.44	0.53	0.46	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	625.8	602.2	623.1	588.2	542.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	0.89	1.26	1.64	1.98	2.29	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	5.02	12.2	16.8	24.1	30.44	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	209.11	240.2	256.4	288.2	342.1	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	0.67	1.22	1.84	2.03	2.34	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	9.44	11.25	12.11	22.42	31.11	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	3.81	4.05	4.24	9.24	12.24	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	8.03	10.2	12.4	16.94	22.68	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	4.13	4.06	4.63	4.44	3.94	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

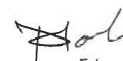
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RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
D			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
			Benthic Organisms					
1	Macrobenthos	--	Decapod Larvae	Decapod Larvae	Decapod Larvae	Gastropods	Decapods Larvae	APHA (23rd Ed. 2017)10500 C
			Gastropods	Nemertine	Nemertine	Polychates	Polychates	
			Bivalves	Bivalves	Isopods	Isopods	Isopods	
			Amphipods	Amphipods	Amphipods	Amphipods	Amphipods	
2	MeioBenthos	--	Herpectacoids	Nematods	Herpectacoids	Turbellarians	Turbellarians	
			Polychates	Polychates	Foraminiferan	Foraminiferan	Foraminiferan	
3	Population	no/m ²	383	358	324	356	220	



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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.3	7.97	7.99	7.93	8.14	8.09	8.09	8.02	8.16	8.04	IS 3025 (Part11)1983
2.	Temperature	°C	30	29	30	29.8	29.9	29.8	30	29.9	30.1	30	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	112	92	118	94	128	112	136	118	128	112	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.2	BDL	2.7	BDL	2.9	BDL	3.1	BDL	2.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.4	6.3	5.9	5.7	6.2	6.1	6.1	6	6	5.9	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	34.5	35.8	35.93	36.28	35.44	35.74	35.21	35.53	35.34	35.88	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	1.7	1.3	2.59	2.16	3.02	2.59	2.59	2.37	3.88	3.45	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.064	0.056	0.121	0.112	0.129	0.108	0.155	0.147	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	10.3	9.5	4.74	4.31	3.97	3.53	2.54	2.15	4.31	3.66	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	23.3	22.5	9.91	9.05	11.9	10.6	5.26	4.44	9.91	8.45	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	33908	33416	36528	36996	36508	37022	35428	36334	35625	36107	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	10.5	6.3	16.1	12.1	12.2	8.2	8.03	4.02	8.11	4.06	APHA 23 rd Ed.,2017, 5220-B

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ³	2.9	2.45	2.69	2.12	2.69	2.42	2.71	2.56	2.87	2.44	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.75	0.86	0.78	0.92	0.61	0.89	0.75	0.64	0.9	0.75	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	115	73	146	84	136	78	123	85	132	70	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Odontella</i>	<i>Diploneis</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	<i>Surirella</i>	<i>Skeletonema</i>	<i>Odontella</i>	<i>Diploneis</i>	<i>Odontella</i>	<i>Diploneis</i>	APHA (23rd Ed. 2017)10200 F
			<i>Cyclotella</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Diplotella</i>	<i>Cyclotella</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Rhizosolenia</i>	
			<i>Pinnularia</i>	<i>Nitzschia</i>	<i>Biddulphia</i>	<i>Odontella</i>	<i>Biddulphia</i>	<i>Odontella</i>	<i>Pinnularia</i>	<i>Nitzschia</i>	<i>Pinnularia</i>	<i>Nitzschia</i>	
			<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Skeletonema</i>	<i>Dinophysis</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	
			<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Surirella</i>	<i>Thalassiosira</i>	<i>Surirella</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	
B	Zooplankton												
1	Abundance(Population)	noX10 ³ / 100 m ³	31		26		30		32		41		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Oikoplura</i>		<i>Copepods</i>		<i>Crustacean Larvae</i>		<i>Egg(Fish and Shrimps)</i>		<i>Copepods</i>		
			<i>Crustacean</i>		<i>Decapoda</i>		<i>Crustacean</i>		<i>Oikoplura</i>		<i>Decapoda</i>		
			<i>Crustacean Larvae</i>		<i>Gastropos Larvae</i>		<i>Gastropos Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean</i>		
			<i>Crustacean</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean</i>		<i>Egg(Fish and Shrimps)</i>		
3	Total Biomass	ml/100 m ³	14.9		14.32		14.52		15.63		17.25		

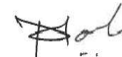
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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

RESULTS OF MARINE WATER (NW EAST PORT W2 47 125 E 665 47 116)													
SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological												
1	Total Bacterial Count	CFU/ml	298		150		186		148		158		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	60		23		35		40		33		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	49		13		25		26		21		IS :15185:2016
4	Enterococcus	/100ml	24		7		10		12		18		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.95	7.9	7.8	7.77	7.98	7.92	7.99	7.91	8.12	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29	30	29.9	29.8	30	29.9	30.1	30	30.2	30.1	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	108	80	112	104	108	92	122	98	104	88	APHA 23 rd Ed.,2017,2540-D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	2.9	BDL	3.2	BDL	3.1	BDL	2.4	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.5	6.3	5.8	5.7	5.9	5.8	6.1	6	6.2	6.3	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.7	35.4	35.11	35.63	35.26	35.56	35.18	35.62	35.14	35.58	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	2.2	1.7	2.59	2.59	2.59	2.15	2.37	2.15	2.59	2.15	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.064	0.047	0.108	0.103	0.099	0.095	0.121	0.112	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	12.3	11.2	4.74	4.31	5.17	4.74	3.62	3.63	4.09	3.66	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	25.5	24.6	9.91	9.48	12.93	11.85	7.41	6.94	9.44	8.45	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	37168	32908	37604	37724	37124	37644	36594	37164	36424	37128	APHA 23 rd Ed.,2017, 2540-C
15.	COD	mg/L	12.3	8.2	12.1	8	8.2	4.1	12.05	8.03	20.28	12.17	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ₃	2.92	2.38	2.54	2.42	2.36	2.39	2.89	2.45	3.02	2.69	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ₃	0.87	0.74	0.79	0.8	0.58	0.81	0.77	0.9	1.1	0.86	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	108	68	129	85	106	70	96	88	142	110	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Pinnularia</i>	<i>Coscinodiscus</i>	<i>Cyclotella</i>	<i>Ceratium</i>	<i>Cyclotella</i>	<i>Ceratium</i>	<i>Pinnularia</i>	<i>Coscinodiscus</i>	<i>Pinnularia</i>	<i>Coscinodiscus</i>	APHA (23rd Ed. 2017)10200 F
			<i>Biddulphia</i>	<i>Diploneis</i>	<i>Fragillaria</i>	<i>Melosira</i>	<i>Fragillaria</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Diploneis</i>	<i>Biddulphia</i>	<i>Diploneis</i>	
			<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	<i>Nitzschia</i>	<i>Melosira</i>	<i>Coscinodiscus</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	
			<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	
			<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	
B	Zooplankton												
1	Abudance(Population)	noX10 ³ / 100 m3	18		34		25		36		42		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Copepods</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		
			<i>Bivalve Larvae</i>		<i>Decapoda</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		
			<i>Crustacean</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Copepods</i>		
			<i>Egg(Fish and Shrimps)</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		
			<i>Siphonephora</i>		<i>Bivalve Larvae</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		
3	Total Biomass	ml/100 m ³	10.6		16.23		15.85		13.25		15.55		

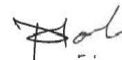
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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

C	Microbiological							
1	Total Bacterial Count	CFU/ml	250	142	174	200	244	APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	38	45	40	29	36	APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	21	21	31	22	29	IS :15185:2016
4	Enterococcus	/100ml	29	6	9	10	18	IS:15186:2002
5	Salmonella	/100ml	Absent	Absent	Absent	Absent	Absent	IS:15187:2016
6	Shigella	/100ml	Absent	Absent	Absent	Absent	Absent	APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent	Absent	Absent	Absent	Absent	IS: 5887 (Part V):1976



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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.67	0.52	0.54	0.56	0.49	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	563.7	588.2	602.4	542.2	562.2	IS: 10158 :1982, RA. 2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED, 2017, 5520 F
5.0	Heavy Metals							
5.1	Aluminum as Al	%	1.12	1.38	1.69	1.88	2.29	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	9.49	15.4	18.8	26.1	33.94	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	294.27	318.4	312.4	341.1	402.1	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	1	1.42	1.98	2.14	2.36	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	12.99	12.01	12.84	18.36	22.68	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	7.85	8.01	8.44	12.28	16.88	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	17.74	18.9	19.4	28.97	36.84	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	6.36	5.85	6.14	5.68	5.14	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

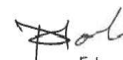
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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022	TEST METHOD
D			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Macrobenthos	--	<i>Sipunculids</i>	<i>Bivalves</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Decapod Larvae</i>	APHA (23rd Ed. 2017)10500 C
			<i>Decapod Larvae</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	
			<i>Gastropods</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Isopods</i>	
			<i>Amphipods</i>	<i>Decapod Larvae</i>	<i>Decapod Larvae</i>	<i>Decapod Larvae</i>	<i>Amphipods</i>	
2	MeioBenthos	--	<i>Foraminiferan</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Herpectacoids</i>	
			<i>Nematods</i>	<i>Nematods</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Polychates</i>	
3	Population	no/m ²	462	268	274	274	396	



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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.78	8.03	7.99	7.93	7.86	7.78	7.92	7.87	8.11	8.04	IS 3025 (Part11)1983
2.	Temperature	°C	29	29	29.8	29.7	30	29.9	30	29.9	30.1	30	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	116	94	134	106	124	102	144	118	136	114	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	2.7	BDL	3.1	BDL	3	BDL	3.3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.4	6.2	5.8	5.7	6.1	6	6.2	6.1	6.1	6	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.8	35.8	35.41	35.63	35.58	36.04	35.66	35.94	35.28	35.77	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	1.7	1.3	2.59	2.16	2.15	1.72	3.45	3.23	3.02	2.59	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.081	0.068	0.121	0.108	0.138	0.129	0.112	0.108	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	10.6	9.7	5.17	4.74	3.36	3.19	4.05	3.62	4.31	4.09	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	24.1	22.9	12.07	9.91	8.4	7.97	8.36	7.41	9.91	9.44	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36964	37992	35444	35740	36122	36566	36844	37386	37246	37990	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	12.3	6.2	12.1	8	16.3	12.2	8.03	4.02	28.39	16.22	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m³	2.76	2.31	2.25	2.36	2.63	2.52	2.76	2.4	2.97	2.76	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.85	0.80	0.69	0.91	0.56	0.86	0.66	0.71	0.98	0.36	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	115	70	135	68	124	72	130	56	125	86	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	Rhizosolenia	Melosira	Navicula	Surirella	Navicula	Surirella	Rhizosolenia	Navicula	Rhizosolenia	Navicula	APHA (23rd Ed. 2017)10200 F
			Fragillaria	Pinnularia	Cyclotella	Rhizosolenia	Cyclotella	Grammatophora	Fragillaria	Cyclotella	Fragillaria	Cyclotella	
			Thalassiothrix	Skeletonema	Pinnularia	Nitzschia	Pinnularia	Nitzschia	Thalassiothrix	Pinnularia	Thalassiothrix	Pinnularia	
			Grammatophora	Thalassiosira	Skeletonema	Thalassionema	Skeletonema	Thalassionema	Grammatophora	Skeletonema	Grammatophora	Skeletonema	
			Ceratium	Thalassiosira	Thalassiosira	Pleurosigma	Thalassiosira	Dinophysis	Ceratium	Thalassiosira	Ceratium	Thalassiosira	
B	Zooplankton												
1	Abundance(Population)	noX10³/ 100 m3	38		28		21		28		29		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		Egg(Fish aNot Detected Shrimps)		Copepods nauplii		Copepods nauplii		Copepods nauplii		Copepods nauplii		
			Oikoplura		Oikoplura		Oikoplura		Oikoplura		Oikoplura		
			Crustacean Larvae		Crustacean Larvae		Crustacean Larvae		Crustacean Larvae		Crustacean Larvae		
			Crustacean		Crustacean		Crustacean		Crustacean		Crustacean		
3	Total Biomass	ml/100 m³	13.62		16.56		13.24		14.36		13.56		

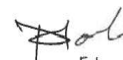
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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

C	Microbiological							
1	Total Bacterial Count	CFU/ml	210	252	290	222	290	APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	62	54	62	50	48	APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	27	36	38	26	33	IS:15185:2016
4	Enterococcus	/100ml	19	12	22	20	24	IS:15186:2002
5	Salmonella	/100ml	Absent	Absent	Absent	Absent	Absent	IS:15187:2016
6	Shigella	/100ml	Absent	Absent	Absent	Absent	Absent	APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent	Absent	Absent	Absent	Absent	IS: 5887 (Part V):1976



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	7.93	8.01	7.97	7.92	7.94	7.88	7.98	7.89	7.96	7.91	IS 3025 (Part11)1983
2.	Temperature	°C	29	29	30	29.9	30	29.9	30.1	30	30.2	30.1	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	120	92	136	84	111	102	128	106	110	98	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	2.8	BDL	3.2	BDL	2.9	BDL	3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.6	6.5	5.9	5.7	6.1	6	6.2	6.1	5.9	5.9	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.7	35.4	35.89	35.93	35.74	36.11	35.54	35.82	35.62	36.04	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	μmol/L	1.7	1.3	2.59	2.16	3.02	2.59	3.23	3.02	2.59	2.15	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	μmol/L	BDL	BDL	0.073	0.056	0.112	0.103	0.125	0.121	0.112	0.108	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	μmol/L	11.0	10.3	4.7	4.31	3.97	3.53	3.36	2.54	3.45	3.23	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	μmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	μmol/L	24.6	24.0	10.34	9.91	9.91	8.84	6.94	5.26	7.93	7.46	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	μg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	29104	37556	35932	36108	36216	36884	35648	36188	36244	36932	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	14.4	8.2	12.1	8	20.4	16.3	12.05	8.03	16.22	8.11	APHA 23 rd Ed.,2017, 5220-B

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	NOVEMBER 2021		DECEMBER 2021		JANUARY 2022		FEBRUARY 2022		MARCH 2022		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton												
1.	Chlorophyll	mg/m ³	2.89	2.34	2.6	2.44	2.45	2.87	2.62	2.9	2.74	2.82	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.91	0.95	0.79	0.87	0.81	0.69	0.73	0.84	0.93	0.65	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	110	63	118	78	120	92	111	89	106	96	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Grammatophora</i>	<i>Coscinodiscus</i>	<i>Cyclotella</i>	<i>Coscinodiscus</i>	<i>Cyclotella</i>	<i>Coscinodiscus</i>	<i>Grammatophora</i>	<i>Coscinodiscus</i>	<i>Grammatophora</i>	<i>Coscinodiscus</i>	APHA (23rd Ed. 2017)10200 F
			<i>Dinophysis</i>	<i>Thalassionema</i>	<i>Fragillaria</i>	<i>Diploneis</i>	<i>Fragillaria</i>	<i>Melosira</i>	<i>Dinophysis</i>	<i>Thalassionema</i>	<i>Dinophysis</i>	<i>Thalassionema</i>	
			<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Nitzschia</i>	<i>Navicula</i>	<i>Surirella</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	
			<i>Fragillaria</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Fragillaria</i>	<i>Dinophysis</i>	<i>Fragillaria</i>	<i>Dinophysis</i>	
			<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	
B	Zooplankton												
1	Abudance(Population)	noX10 ³ / 100 m ³	29		31		45		33		28		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Crustacean</i>		<i>Crustacean</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Siphonophora</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Bivalve Larvae</i>		<i>Oikoplura</i>		
			<i>Crustacean</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean</i>		<i>Crustacean Larvae</i>		
			<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean</i>		
		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Siphonophora</i>		<i>Bivalve Larvae</i>			
3	Total Biomass	ml/100m ³	13.96		15.62		17.23		16.98		14.86		

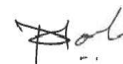
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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

C	Microbiological							
1	Total Bacterial Count	CFU/ml	290	200	232	214	200	APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	74	26	30	12	29	APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	55	19	21	6	10	IS:15185:2016
4	Enterococcus	/100ml	34	6	11	4	9	IS:15186:2002
5	Salmonella	/100ml	Absent	Absent	Absent	Absent	Absent	IS:15187:2016
6	Shigella	/100ml	Absent	Absent	Absent	Absent	Absent	APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent	Absent	Absent	Absent	Absent	IS: 5887 (Part V):1976



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Sr. Chemist

Mr. Nitin Tandel
Technical Manager

RESULTS OF ETP OUTLET WATER

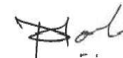
SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL					GPCB Limit	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			22/11/2021	20/12/2021	20/01/2022	28/02/2022	23/03/2022		
1.	Colour	Pt. Co. Scale	20	30	25	20	25	100	IS 3025(Part 4)
2.	pH @ 27 ° C	--	7.12	7.16	7.28	7.47	7.11	6.5 to 8.5	APHA 23 rd Ed., 2017, 4500-H ⁺ B
3.	Temperature	°C	29	30	29.9	29.9	30.1	40	IS 3025(Part 9)1984
4.	Total Suspended Solid	mg/L	40	34	32	24	56	100	APHA 23 rd Ed., 2017, 2540 -D
5.	Total Dissolved Solids	mg/L	1444	1678	1656	1612	1488	2100	APHA 23 rd Ed., 2017, 2540- C
6.	COD	mg/L	72.2	76.2	72.4	76.4	71.1	100	IS 3025(Part 58)2006
7.	BOD (3 days at 27 °C)	mg/L	18	19	18	17	22	30	IS 3025(Part 44)1993Amd.01
8.	Chloride (as Cl) -	mg/L	450.1	422.4	464.2	478.2	478.6	600	IS 3025(PART 32) 1988
9.	Oil & Grease	mg/L	BDL()	BDL()	BDL()	BDL()	BDL()	10	IS 3025(Part39)1991, Amd. 2
10.	Sulphate (as SO ₄)	mg/L	229.3	214.4	228.6	232.4	129.4	1000	IS 3025(Part 24)1986
11.	Ammonical Nitrogen	mg/L	8.88	7.44	8.12	7.84	25.4	50	IS 3025(Part 34)1988,
12.	Phenolic Compound	mg/L	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	1	IS 3025(Part 43)1992, Amd.2
13.	Copper as Cu	mg/L	BDL	BDL	BDL	BDL	BDL	3	IS 3025(Part 42)1992amd.01,
14.	Lead as Pb	mg/L	BDL	BDL	BDL	BDL	BDL	0.1	APHA 23 rd Ed., 2017, 3111-B

Continue...

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL					GPCB Limit	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021	JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			22/11/2021	20/12/2021	20/01/2022	28/02/2022	23/03/2022		
15.	Sulphide as S	mg/L	0.14	0.16	0.28	0.34	0.28	2	APHA 23 rd Ed., 2017, 4500 S ² F
16.	Cadmium as Cd	mg/L	BDL	BDL	BDL	BDL	BDL	2	APHA 23 rd Ed., 2017, 3111-B
17.	Fluoride as F	mg/L	0.34	0.41	0.46	0.46	0.98	2	APHA 23 rd Ed., 2017, 4500 F, D
18.	Residual Chlorine	mg/L	--	0.6	0.72	0.68	0.62	0.5 Min.	APHA 23 rd Ed., 2017, 4500-Cl-B
19.	Percent Sodium	%	--	--	--	--	44.18	60	By Calculation
20.	Sodium Absorption ratio	--	--	--	--	--	5.1	26	By Calculation



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Results of Ambient Air Quality Monitoring

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	01-11-2021	88.45	46.25	21.87	33.45	0.32	NOT DETECTED	NOT DETECTED
2.	02-11-2021	83.45	45.23	20.14	31.27	0.45	NOT DETECTED	NOT DETECTED
3.	08-11-2021	89.12	47.24	22.54	32.45	0.23	NOT DETECTED	NOT DETECTED
4.	09-11-2021	78.54	39.32	18.65	30.21	0.36	NOT DETECTED	NOT DETECTED
5.	15-11-2021	87.21	44.16	23.45	28.27	0.17	NOT DETECTED	NOT DETECTED
6.	16-11-2021	83.40	47.85	22.15	29.45	0.25	NOT DETECTED	NOT DETECTED
7.	22-11-2021	85.62	36.73	17.90	26.72	0.17	NOT DETECTED	NOT DETECTED
8.	23-11-2021	71.80	32.45	23.34	28.54	0.09	NOT DETECTED	NOT DETECTED
9.	29-11-2021	88.34	36.53	21.87	27.19	0.17	NOT DETECTED	NOT DETECTED
10.	30-11-2021	85.21	33.45	18.24	25.21	0.24	NOT DETECTED	NOT DETECTED
11.	05-12-2021	75.21	40.25	18.76	30.25	0.25	NOT DETECTED	NOT DETECTED
12.	06-12-2021	80.25	42.19	23.67	34.22	0.62	NOT DETECTED	NOT DETECTED
13.	13-12-2021	89.45	45.32	25.44	36.17	0.40	NOT DETECTED	NOT DETECTED
14.	14-12-2021	86.25	45.32	25.44	36.17	0.40	NOT DETECTED	NOT DETECTED
15.	20-12-2021	90.00	41.39	25.14	34.21	0.25	NOT DETECTED	NOT DETECTED
16.	21-12-2021	83.44	44.52	28.14	35.72	0.45	NOT DETECTED	NOT DETECTED

Continue...

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
17.	27-12-2021	78.21	40.25	23.45	32.10	0.23	NOT DETECTED	NOT DETECTED
18.	28-12-2021	70.43	37.81	25.12	30.33	0.10	NOT DETECTED	NOT DETECTED
19.	03-01-2022	88.25	37.21	17.85	27.84	0.80	NOT DETECTED	NOT DETECTED
20.	04-01-2022	76.54	32.21	15.23	23.49	1.14	NOT DETECTED	NOT DETECTED
21.	10-01-2022	83.45	40.15	21.20	29.25	1.20	NOT DETECTED	NOT DETECTED
22.	11-01-2022	87.20	47.23	28.35	34.52	0.85	NOT DETECTED	NOT DETECTED
23.	17-01-2022	85.23	45.12	25.44	31.29	1.00	NOT DETECTED	NOT DETECTED
24.	18-01-2022	88.25	47.21	21.29	35.42	1.15	NOT DETECTED	NOT DETECTED
25.	24-01-2022	87.65	46.23	32.45	39.18	0.95	NOT DETECTED	NOT DETECTED
26.	25-01-2022	85.52	47.85	28.96	34.55	0.75	NOT DETECTED	NOT DETECTED
27.	31-01-2022	80.78	48.75	33.23	38.78	1.25	NOT DETECTED	NOT DETECTED
28.	03-02-2022	89.23	44.12	36.23	41.19	0.45	2.17	NOT DETECTED
29.	07-02-2022	85.34	39.28	30.15	38.25	1.19	4.12	NOT DETECTED
30.	10-02-2022	76.33	43.29	28.17	37.25	1.35	3.14	NOT DETECTED
31.	14-02-2022	82.55	45.67	36.29	42.18	1.12	NOT DETECTED	NOT DETECTED
32.	16-02-2022	88.25	47.38	34.25	39.23	1.00	1.29	NOT DETECTED
33.	21-02-2022	85.23	45.68	37.22	42.18	1.23	3.14	NOT DETECTED

Continue...

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
34.	23-02-2022	88.76	46.21	33.15	40.15	1.00	1.45	NOT DETECTED
35.	28-02-2022	79.45	40.15	38.15	42.16	1.18	2.25	NOT DETECTED
36.	03-03-2022	83.46	37.89	34.56	42.20	1.25	4.15	NOT DETECTED
37.	07-03-2022	80.45	41.45	27.15	37.89	1.00	3.17	NOT DETECTED
38.	10-03-2022	84.56	40.18	25.19	35.18	1.00	5.12	NOT DETECTED
39.	14-03-2022	87.15	40.23	32.45	40.25	1.34	2.35	NOT DETECTED
40.	17-03-2022	85.12	48.15	40.18	42.36	1.00	2.00	NOT DETECTED
41.	21-03-2022	87.13	39.15	35.17	40.19	1.18	2.87	NOT DETECTED
42.	24-03-2022	88.21	46.78	30.18	42.35	1.20	3.42	NOT DETECTED
43.	28-03-2022	84.52	43.45	35.22	40.17	1.15	3.00	NOT DETECTED
44.	30-03-2022	85.64	46.75	39.45	44.38	1.00	2.18	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Location Name		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	01-11-2021	68.76	28.75	12.34	25.67	0.16	NOT DETECTED	NOT DETECTED
2.	02-11-2021	73.45	22.45	17.34	23.45	0.20	NOT DETECTED	NOT DETECTED
3.	08-11-2021	58.93	20.18	15.21	21.25	0.15	NOT DETECTED	NOT DETECTED
4.	09-11-2021	66.45	25.23	13.70	20.34	0.11	NOT DETECTED	NOT DETECTED
5.	15-11-2021	60.23	23.48	15.44	23.45	0.18	NOT DETECTED	NOT DETECTED
6.	16-11-2021	72.35	27.89	17.25	27.67	0.07	NOT DETECTED	NOT DETECTED
7.	22-11-2021	65.81	25.45	15.98	24.36	0.09	NOT DETECTED	NOT DETECTED
8.	23-11-2021	69.23	27.21	12.34	20.25	0.14	NOT DETECTED	NOT DETECTED
9.	29-11-2021	58.74	22.35	14.56	21.34	0.19	NOT DETECTED	NOT DETECTED
10.	30-11-2021	67.25	26.78	15.35	24.23	0.16	NOT DETECTED	NOT DETECTED
11.	05-12-2021	74.53	37.85	19.86	31.28	0.25	NOT DETECTED	NOT DETECTED
12.	06-12-2021	86.12	40.15	21.45	34.15	0.20	NOT DETECTED	NOT DETECTED
13.	13-12-2021	80.55	36.78	19.55	31.27	0.23	NOT DETECTED	NOT DETECTED
14.	14-12-2021	78.23	35.56	21.26	34.23	0.25	NOT DETECTED	NOT DETECTED
15.	20-12-2021	87.45	41.35	23.67	37.13	0.25	NOT DETECTED	NOT DETECTED
16.	21-12-2021	82.15	39.21	22.53	34.80	0.14	NOT DETECTED	NOT DETECTED

Continue...

Location Name		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
17.	27-12-2021	71.23	35.42	14.89	32.67	0.10	NOT DETECTED	NOT DETECTED
18.	28-12-2021	65.23	30.21	11.45	28.34	0.05	NOT DETECTED	NOT DETECTED
19.	03-01-2022	88.23	35.23	12.34	25.34	0.85	NOT DETECTED	NOT DETECTED
20.	04-01-2022	71.23	31.20	16.73	31.26	0.45	NOT DETECTED	NOT DETECTED
21.	10-01-2022	75.24	36.55	14.65	28.47	0.75	NOT DETECTED	NOT DETECTED
22.	11-01-2022	84.56	45.67	12.34	35.32	1.00	NOT DETECTED	NOT DETECTED
23.	17-01-2022	83.40	40.23	17.23	34.31	0.95	NOT DETECTED	NOT DETECTED
24.	18-01-2022	85.54	45.21	15.26	35.33	0.82	NOT DETECTED	NOT DETECTED
25.	24-01-2022	88.24	39.22	18.24	29.45	1.04	NOT DETECTED	NOT DETECTED
26.	25-01-2022	75.25	44.53	15.35	31.25	1.12	NOT DETECTED	NOT DETECTED
27.	31-01-2022	86.12	47.25	17.36	33.25	0.96	NOT DETECTED	NOT DETECTED
28.	03-02-2022	83.20	35.67	23.18	31.45	1.24	1.76	NOT DETECTED
29.	07-02-2022	89.23	39.23	21.18	36.23	0.76	2.15	NOT DETECTED
30.	10-02-2022	86.34	42.45	24.15	37.25	0.34	NOT DETECTED	NOT DETECTED
31.	14-02-2022	84.15	47.34	21.29	38.19	1.00	3.15	NOT DETECTED
32.	16-02-2022	87.34	40.15	23.19	39.17	0.55	1.27	NOT DETECTED
33.	21-02-2022	83.45	43.67	20.16	35.23	1.05	2.15	NOT DETECTED

Continue...

Location Name		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
34.	23-02-2022	81.89	45.20	24.19	36.27	1.00	NOT DETECTED	NOT DETECTED
35.	28-02-2022	87.45	48.35	26.17	34.12	1.25	2.18	NOT DETECTED
36.	03-03-2022	85.63	30.27	28.95	37.25	1.34	2.34	NOT DETECTED
37.	07-03-2022	85.20	42.35	25.12	34.90	1.20	5.12	NOT DETECTED
38.	10-03-2022	82.14	45.67	32.18	40.23	1.15	2.10	NOT DETECTED
39.	14-03-2022	87.15	48.45	30.17	37.52	1.20	1.78	NOT DETECTED
40.	17-03-2022	85.12	39.56	28.44	39.16	1.30	2.45	NOT DETECTED
41.	21-03-2022	80.47	43.44	25.62	35.61	1.25	3.10	NOT DETECTED
42.	24-03-2022	86.35	40.17	30.16	37.83	1.20	2.87	NOT DETECTED
43.	28-03-2022	81.93	39.35	25.21	35.19	1.15	2.00	NOT DETECTED
44.	30-03-2022	88.45	42.34	30.27	41.25	1.26	3.15	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Location Name		ADANI PORT – TUG Berth 600 KL Pump House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	01-11-2021	71.55	37.51	8.76	17.23	0.25	NOT DETECTED	NOT DETECTED
2.	02-11-2021	78.43	32.44	9.15	15.32	0.17	NOT DETECTED	NOT DETECTED
3.	08-11-2021	60.35	26.75	8.15	18.43	0.29	NOT DETECTED	NOT DETECTED
4.	09-11-2021	68.23	30.15	12.34	19.21	0.12	NOT DETECTED	NOT DETECTED
5.	15-11-2021	65.21	28.23	10.25	17.54	0.09	NOT DETECTED	NOT DETECTED
6.	16-11-2021	76.75	31.24	9.18	15.28	0.23	NOT DETECTED	NOT DETECTED
7.	22-11-2021	65.44	26.75	8.12	16.23	0.15	NOT DETECTED	NOT DETECTED
8.	23-11-2021	56.84	21.85	10.21	18.25	0.18	NOT DETECTED	NOT DETECTED
9.	29-11-2021	62.17	24.64	13.44	21.26	0.05	NOT DETECTED	NOT DETECTED
10.	30-11-2021	68.14	27.85	10.45	17.26	0.08	NOT DETECTED	NOT DETECTED
11.	05-12-2021	54.35	42.36	12.34	24.56	0.14	NOT DETECTED	NOT DETECTED
12.	06-12-2021	69.21	40.56	10.15	22.18	0.25	NOT DETECTED	NOT DETECTED
13.	13-12-2021	62.56	37.65	12.42	26.30	0.15	NOT DETECTED	NOT DETECTED
14.	14-12-2021	76.15	42.85	14.56	27.16	0.20	NOT DETECTED	NOT DETECTED
15.	20-12-2021	81.25	45.18	12.65	25.11	0.15	NOT DETECTED	NOT DETECTED
16.	21-12-2021	71.54	40.17	8.15	23.12	0.15	NOT DETECTED	NOT DETECTED

Continue...

Location Name		ADANI PORT – TUG Berth 600 KL Pump House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
17.	27-12-2021	64.32	34.51	10.25	25.22	0.18	NOT DETECTED	NOT DETECTED
18.	28-12-2021	60.34	28.76	8.15	20.15	0.15	NOT DETECTED	NOT DETECTED
19.	03-01-2022	87.21	45.62	13.45	21.35	0.56	NOT DETECTED	NOT DETECTED
20.	04-01-2022	78.23	41.23	11.50	25.67	0.10	NOT DETECTED	NOT DETECTED
21.	10-01-2022	58.92	38.90	16.78	22.35	1.05	NOT DETECTED	NOT DETECTED
22.	11-01-2022	84.53	46.75	12.25	30.21	0.80	NOT DETECTED	NOT DETECTED
23.	17-01-2022	81.80	44.67	10.35	36.44	0.54	NOT DETECTED	NOT DETECTED
24.	18-01-2022	85.64	48.25	17.23	30.17	0.23	NOT DETECTED	NOT DETECTED
25.	24-01-2022	89.45	49.12	15.24	28.56	1.07	NOT DETECTED	NOT DETECTED
26.	25-01-2022	85.21	43.20	13.25	21.44	0.84	NOT DETECTED	NOT DETECTED
27.	31-01-2022	77.23	49.21	10.25	32.45	0.96	NOT DETECTED	NOT DETECTED
28.	03-02-2022	86.23	45.23	27.15	34.13	0.87	2.15	NOT DETECTED
29.	07-02-2022	76.45	40.25	21.28	29.26	0.35	NOT DETECTED	NOT DETECTED
30.	10-02-2022	89.21	46.10	24.39	30.15	1.14	3.45	NOT DETECTED
31.	14-02-2022	85.23	45.12	20.18	28.77	1.15	1.76	NOT DETECTED
32.	16-02-2022	87.45	47.18	23.10	35.14	0.95	NOT DETECTED	NOT DETECTED
33.	21-02-2022	84.14	42.95	25.19	32.19	1.52	NOT DETECTED	NOT DETECTED

Continue...

Location Name		ADANI PORT – TUG Berth 600 KL Pump House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
34.	23-02-2022	88.24	44.12	19.44	32.16	1.00	2.34	NOT DETECTED
35.	28-02-2022	85.45	42.82	26.15	35.18	1.14	4.12	NOT DETECTED
36.	03-03-2022	89.65	45.78	31.16	39.18	1.23	4.25	NOT DETECTED
37.	07-03-2022	84.32	42.62	26.23	35.12	1.00	1.87	NOT DETECTED
38.	10-03-2022	82.34	40.95	29.15	39.17	1.44	2.10	NOT DETECTED
39.	14-03-2022	88.14	45.67	32.17	41.23	1.20	3.45	NOT DETECTED
40.	17-03-2022	84.56	43.78	27.34	38.66	1.00	2.65	NOT DETECTED
41.	21-03-2022	81.90	45.78	25.17	35.90	1.80	5.12	NOT DETECTED
42.	24-03-2022	88.35	47.91	32.15	40.83	1.25	4.74	NOT DETECTED
43.	28-03-2022	85.43	44.78	30.62	37.90	1.30	3.23	NOT DETECTED
44.	30-03-2022	88.23	43.26	28.15	39.22	1.00	6.15	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Location Name		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	01-11-2021	57.23	23.45	11.23	20.15	0.15	NOT DETECTED	NOT DETECTED
2.	02-11-2021	62.34	25.67	15.23	21.34	0.18	NOT DETECTED	NOT DETECTED
3.	08-11-2021	54.50	22.34	12.17	18.76	0.11	NOT DETECTED	NOT DETECTED
4.	09-11-2021	52.34	20.17	11.21	19.35	0.18	NOT DETECTED	NOT DETECTED
5.	15-11-2021	61.78	24.54	12.35	17.65	0.07	NOT DETECTED	NOT DETECTED
6.	16-11-2021	70.23	27.85	14.18	22.35	0.15	NOT DETECTED	NOT DETECTED
7.	22-11-2021	56.72	21.36	15.23	23.15	0.20	NOT DETECTED	NOT DETECTED
8.	23-11-2021	64.23	24.78	11.72	18.23	0.13	NOT DETECTED	NOT DETECTED
9.	29-11-2021	60.23	21.54	13.25	19.45	0.11	NOT DETECTED	NOT DETECTED
10.	30-11-2021	53.57	18.94	12.43	17.32	0.08	NOT DETECTED	NOT DETECTED
11.	05-12-2021	60.23	28.83	7.84	25.67	0.05	NOT DETECTED	NOT DETECTED
12.	06-12-2021	73.45	32.45	8.15	28.11	0.23	NOT DETECTED	NOT DETECTED
13.	13-12-2021	65.24	30.18	15.24	26.15	0.15	NOT DETECTED	NOT DETECTED
14.	14-12-2021	86.15	33.45	13.17	28.15	0.20	NOT DETECTED	NOT DETECTED
15.	20-12-2021	76.23	30.15	15.14	25.89	0.05	NOT DETECTED	NOT DETECTED
16.	21-12-2021	68.23	25.43	12.38	27.15	0.12	NOT DETECTED	NOT DETECTED

Continue...

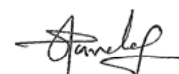
Location Name		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
17.	27-12-2021	60.21	23.48	14.17	25.13	0.10	NOT DETECTED	NOT DETECTED
18.	28-12-2021	56.32	20.25	10.50	20.15	0.10	NOT DETECTED	NOT DETECTED
19.	03-01-2022	83.23	29.67	9.12	21.23	0.75	NOT DETECTED	NOT DETECTED
20.	04-01-2022	56.70	25.43	13.21	20.15	0.55	NOT DETECTED	NOT DETECTED
21.	10-01-2022	75.24	28.21	11.23	25.23	1.03	NOT DETECTED	NOT DETECTED
22.	11-01-2022	80.23	23.45	10.25	24.25	0.34	NOT DETECTED	NOT DETECTED
23.	17-01-2022	81.56	27.12	14.56	27.21	0.15	NOT DETECTED	NOT DETECTED
24.	18-01-2022	86.24	28.94	16.24	31.45	0.84	NOT DETECTED	NOT DETECTED
25.	24-01-2022	75.24	21.35	12.68	33.20	0.52	NOT DETECTED	NOT DETECTED
26.	25-01-2022	83.45	26.75	17.23	27.34	0.34	NOT DETECTED	NOT DETECTED
27.	31-01-2022	85.56	32.45	15.44	25.67	0.75	NOT DETECTED	NOT DETECTED
28.	03-02-2022	85.77	34.56	15.78	25.18	0.87	NOT DETECTED	NOT DETECTED
29.	07-02-2022	89.21	30.18	19.21	32.95	1.05	2.45	NOT DETECTED
30.	10-02-2022	88.45	35.81	16.25	29.17	0.65	NOT DETECTED	NOT DETECTED
31.	14-02-2022	85.76	37.25	16.36	28.35	0.89	NOT DETECTED	NOT DETECTED
32.	16-02-2022	88.34	34.23	19.25	28.79	0.23	3.12	NOT DETECTED
33.	21-02-2022	83.45	36.12	21.18	29.34	1.00	1.97	NOT DETECTED

Continue...

Location Name		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
34.	23-02-2022	84.64	39.12	17.25	31.29	0.85	NOT DETECTED	NOT DETECTED
35.	28-02-2022	86.77	32.00	23.19	34.95	0.68	2.15	NOT DETECTED
36.	03-03-2022	82.15	27.00	12.45	20.45	0.05	1.15	NOT DETECTED
37.	07-03-2022	75.62	29.14	17.21	27.18	1.00	2.10	NOT DETECTED
38.	10-03-2022	85.67	31.18	20.14	30.18	1.13	1.76	NOT DETECTED
39.	14-03-2022	84.54	29.12	18.77	27.15	0.75	1.23	NOT DETECTED
40.	17-03-2022	78.32	35.84	21.34	28.91	0.90	2.10	NOT DETECTED
41.	21-03-2022	77.35	30.48	16.93	25.62	1.14	1.52	NOT DETECTED
42.	24-03-2022	85.34	36.75	20.16	27.85	0.75	1.00	NOT DETECTED
43.	28-03-2022	88.23	34.52	21.15	28.92	0.90	1.43	NOT DETECTED
44.	30-03-2022	85.34	30.92	24.56	30.25	0.75	1.95	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		CT3 RMU-2				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		15-11-2021	14-12-2021	06-01-2022	01-02-2022	18-03-2022
1	06:00 to 07:00	55.4	65.5	62.34	64.34	63.17
2	07:00 to 08:00	61.6	63.5	65.78	66.12	65.18
3	08:00 to 09:00	62.5	66.9	68.14	69.84	66.2
4	09:00 to 10:00	65.4	67.5	68.35	68.75	63.5
5	10:00 to 11:00	61.9	68.6	67.51	69.23	67.5
6	11:00 to 12:00	63.4	61.5	65.23	68.21	69.71
7	12:00 to 13:00	67.8	66.4	67.12	69.65	68.2
8	13:00 to 14:00	68.3	68.9	65.15	68.73	67.21
9	14:00 to 15:00	68.1	66.7	62.18	66.19	65.48
10	15:00 to 16:00	69.4	67.5	67.12	68.45	67.42
11	16:00 to 17:00	69.5	68.1	65.4	67.7	68.5
12	17:00 to 18:00	66.2	68.5	64.5	66.2	69.74
13	18:00 to 19:00	61.8	66.9	62.19	65.69	64.26
14	19:00 to 20:00	60.7	62.5	60.15	67.34	66.83
15	20:00 to 21:00	66.5	63.3	65.1	65.3	64.33
16	21:00 to 22:00	63.5	58.9	61.15	63.45	62.14
Day Time		<75 dB (A)				

Continue...

Location Name		CT3 RMU-2				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time				
		15-11-2021	14-12-2021	06-01-2022	01-02-2022	18-03-2022
1	22:00 to 23:00	60.5	61.3	60.28	62.67	63.54
2	23:00 to 24:00	63.4	59.7	61.25	63.28	64.52
3	24:00 to 01:00	62.8	60.6	58.25	61.64	62.68
4	01:00 to 02:00	62.5	60.5	55.15	60.75	61.28
5	02:00 to 03:00	60.5	56.7	59.25	61.55	60.98
6	03:00 to 04:00	61.3	63.5	60.15	62.78	61.27
7	04:00 to 05:00	60.6	62.8	57.15	63.45	64.82
8	05:00 to 06:00	62.4	64.5	58.5	62.19	63.12
Night Time		<70 dB (A)				

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		Near Fire Station				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		16-11-2021	07-12-2021	07-01-2022	08-02-2022	02-03-2022
1	06:00 to 07:00	63.1	61.8	60.1	61.23	62.85
2	07:00 to 08:00	66.7	63.8	61.25	63.45	64.51
3	08:00 to 09:00	68.2	66.7	62.45	64.56	65.78
4	09:00 to 10:00	64.9	65.3	66.75	68.92	69.81
5	10:00 to 11:00	69.1	66.7	63.23	67.4	66.21
6	11:00 to 12:00	66.8	62.9	61.25	66.23	67.35
7	12:00 to 13:00	65.2	64.2	62.15	65.29	66.74
8	13:00 to 14:00	64.4	62.5	63.15	67.24	68.31
9	14:00 to 15:00	60.5	63.6	60.28	66.18	65.1
10	15:00 to 16:00	62.3	60.6	61.15	62.45	64.22
11	16:00 to 17:00	61.5	63.5	63.45	65.14	64.27
12	17:00 to 18:00	58.5	60.5	66.34	67.29	66.87
13	18:00 to 19:00	59.2	58.5	61.25	64.25	65.46
14	19:00 to 20:00	58.5	58.3	60.25	63.45	62.87
15	20:00 to 21:00	60.3	59.5	57.84	60.23	61.32
16	21:00 to 22:00	58.9	58.5	56.52	58.45	59.76
Day Time		<75 dB (A)				


Continue...

Location Name		Near Fire Station				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		16-11-2021	07-12-2021	07-01-2022	08-02-2022	02-03-2022
1	22:00 to 23:00	57.9	58.2	60.24	57.15	56.27
2	23:00 to 24:00	61.6	57.5	63.18	58.15	57.32
3	24:00 to 01:00	60.3	57.5	61.15	58.44	59.51
4	01:00 to 02:00	61.9	56.8	60.15	56.45	55.23
5	02:00 to 03:00	60.6	56.9	60.2	52.34	53.21
6	03:00 to 04:00	56.8	55.4	58.45	55.67	56.75
7	04:00 to 05:00	60.9	57.8	61.25	56.89	55.21
8	05:00 to 06:00	59.4	60.2	60.2	58.23	57.34
Night Time		<70 dB (A)				

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		ADANI PORT – TUG Berth 600 KL Pump House				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		15-11-2021	13-12-2021	05-01-2022	07-02-2022	03-03-2022
1	06:00 to 07:00	61.6	63.4	61.18	63.78	64.23
2	07:00 to 08:00	65.2	66.9	63.23	66.21	67.28
3	08:00 to 09:00	63.9	65.5	61.15	64.92	65.31
4	09:00 to 10:00	65.5	69.6	67.84	66.25	67.33
5	10:00 to 11:00	63.5	65.2	64.69	65.23	64.21
6	11:00 to 12:00	67.6	66.5	65.66	68.14	69.74
7	12:00 to 13:00	68.6	69.5	68.14	69.15	68.31
8	13:00 to 14:00	65.5	69.2	67.15	66.25	65.93
9	14:00 to 15:00	69.4	69.4	69.15	65.23	64.12
10	15:00 to 16:00	69.2	69.5	66.25	67.39	68.46
11	16:00 to 17:00	68.7	69.5	68.14	69.45	67.5
12	17:00 to 18:00	68.3	68.2	62.44	65.18	66.32
13	18:00 to 19:00	65.1	69.5	67.12	68.35	67.31
14	19:00 to 20:00	62.4	65.5	69.15	66.54	65.43
15	20:00 to 21:00	60.7	61.5	67.23	63.45	62.14
16	21:00 to 22:00	62.4	64.5	61.25	62.93	63.14
Day Time		<75 dB (A)				

Continue...

Location Name		ADANI PORT – TUG Berth 600 KL Pump House				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		15-11-2021	13-12-2021	05-01-2022	07-02-2022	03-03-2022
1	22:00 to 23:00	62.6	61.5	60.24	61.76	60.78
2	23:00 to 24:00	63.7	62.5	63.18	62.3	63.42
3	24:00 to 01:00	60.5	62.3	61.15	60.45	59.44
4	01:00 to 02:00	62.4	62.5	60.15	58.96	57.32
5	02:00 to 03:00	61.5	61.6	60.2	55.37	54.28
6	03:00 to 04:00	61.5	60.3	58.45	57.24	56.39
7	04:00 to 05:00	62.9	64.4	61.25	60.35	61.28
8	05:00 to 06:00	60.5	61.8	60.2	61.86	62.53
Day Time		<70 dB (A)				

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		PUB/Adani House				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		16-11-2021	06-12-2021	18-01-2022	15-02-2022	09-03-2022
1	06:00 to 07:00	62.5	62.8	61.23	59.45	60.1
2	07:00 to 08:00	63.5	63.5	62.54	60.14	61.86
3	08:00 to 09:00	64.9	64.5	63.4	66.83	65.91
4	09:00 to 10:00	65.8	66.9	65.23	64.2	63.28
5	10:00 to 11:00	67.8	66.5	63.21	67.16	68.72
6	11:00 to 12:00	69.6	66.7	64.35	65.34	66.32
7	12:00 to 13:00	68.2	68.5	67.34	64.56	65.97
8	13:00 to 14:00	67.8	65.5	66.23	62.75	63.12
9	14:00 to 15:00	66.8	62.6	61.23	60.45	59.54
10	15:00 to 16:00	65.4	63.5	65.23	63.46	62.38
11	16:00 to 17:00	65.1	66.7	67.2	65.29	66.39
12	17:00 to 18:00	60.5	62.4	63.22	66.21	67.31
13	18:00 to 19:00	60.8	61.5	62.45	65.21	66.79
14	19:00 to 20:00	67.3	60.5	61.23	62.3	63.21
15	20:00 to 21:00	61.9	60.3	59.87	58.45	59.54
16	21:00 to 22:00	62.5	60.1	58.75	57.19	58.42
Day Time		<75 dB (A)				

Continue...

Location Name		PUB/Adani House				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		16-11-2021	06-12-2021	18-01-2022	15-02-2022	09-03-2022
1	22:00 to 23:00	62.8	60.3	57.34	56.24	57.17
2	23:00 to 24:00	63.1	60.2	60.23	58.25	59.64
3	24:00 to 01:00	62.5	62.5	59.25	57.25	58.43
4	01:00 to 02:00	61.5	60.4	58.34	55.21	56.34
5	02:00 to 03:00	60.6	60.4	57.64	54.59	53.76
6	03:00 to 04:00	60.6	60.2	57.45	58.69	59.73
7	04:00 to 05:00	64.3	62.3	58.23	59.23	58.21
8	05:00 to 06:00	63.6	62.3	59.25	57.38	56.24
Day Time		<70 dB (A)				

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring								
Sr. No.	Parameter	Unit	Hot Water System-1 (Liquid Terminal)	Hot Water System-2 (Liquid Terminal)	Thermic Fluid Heater (Bitumin-1)	Thermic Fluid Heater (Bitumin-2)	GPCB LIMIT	Method of Test
Oct-21								
1	Particulate Matter	mg/Nm ³	30.61		26.74		150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	5.55		4.45		100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	34.62		29.37		50	IS 11255 (Part - 7)
Nov-21								
1	Particulate Matter	mg/Nm ³	32.45	31.45	21.34	18.10	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	5.76	6.15	4.56	4.25	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	29.54	27.10	25.12	21.45	50	IS 11255 (Part - 7)
Dec-21								
1	Particulate Matter	mg/Nm ³	30.12	28.76	24.56	20.23	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.12	5.50	5.12	5.11	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	27.15	28.15	26.18	18.76	50	IS 11255 (Part - 7)
Jan-22								
1	Particulate Matter	mg/Nm ³		25.10	21.23		150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm		9.26	5.45		100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm		25.60	23.25		50	IS 11255 (Part - 7)

Continue...

Sr. No.	Parameter	Unit	Hot Water System-1 (Liquid Terminal)	Hot Water System-2 (Liquid Terminal)	Thermic Fluid Heater (Bitumin-1)	Thermic Fluid Heater (Bitumin-2)	GPCB LIMIT	Method of Test
Feb-22								
1	Particulate Matter	mg/Nm ³	21.44		18.36		150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	7.23		6.19		100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	20.18		22.52		50	IS 11255 (Part - 7)
Mar-22								
1	Particulate Matter	mg/Nm ³	19.45	21.3	16.53		150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.48	7.5	5.85		100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	21.35	22.1	20.90		50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring								
Sr. No.	Parameter	Unit	D.G. Set-6, 7 & 8 (1250 KVA - CT2) Common Stack	D.G. Set-9 (1500 KVA - CT3)	D.G. Set-10 (1500 KVA - CT3)	D.G. Set-11 (1500 KVA - CT3)	GPCB LIMIT	Method of Test
			Feb-22					
			26-02-2022	26-02-2022	26-02-2022	26-02-2022		
1	Particulate Matter	mg/Nm ³	24.8	18.64	18.35	20.4	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	7.13	9.3	6.8	7.5	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	38.25	34.5	29.5	33.1	50	IS 11255 (Part - 7)
Sr. No.	Parameter	Unit	D.G. Set-12 (1500 KVA) - CT4	D.G. Set-13 (1500 KVA) - CT4	D.G. Set-14 (1500 KVA) - CT4	D.G. Set-1 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Mar-22					
			05-03-2022	05-03-2022	05-03-2022	09-03-2022		
1	Particulate Matter	mg/Nm ³	21.38	24.1	19.26	16.75	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.1	7.13	6.74	5.13	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	31.23	33.48	30.13	26.75	50	IS 11255 (Part - 7)

Continue...

Sr. No.	Parameter	Unit	D.G. Set-2 (500 KVA) - DG House - MPT	D.G. Set-3 (500 KVA) - DG House - MPT	D.G. Set-4 (500 KVA) - DG House - MPT	D.G. Set-5 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Mar-22					
			09-03-2022	09-03-2022	09-03-2022	09-03-2022		
1	Particulate Matter	mg/Nm ³	20.49	16.78	20.35	21.34	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.34	5.1	6.15	6.8	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	33.25	26.43	30.37	30.15	50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)



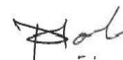

Jaivik S. Tandel
(Manager - Operations)

RESULTS OF BORE HOLE WATER

SR.NO.	TEST PARAMETERS	UNIT	Pump House-1	Pump House-2	Pump House-3	Near Control room	Near ETP	TEST METHOD
			26/03/2022	26/03/2022	26/03/2022	26/03/2022	26/03/2022	
1.	pH @ 25 ° C	--	8.17	7.85	8.06	7.96	7.60	IS 3025(Part 11)1983
2.	Salinity	ppt	3.83	0.95	1.18	0.97	11.85	APHA 23 rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
4.	Hydrocarbon	mg/L	N.D.	N.D.	N.D.	N.D.	N.D.	GC/GCMS
5.	Lead as Pb	mg/L	0.056	0.064	0.036	0.048	0.038	IS 3025 (PART 47) 1994
6.	Arsenic as As	mg/L	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017,3114-C
7.	Nickel as Ni	mg/L	BDL	BDL	BDL	BDL	BDL	IS 3025 (PART 54) 2003
8.	Total Chromium as Cr	mg/L	BDL	0.084	BDL	BDL	0.092	IS 3025 (PART 52) 2003
9.	Cadmium as Cd	mg/L	BDL	BDL	BDL	BDL	BDL	IS 3025(PART 41) 1992
10.	Mercury as Hg	mg/L	BDL	BDL	BDL	BDL	BDL	APHA 23 rd Ed.,2017, 3112-B
11.	Zinc as Zn	mg/L	0.154	0.282	0.194	0.236	0.211	IS 3025(PART 49) 1994
12.	Copper as Cu	mg/L	BDL	BDL	BDL	BDL	BDL	IS 3025 (PART 42) 1992
13.	Iron as Fe	mg/L	0.38	0.94	0.86	0.91	1.12	IS 3025(PART 53) 2003
14.	Insecticides/Pesticides	µg/L	Absent	Absent	Absent	Absent	Absent	USEPA 8081 B
15.	Depth of Water Level from Ground Level	meter	1.90	2.10	1.95	2.10	2.15	--



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Minimum Detection Limit

Ambient Air Quality Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Particulate Matter (PM10)	µg/m3	5 µg/m3
2	Particulate Matter (PM10)	µg/m3	5 µg/m3
3	Sulphur Dioxide (SO2)	µg/m3	4 µg/m3
4	Nitrogen Dioxide (NO2)	µg/m3	5 µg/m3
5	Carbon Monoxide (CO)	mg/m3	0.01 mg/m3
6	Ammonia (NH3)	µg/m3	5 µg/m3
7	Ozone (O3)	µg/m3	5 µg/m3
8	Lead (Pb)	µg/m3	0.5 µg/m3
9	Nickle (Ni)	ng/m3	1 ng/m3
10	Arsenic (As)	ng/m3	1 ng/m3
11	Benzene	µg/m3	1µg/m3
12	Benzo(o)Pyrene	ng/m3	0.1 ng/m3
14	Hydro Carbon	µg/m3	1 µg/m3

Stack Emission Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Suspended particulate matter	mg/Nm3	2 mg/Nm3
2	Sulphur Dioxide SOX	mg/Nm3	4 mg/Nm3
3	Oxides of Nitrogen NOX	mg/Nm3	5 mg/Nm3

ETP Water

Sr. No.	Test Parameter	Unit	MDL
1	Colour	Pt. Co. Scale	5
2	pH @ 27 ° C	--	2
3	Temperature	OC	5
4	Total Suspended Solids	mg/L	4
5	Total Dissolved Solids	mg/L	4
6	COD	mg/L	2
7	BOD (3 days at 27 OC)	mg/L	1
8	Chloride (as Cl) -	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate (as SO ₄)	mg/L	1
11	Ammonical Nitrogen	mg/L	2
12	Phenolic Compound	mg/L	0.1
13	Copper as Cu	mg/L	0.05
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.05
16	Cadmium as Cd	mg/L	0.003
17	Fluoride as F	mg/L	0.2
18	Residual Chlorine	mg/L	0.1
19	Percent Sodium	%	--
20	Sodium Absorption ratio	--	--

MARINE WATER			
Sr. No.	Test Parameter	Unit	MDL
1	pH	--	5
2	Temperature	oc	5
3	Total Suspended Solids	mg/L	4
4	BOD (3 Days @ 27oC)	mg/L	1
5	Dissolved Oxygen	mg/L	0.2
6	Salinity	ppt	0.01
7	Oil & Grease	mg/L	2
8	Nitrate as NO ₃	μmol/L	0.4
9	Nitrite as NO ₂	μmol/L	0.04
10	Ammonical Nitrogen as NH ₃	μmol/L	0.8
11	Phosphates as PO ₄	μmol/L	0.4
12	Total Nitrogen	μmol/L	2.2
13	Petroleum Hydrocarbon	μg/L	0.1
14	Total Dissolved Solids	mg/L	4
15	COD	mg/L	2

Sea SEDIMENT			
Sr. No.	Test Parameter	Unit	MDL
1	Organic Matter	%	0.5
2	Phosphorus as P	µg/g	1
3	Texture	--	--
4	Petroleum Hydrocarbon	µg/g	0.1
5	Aluminum as Al	%	0.1
6	Total Chromium as Cr+3	µg/g	2
7	Manganese as Mn	µg/g	1
8	Iron as Fe	%	0.1
9	Nickel as Ni	µg/g	1
10	Copper as Cu	µg/g	1
11	Zinc as Zn	µg/g	1
12	Lead as Pb	µg/g	1
13	Mercury as Hg	µg/g	0.05

BORE HOLE WATER			
Sr. No.	Test Parameter	Unit	MDL
1	pH @ 25 ° C	--	5
2	Salinity	ppt	--
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.1
5	Lead as Pb	mg/L	0.01
6	Arsenic as As	mg/L	0.01
7	Nickel as Ni	mg/L	0.02
8	Total Chromium as Cr	mg/L	0.05
9	Cadmium as Cd	mg/L	0.003
10	Mercury as Hg	mg/L	0.001
11	Zinc as Zn	mg/L	0.05
12	Copper as Cu	mg/L	0.05
13	Iron as Fe	mg/L	0.1
14	Insecticides/Pesticides	µg/L	0.1
15	Depth of Water Level from Ground Level	meter	--

Annexure – 4

Details of Greenbelt Development at APSEZ, Mundra

Total Green Zone Detail Till Up to March – 2022					
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	--	--	--
TOTAL (APSEZL)	486.19	8,12,591	1,35,171	426484.27	271633.33
		Total Saplings: 9,47,762 Nos.			

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
18	Kukadsar- (Bhadeswar- Mundra)	Kutch	250	2021-22	Avicennia marina	Shreeji Enterprise
Total			3140			

Annexure – 5

ALGAL REMOVAL WORK FROM MANGROVE AREAS

Creek area is regularly observed for checking algal encrustations. On the mangrove recruits & where the algal encrustation is found to be substantial, it is removed manually by deployment of required manpower. This operation is performed during the low tide conditions. The main object is to provide better growing condition for the growth of mangroves. Periodically, spread of Prosopis towards the mangrove areas is also observed as this species will compete with mangrove plants for growth.

Mangroves nursery is developed in a creek behind IOCL & 125,000 nos. of new saplings are planted in creek area.

Reference photographs of activities undertaken as per given guidelines,

A) Removal of algal encrustations & preventing the spread of Prosopis:





B) Development of Nursery & Plantation of Mangroves:



Annexure – 6



OIL SPILL CONTINGENCY RESPONSE PLAN TIER 1

(To be used in conjunction with OSRA Vol-1 and Vol-2)

**ADANI PORTS AND SPECIAL
ECONOMIC ZONE LIMITED**

POST BAG NO. 1

NAVINAL ISLAND

MUNDRA 370 421

PH. : (02838) 289221 / 289371

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Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 1 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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3.	Marine Control Room	03	01/01/2014
4.	Sr. Manager (Fire Services)	04	01/01/2014
5.	Auditor's Copy	05	01/01/2014
6.	Systems Co-ordinator	Original Copy	01/01/2014
7.	HOD (Marine)	06	01/01/2014
8.	Coast Guard	07	01/01/2014
.			

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OIL SPILL CONTINGENCY RESPONSE PLAN

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Section 03: Strategy

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- 1.3 Statutory requirements
- 1.4 Mutual aid agreements
- 1.5 Geographical limits of plan
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Maps / Charts

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2. Coastal charts, currents, tidal information (ranges and streams), prevailing winds
3. Risk locations and probable fate of oil
4. Shoreline resources for priority protection
5. Shoreline types
6. Sea zones and response strategies
7. Coastal zones and response strategies
8. Shoreline zones and clean up strategies
9. Oil and waste storage / disposal sites
10. Sensitivity Maps/ Atlas

Lists

1. **Primary Oil spill Equipment:** booms, skimmers, spray equipment, dispersant, absorbents, oil storage, Radio communications etc. (Manufacturer, type, size, location, transport, contact, delivery time, cost and conditions)
2. **Auxiliary Equipment:** Tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communication equipment etc. (Manufacturer, type, size, location, transport, contact, delivery time, cost and conditions)
3. **Support Equipment:** Aircraft, communications, catering, housing, transport, field sanitation and shelter etc. (Availability, contact, cost and conditions)
4. **Sources of Manpower:** Contractors, local authorities, caterers, security firms (Availability, numbers, skills, contact, cost and conditions)
5. **Experts and Advisors:** Environment, safety, auditing (Availability, contact, cost and conditions)
6. **Local and National Government contacts:** Name, rank and responsibility, address, telephone, fax, telex.

Data

1. Specifications of oils commonly traded
2. Wind and weather
3. Information sources

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Annexure 2	POLREP Report
Annexure 3	List of resources available
Annexure 4	List of Telephone numbers of Expert and advisors
Annexure 5	Responsibilities: Marine Officer / SPM Officer
Annexure 6	Responsibilities: Marine Manager / On Scene Commander
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Annexure 8	Responsibilities: HOD – Marine
Annexure 9	Oil Spill Progress report
Annexure 10	Emergency response Log
Annexure 11	Classification of oils
Annexure 12	Response Guidelines
Annexure 13	Site Specific Health and Safety Plan.
Annexure 14	Indian Chart 2079
Annexure 15	List of recycler approved by state of Gujarat
Annexure 16	List of agency for support & guidance for rescue & rehabilitation of oiled bird & mangroves management during oil spill

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Strategy

1. Introduction

The movement of Petroleum/ Petroleum-products from the production centre in middle east to Adani Ports and SEZ Ltd and various other ports in Gulf of Kutch is handled through ships at sea and to refineries using pipe lines on ground. Like any other port, Adani Port is very much vulnerable to oil spill disaster arising due to collision, leakage or grounding of vessels in sea and damage to pipelines on ground.

This action plan prepared by Adani Ports and SEZ Ltd, Mundra is to combat the oil spill (LOS-DCP) is in accordance with the NOS-DCP, International Petroleum Industry Environmental Conservation Association (IPIECA).

1.1 Authorities and responsibilities

Adani Ports and SEZ Limited

APSEZL has responsibility for dealing with oil spillages which occur within port limit if the estimated quantity of product lost is 700 tons or less.

Should the spill migrate to other areas, the Coast Guard Monitor will assume the position of On Scene Commander and will direct the response effort. In both cases, APSEZL will act and deploy their resources as required by the relevant On Scene Commander.

This operational version of Oil Spill Contingency Response Plan for the Adani Ports and SEZ Ltd, Mundra is intended for use by all such personnel like Marine Personnel, Tug Masters and all others as indicated in the Spill Response Organization who may be involved in the response to oil spills which may occur within Adani Port Limits.

This plan has been prepared as per the stipulation of Ministry of Environment and Forest Clearance (MoEF) and Coast Guard Requirements.

Gujarat Maritime Board

While responsibility for oil spill contingency remains with conservator of the port – Gujarat Maritime Board Port Officer, this plan (Tier 1) demonstrates the readiness of Adani Port for mitigating oil spill incidents.

Port Conservator will monitor and provide the necessary assistance required for administering the oil spill operation within the port limit.

Indian Coast Guard

The Indian Coast Guard has a statutory duty to protect the maritime and other national interests of India in the Maritime Zones of India and to prevent and control marine pollution. Coast Guard is also the Central Co-ordinating Authority for marine pollution control in the country. The Indian Coast Guard is responsible for implementation and enforcement of the relevant marine pollution laws.

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The National Oil Spill Disaster Contingency Plan stipulates the organizational and operational details to effectively combat a national oil spill contingency. The plan promotes the development of Regional and Local Contingency Plans in the three Coast Guard Regions.

The Coast Guard Monitor will assume the role of On Scene Commander in the event that any oil spill involving PLL operations exceeds 700 tons.

Gujarat Pollution Control Board

The Gujarat Pollution Control Board is responsible for, and control, waters up to 5 km from the shoreline. They require to be advised of all pollution incidents.

Ministry of Environment, Gujarat

The Ministry requires to be informed of all pollution incidents.

Emergency Response Team

Emergency Response Team (ERT) is the nomenclature used to describe the command and control team established for an oil spill incident at the jetty or in the jetty approaches, with representatives of organizations attending as described in section 2.4.

The ERT will convene at the Terminal Control Room, under the chairmanship of the Terminal Manager, and will consist of a Management Team and a Support Team as noted in section 2.3.

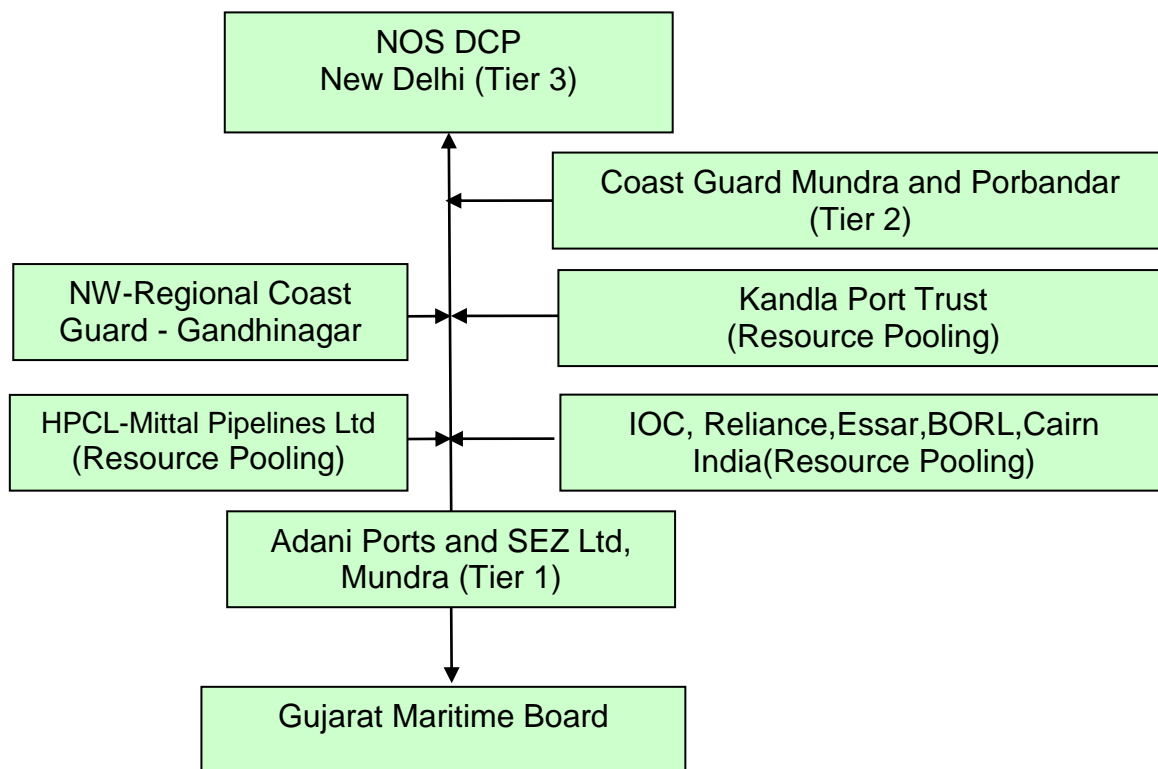
It is a strategic plan to quickly call on additional resources in a systematic manner firstly from Adani port and subsequently from other ports.

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1.2 Coordinating Committee



1.3 Statutory requirements

The Indian Government is a signatory to the International Convention on Oil Pollution Preparedness, Response and Co-operation which came into force in May 94. Under the NOSDCP, it is obligatory for a port to have a Local Oil Spill Contingency Plan to combat oil spills within port limits.

This oil spill contingency response plan (Tier 1) is the response plan in accordance with the facilities available at Adani Port only.

This plan is prepared in accordance with:

- Marine Environmental Impact Assessment of SPMs, COTs and connecting pipelines of APSEZL at Mundra dated February 2001, prepared by National Institute of Oceanography, Mumbai.
- Report on Risk assessment study and On-site disaster management Plan for SPMs, COTs and connecting Pipelines of Adani Ports and Special Economic Zone Limited, by TATA AIG Risk Management Services Limited, dated February 2001.
- HAZOP study report of SPM Terminal pipeline project by Intec Engineering, dated 26/02/2004.
- IPIECA guide to Contingency planning for oil spills on water.
- Oil spill risk assessment and contingency plan study done by M/s Environ Software Pvt. Ltd. (Copy enclosed)

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1.4 Mutual aid agreements

APSEZL signed MOU with HPCL Mittal Pipelines Limited, Mundra operating in the region of Gulf of Kutch to have mutual aid agreement for the purpose of assisting each other within stipulated time frame with best combination of resources to combat and overcome any large and worst spill with the intent of maximizing the availability of the private, public and government sector response resources during oil spills where assistance is requested by another member.

As per agreement, the member agencies of the affected member state or province may directly request cascable response resources located in oil handling agencies operating in the region of Gulf of Kutch.

1.5 Geographical limits of plan

Adani Ports and SEZ Ltd, Mundra is situated at the North head of Gulf of Kutch which is at the west coast of India. Ships calling Adani Port therefore have to traverse across the GOK. This oil spill contingency response plan (Tier 1) is applicable for the following:

- 1) Loading and Unloading of liquid cargo at the Multi-purpose terminal jetty at the Adani Port.
- 2) Unloading of the crude oil the vessels at the single point mooring (SPM) to offload 70,000 to 3,00,000 DWT.
- 3) Bunkering operations carried out within the port limits.
- 4) Any spill that occurs from any source within port limit (including West Basin, South Basin and LNG Terminal) whether at berths, anchorages or in the channel.

APSEZL falls within the area jurisdiction of The Commander, No.1 Coast Guard District (Gujarat), located at Porbandar. Mundra has a full-fledged Indian Coast Guard Station. The Port limit of APSEZL, Mundra is shown in enclosed chart in annexure 14.

1.6 Interface with ROSDCP and NOSDCP

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.

The NOSDCP sets out a clear definition of the responsibilities of the major participants, such as the Coast Guard, various ministries and departments, ports and oil industry.

The national oil spill contingency plan hierarchy outlined in Figure 1 consists of NOSDCP at the apex level to coordinate significant or disaster type spills, the Regional Oil Spill Disaster Contingency plan (ROSDCP) to coordinate spill in the Gulf of Kutch, utilizing the resources available within the region.

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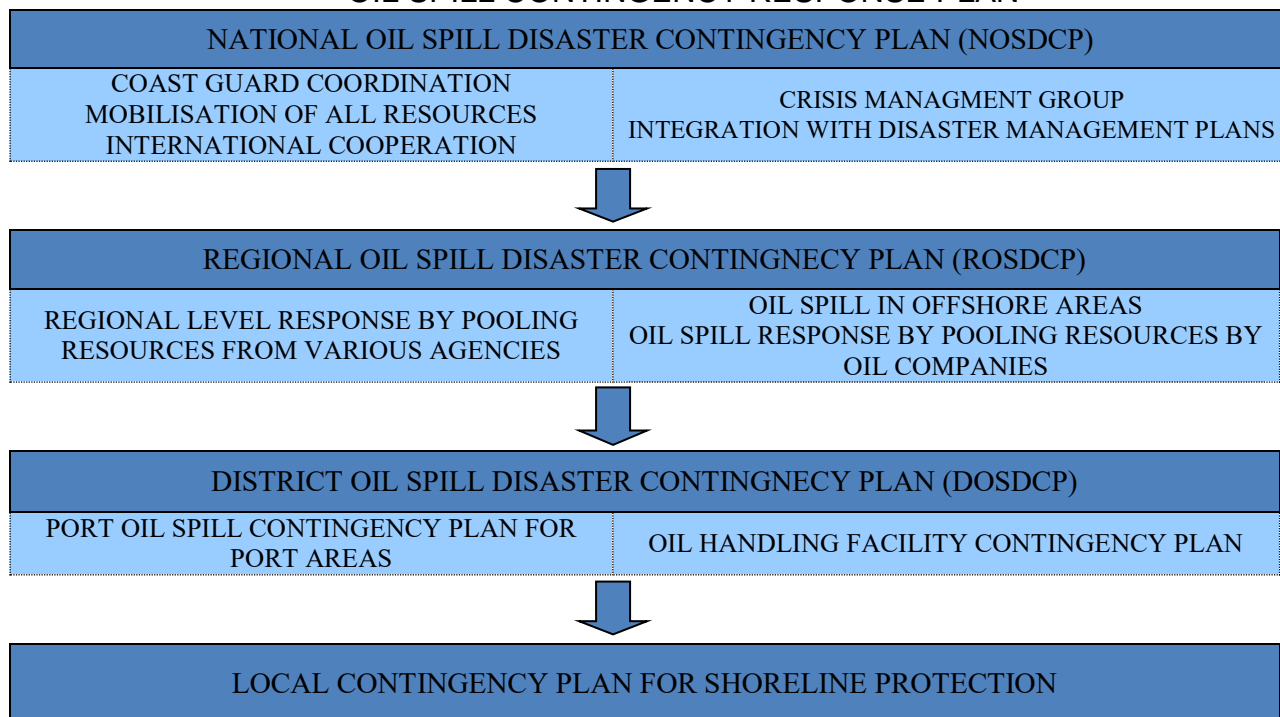


Figure 1 - Contingency Plan hierarchy

The aim of Local Contingency Plan - for the Mundra Port, is to outline arrangements for responding to oil spills in the coastal and shoreline areas, with the aim of protecting against environmental pollution as a result of oil spill or, where this is not possible, minimize the effect and respond the oil spill in an environment friendly manner and dispose the collected oil/debris in according to the existing laws/regulations/orders in force. CONTINGENCY PLAN FOR SHORELINE PROTECTION
DISTRICT OIL SPILL CONTINGENCY PLAN

2 Risk Assessment

The number of vessels calling annually at APSEZL is more than 3000 including Chemical, Gas and oil tankers. The threat of oil spill is much high in Gulf of Kutch and is very oil spill sensitive area. A marine national park is located in the Southern shore of GOK. There is a popular beach spot on the Northern shore namely Mandvi. Lastly, as GOK is a closed system, any oil spilled will arrive to the shores.

2.1 Identification of activities and risks

The scenario of the spill are classified under two categories :

- Oil Spill at Mundra Port Multi-Purpose Terminals
- Oil Spill at SPM

The oil spill could occur due to various reasons at any of the APSEZL's marine facilities (SPMs, Basins/ berths, anchorage or approach channel) within the new Mundra Port limit. The spills beyond these areas are not covered in this plan. Both the categories are discussed in detail

Accidental oil spill at Multipurpose terminals/ Basins/ berths, anchorage or approach channel is possible from overflow of slop tanks, bunker tanks, reception facility and road tankers (generally a low pressure operation).

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Accidental oil spill at the SPM may be due to hose puncture while unloading, failure of swivel joint of SPM or Leakage of Crude Oil at PLEM or from the submarine pipeline.

Following risks are being addressed to mitigate incident of oil pollution:

- Connection of hoses with established work instructions for use of blank flanges, drip trays etc.
- Thorough understanding of use of OSD and limitations of vessel surging due to slack mooring ropes in given weather conditions.
- Monitoring of ships pump room atmosphere, display of fire notices and acknowledging accidental explosion through the use of IMO ship / shore check list.
- Spillage of F.O. during bunkering operations by using bunkering check list
- Ballast discharge contamination or malfunction of ship's sea side valves by prohibiting such operations without written permission of the port.
- Non use of reception facility of the port by ships on cost plus basis.

Operational leakage

Spill due to floating hose failure at SPM: (183 t, at pumping rate of 10000 m³/h of crude oil for 75 sec): (Spill points - S1 at HMEL SPM & S2 at Mundra SPM)

Crude oil pumping rate from the tanker to the shore tanks will be varying between 5000 m³/hr and 10000 m³/hr. In the present study, the maximum pumping rate of 10000m³/hr has been considered to assess the risk on a higher side. The Safety Break Away Coupling in the crude oil transfer hose will be activated within a few seconds in the event of hose rupture or hose failure. Again for the sake of assessing higher risk, a response time of 60 sec – 75 sec (worst case scenario) is considered to estimate the amount of oil that would spill at the SPM. Thus the quantity of crude oil spill has been estimated to be a maximum of 183 tons in the event of hose failure or rupture.

Spill due to rupture of sub-sea crude oil pipeline from SPM to shore tanks: (384 tons of crude oil, at pumping rate of 10000 m³/hr for 60 sec): Spill point S3 taken at midpoint of the pipeline from HMEL SPM to LFP)

Crude oil pumping rate from the tanker will be in the range of 5000 m³/hr to 10000 m³/hr. In the present study, to assess the maximum risk, pumping rate of 10000 m³/hr has been considered. The minimum wall thickness of sub-sea crude oil pipeline is 15.6 mm and the maximum thickness is 24 mm. Moreover all along, 5 inches concrete cladding (weight coating) is provided on the surface of the pipeline. Crude oil pipelines designed, constructed and laid as per the international norms are safe and leakages are extremely rare during their designed life. However, a rupture of size 1 cm x 12.7 cm has been assumed for assessing the quantum of oil spill through sub-sea pipeline.

The maximum manifold pressure will be 12 kg/cm² and crude oil will be pumped to the shore tanks without any boosting device in-between. As the level in the tanker depletes, discharge pressure would also be reduced. Moreover, with the flow distance the crude oil pressure inside the pipe drops. For the sake of assessing the amount of oil spill in case of rupture of sub-sea pipeline, an average pressure of 10 kg/cm² and a water column height of 35 m have been considered.

Accordingly the quantity of Crude oil spill has been estimated using the formula given by

$$Q = C_d A (2gH)^{1/2}$$

Where,

Q = quantity of spill (m³/s)

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C_d = coefficient of discharge (0.9)

A = Area of rupture (m^2) (1 cm x 12.7 cm)

H = Net head (m) ($6.5 \text{ kg/cm}^2 = 65 \text{ m}$)

This would give a value of 0.04 m^3 of crude oil per sec spilling out of the pipeline through the rupture as the pump will be in operation.

The availability of solenoid operated hydraulic shutoff valves in the sub-sea pipeline, which will get activated in less than 15 seconds time as soon as the pressure falls, will limit the amount of oil leaked in case of pipe rupture and consequent drop inside the pipeline. However 60 sec response time has been considered for quantification of oil spill. Accordingly the quantity of Crude oil spill has been estimated to be 2.4 m^3 before the pump discharge valve closes. However, there will be high pressure inside the pipeline initially and the oil inside the pipeline will start leaking into the waters through the hole as the pressure inside the pipe line is higher than the outside pressure, even after the valve is closed and pumping is stopped. Even after the pipeline inside pressure equalises the outside static pressure acting on the rupture, oil continues to start leaking as the density difference between the oil and water; oil being lighter and LFP is higher in elevation compared to the pipeline elevation. Two factors need to be considered here; the specific gravity of the crude oil inside the pipeline is less than 1 whereas the sea water specific gravity is more than 1. Also depending on the location of the hole/leak, there will always be a static head of sea water acting on the leak when the oil tries to flow out and sea water trying to flow in to occupy the place vacated by the leaked oil. Hence all the oil in the pipeline will not leak and there would be an equilibrium point reached when there would be no more oil leaking from the hole as the sea water pressures effectively blocks the oil leak. Also, the leak would be attended to within the stipulated time as per the standard maintenance procedures followed by the organisation. For the purpose of this study and as a worst case scenario before the leak is repaired by the established maintenance procedures, it is assumed that a maximum of 5% of the pipeline oil volume would leak and though it would be a continuous leak, this total quantity is taken to be instantaneous for the purpose of the study.

The pipeline length is approximately 10 km (from SPM to LFP) and the pipeline size is 42" NB. The pipeline volume works out to be approximately 8662 m^3 or 7622 t.

Hence the total oil leaked due to rupture in sub-sea pipeline will be $2.15 \text{ t} + 5\%$ of pipeline volume of oil in t ($0.05 \times 7622 = 381 \text{ t}$) which works out to be a maximum of 383.45 t, say 384 t of crude oil.

For the purpose of simulation studies, this spill on the pipeline is assumed to have taken place at the midway point from HMEL SPM to LFP (designated as spill point S3 in the report) and is taken on the sub-sea pipeline from HMEL SPM to LFP. As the pipeline from HMEL SPM to LFP and the Mundra SPM to LFP run very close only one leak point in the pipeline is studied as it gives a representative oil spill study for the pipeline leakage scenario.

Spill due to collision at SPM: (Spill points S1 & S2)

Crude Oil is received at SPM by ocean tankers having capacity between 90,000-360,000 metric tons. Crude Oil is pumped to shore tanks through pipeline/s from the SPM. In the present scenario, collision of the vessel at the SPM or tanker route with another vessel enroute to other terminals can cause partial damage to the vessels cargo tanks (not more than 3 nos. of cargo tanks) leading to a maximum oil spill of about 700 tons to 25,000 tons of crude oil. In the present study, the probable quantity of crude oil spill due collision at SPM is considered as 700 tons at the minimum and as 25,000 tons at the maximum.

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Spill due to collision or grounding in the tanker route: (Spill point S4)

Tankers are expected to call at the SPMs frequently depending upon the demand for the refineries for the crude oil. These tankers may meet accidents like collision with other vessels or grounding in the vicinity of the SPM. In case of such accidents, the spillage may vary depending on the size of the tanker and the extent of damage and number of cargo tanks ruptured etc. In the present study the probable quantity of spill in the tanker route considered for modelling is 25000 tons at a point which lies on the tanker route to SPM not exactly within Mundra port limit; but a spill point is taken along the tanker route in the Gulf but close to the Mundra port limit.

Spills at the berths (applicable to berths at West Basin, South Basin, East Basin, North Basin, LNG berth and existing cargo berths of Mundra port.)

Oil spills can take place at the berths in the basins during the loading / unloading as well as berthing and traversing operations. The likely spill scenarios are discussed below:

a) Spills during the navigation of the vessel along the approach channel: (Spill point S7 for West Basin)

The spill location can be anywhere in the path. One location along the approach path has been selected for carrying out for model runs.

b) Spills around the jetty (in the maneuvering basin / turning circle): (Spill point S6 for West Basin and Spill point S10 for South Basin)

This can occur due to tug boat impacting the vessel and grounding of the vessel. One location around the jetty at the turning circle has been considered for the computational runs

c) Spills at the berths: (Spill point S5 for West Basin, Spill point S9 for South Basin, Spill point S13 for East Basin, Spill point S14 for North Basin, Spill point S8 for LNG jetty, Spill point S11 for MMPT 1 and Spill point S12 for MICT / AMCT berth locations)

During the loading/unloading operations spills may take place due to one or more of the following: –

Hose/ loading arm leakage (liquid products handled at the liquid berth), overflow on the vessel deck, vessel grounding at the jetty, vessel colliding with jetty, fire and explosion on the vessel or at the jetty, during bunkering operations etc.

Spills along approach Channel / Route

Vessels to the port berths follow the Deep Water route in Gulf of Kutch and Pilot boards at Pilot Boarding Ground “A” or “B”, subject to tide and the berth allotted to the tanker.

While the risk of grounding is low, it cannot be wholly eliminated; the most likely causes are steering or propulsion system failure or navigational error, any of which could result in grounding on the channel margins. Given that the bed of the Gulf is rocky at some places the likelihood of any significant hull damage cannot be ruled out. In a general case scenario, weld fractures in the forward bunker tanks could give rise to a release of approximately 10 Tons of diesel oil and in a worst case scenario extensive damage to the bunker tanks may occur which would cause a spill of 500 to 700 t of FO spill.

Collision

The risk of collision while transiting the channel is negligible given the reason that port authorities use sophisticated ship tracking and navigational systems as the Gulf traffic has increased. These systems would ensure that the chances of any collision are remote or non-existent when ships / marine craft traverses / transits through the channel. However, even if any collision occurs, it is beyond reasonable

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doubt that such an incident would result in the fore part rather than the parallel mid-body of the vessel and the loss of integrity of hull plating of a cargo tank is most unlikely. A spill quantity of 700 t can be the maximum in such a scenario.

Berthing Incident

Oil and/ or liquid chemical spill can occur as a result of hull coming in contact with the corners of the jetty structure during ship berthing or un-berthing maneuvers. Such incidents are generally due to failure of a

vessel's main propulsion or steering systems, loss of control onboard on support tug in attendance or Master error or wrong judgment.

The potential spill quantities involved depend on the vessel type and the location and extent of the impact damage; hull damage to a 20000 DWT – 80000 DWT tanker / vessel in way of a forward or aft wing tank, for example, could give rise to a release of some 500 Tons of product. The potential spill quantity, should hull plating be ruptured in way of an aft wing diesel oil bunker tank can, historically, be up to 100 Tons.

Tug Impact

There are well-documented incidents where cargo or bunker oil has been released as a result of hull impact damage by tugs. This can occur when tugs are approaching a vessel underway prior to berthing, or when coming alongside a moored vessel prior to un-berthing. The potential spill quantities again depend on the location and extent of the impact damage but can be over 20 tons for Diesel oil and 100 Tons for cargo (FO) oil. Spills from this cause are considered to be of low likelihood but the risk is acknowledged.

Loading Arms / Flexible hoses

The operation of loading arms / flexible hoses can lead to minor releases of oil. Common sources are vent valves, swivel joints and hydraulic lines. Such spillage seldom exceeds 0.1 Tons.

Cargo Tank Overflow

Cargo tank overflows can occur on board loading vessels; spills of this nature can be due to instrumentation failure, tank valve mismanagement or operator error. The spill quantity is a function of the flow rate and also the number of tanks being loaded at the time of the incident. Some of the oil and/or chemical will be retained on deck but, in a worst case scenario, up to 3 tons could escape overboard.

Hull Failure

The incidence of oil pollution due to hull failure is low and some 84% of the incidents attributed to this cause by ITOPF involved spill quantities of less than 7 tons; these spills were caused mainly by minor hull fractures and weld failures. The potential for more serious incidents with spill quantities in excess of 700 tons must however be acknowledged.

Fire and Explosion

Fires and explosions on board ship represent a safety hazard with the risk of pollution as a secondary impact. Most tankers engaged for trading will be equipped with inert gas systems. Given the controls, which are imposed and enforced by APSEZL authorities in respect of the oxygen content of cargo tanks, the risk of fire and/or explosion in the cargo spaces must be regarded as minimal, insofar as cargo transfer operations are concerned.

Strict monitoring and control of the main cargo pump room atmosphere will minimize the fire and explosion risks associated with this space.

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Fires resulting from uncontrolled smoking in the accommodation, unauthorized hot work such as welding, and engine room fires can spread rapidly if not dealt with swiftly and can give rise to incidents of a very serious nature.

While the likelihood of fire or explosion occurring on board vessels berthed at the Mundra port berths is low, the risk is nevertheless acknowledged. Such an incident could give rise to a spillage of 700 tons or more.

Bunkering – spillage of fuel oil

Bunkering at the port may sometimes give rise to spills due to hose failure and / or bunker tank overflow etc. in spite of the strict regulatory supervision of the port operations. These spills could be as small as a few kgs to a maximum of 500 t of FO.

As can be seen from the spill scenarios mentioned above, the spills range from extremely negligible quantities to enormous quantities in rare catastrophic events. The simulation of oil spills does not vary significantly in various scenarios except for the magnitude of impact zone and the quantity involved in such impacts. Though the software is intended to be used for specific scenarios so as to get the trajectory and other weathering information; in this study, a few hypothetical scenarios have been simulated and computations carried out considering the worst-case scenarios of oil spills at the different likely locations in the domain.

Based on the above deliberations, the following scenarios for computations have been selected for carrying out modeling studies for the oil spill trajectory and weathering processes.

Computational Scenarios:

Spill Locations	Pre-monsoon (Jan)	Monsoon (July)	Post monsoon (Nov)
SPM			
Crude oil spill of 183 t at the pumping rate of 10000 m ³ /hr (for 75 sec release) at the SPMs (due to Hose failure) Spill points: S1 and S2 During spring and neap tide conditions (tide conditions : PF and PE)	▪	▪	•
Instantaneous crude oil spill of 700t at the SPMs Spill points: S1 and S2	▪	▪	•
Instantaneous crude oil spill of 25000t at the SPMs -- Spill points: S1 and S2	▪	▪	•
Pipeline Leakage			
Crude oil spill of 384 t at the pumping rate of 10000 m ³ /hr (for 60 sec release) along the pipeline corridor at a select (midway) point of subsea pipeline in the pipeline routes. -- Spill point: S3	▪	▪	•
Tanker route			
Instantaneous crude oil spill of 25000t along the tanker route at select location. Spill point: S4	▪	▪	•

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West Basin (berths)			
100 tons (due to Berthing incident/ collision) at the West Basin berths (FO) Spill point: S5	■	■	●
50 Tons (due to Berthing incident/ collision (diesel oil tanks) at the West Basin berths (HSD) Spill point: S5	■	■	●
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berths -- Spill point: S5	■	■	●
In the maneuvering basin: <ul style="list-style-type: none"> ○ 20 Tons of HSD oil due to Tug Impact (HSD) ○ 100 Tons of FO due to Tug Impact Spill point: S6	■	■	●
Along the vessel route at one location: Instantaneous oil spill of 700t along the tanker route at a select location.(FO): Spill point: S7	■	■	●
LNG Berth			
100 tons (due to Berthing incident/ collision) at the LNG berth (FO) -- Spill point: S8	■	■	●
50 Tons (due to Berthing incident/ collision (diesel oil tanks)) at the LNG berth (HSD) – Spill point: S8	■	■	●
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth-- Spill point: S8	■	■	●
South Basin (Berths)			
100 tons (due to Berthing incident/ collision) at the South Basin berths (FO) -- Spill point: S9	■	■	●
50 Tons (due to Berthing incident/ collision (diesel oil tanks) at the South Basin berths(HSD) – Spill point: S9	■	■	●
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth -- Spill point: S9	■	■	●
At the turning circle: <ul style="list-style-type: none"> ○ 20 Tons of HSD oil due to Tug Impact ○ 100 Tons of FO due to Tug Impact Spill point: S10	■	■	●
At the existing MMPT 1 Berth: : Spill Point S11			
100 tons (due to Berthing incident/ collision) at the berth(FO) -- Spill point: S11	■	■	●
50 Tons (due to Berthing incident/ collision (diesel oil tanks)) at the berth (HSD) – Spill point: S11	■	■	●
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth	■	■	●

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At the existing MICT / AMCT Berths: : Spill point S12			
100 tons (due to Berthing incident/ collision) at the (FO) - Spill point S12	■	■	●
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth - Spill point S12	■	■	●
At the East Basin: Spill point S13			
100 tons (due to Berthing incident/ collision) at the East Basin berth (FO) - Spill point S13	■	■	●
At the North Basin: Spill point S14			
100 tons (due to Berthing incident/ collision) at the North Basin berth (FO) - Spill point S14	■	■	●

2.2 Types of oil likely to be spilled

Mundra Port mainly deals with Vegetable oils, Furnace oil, Naphtha, Methanol, High Speed Diesel, Super Kerosene Oil and other light oils at its Multi-Purpose terminal. The vessels calling at the port (or the designated anchorage areas) may spill fuel, diesel or a minimal quantity of lubricating oils. The SPM is being used to discharge crude oils from tankers.

At Berths:

- Vegetable oils,
- Furnace oil,
- Naphtha,
- Methanol,
- High Speed Diesel,
- Super Kerosene Oil,
- Carbon Black Feed Stock (CBFS),
- Motor Spirit,
- Other light oils
- Other HNS Substances

At SPM:

- Crude oil

At anchorages or within port limits:

- Fuel oil,
- Diesel oil,
- Minimal quantity of lubricating oil.

2.3 Probable fate of spilled oil

APSEZL is all weather, commercial port with geographical and hydrological advantages on the West Coast of India, in the Gulf of Kutch. Tidal range is between +0.37 m during Neaps and + 6.40 m during springs. Tidal streams flow 070⁰ – 250⁰ at an average rate of 3 kts and 4-5 kts during spring tides.

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It has been observed from the modeling study that during pre-monsoon season, the spills occurring at the APSEZL marine facilities move towards the southern / southwestern part of the Gulf of Kutch nearer to the facilities depending on tide phase.

The spills taking place at the APSEZL marine facilities move towards northern coast of Gulf of Kutch during monsoon season and affect the coast near Mundra, Kandla etc.

During post - monsoon season, the spills taking place at the APSEZL marine facilities move towards south / southwest and affect the islands /coast on southern side of the Gulf of Kutch.

The surface or subsurface oil spill consists of slick floating on the water surface, which partially dissolves in the water and partially evaporates into the atmosphere. There is a continuous exchange between the suspended and surface oil (floating oil). The assumption made in deriving the governing equations is that the thickness of the oil layer is negligible in comparison with the water depth.

In addition to the location, size and physico-chemical properties of the spill, other major factors affect the fate of the oil slick are governed by complex interrelated transport (turbulence) and weathering processes (evaporation, emulsification and dissolution). The spilled oil spreads and moves by the forces of winds and currents. A small portion of hydrocarbons begin to go into solution in the underlying water column, but most of the oil is lost through evaporation into the atmosphere. In the present model, all these processes are considered in the transport of Oil Slick.

Out of the above mentioned oils the vegetable or light oils do not pose any significant threat to the environment.

The spilled 'persistent' crude oil (or fuel oil) undergoes a number of physical and chemical changes known as "weathering". The major weathering processes are spreading, evaporation, dispersion, emulsification, dissolution, oxidation sedimentation and biodegradation.

The term persistent is used to describe those oils which, because of their chemical composition, are usually slow to dissipate naturally when spilled into the marine environment and are therefore likely to spread and require cleaning up. Non-persistent oils tend to evaporate quickly when spilled and do not require cleaning up. Neither persistence nor non-persistence is defined in the Conventions. However, under guidelines developed by the 1971 Fund, an oil is considered non-persistent if at the time of shipment at least 50% of the hydrocarbon fractions, by volume, distill at a temperature of 340°C (645°F), and at least 95% of the hydrocarbon fractions, by volume, distill at a temperature of 370°C (700°F) when tested in accordance with the American Society for Testing and Materials Method D86/78 or any subsequent revision thereof."

- a) **Spreading:** is one of the most significant processes during early stages of a spill is initially due to gravity. The oil spreads as a coherent slick and the rate is influenced by its activity. After a few hours, the slick begins to break-up and after this stage, spreading is primarily due to turbulence. Wind and wave actions also tend to fragment the slick, breaking it up into islands and windrows.
- b) **Evaporation:** The rate and extent of evaporation depends primarily on the volatility of the oil. In general, oil components with a boiling point below 200 D C evaporate within 4 to 16 hours in tropical conditions. Spills of refined products such as kerosene and gasoline evaporate completely and light crude lose up to 40 % of its volume within a few hours. In contrast, heavy crude and fuel oils undergo little evaporation.
- c) **Dispersion:** Waves and turbulence act on the slick to produce droplets of oil of different sizes. Small droplets remain in suspension while the larges ones rise to the surface. The rate of dispersion mainly depends on the nature of the oil and the sea state. Oils which remain fluid can spread unhindered by other weathering processes can disperse completely in moderate sea conditions within a few days. Viscous oils tend to form thick lenses on the water surface with slow

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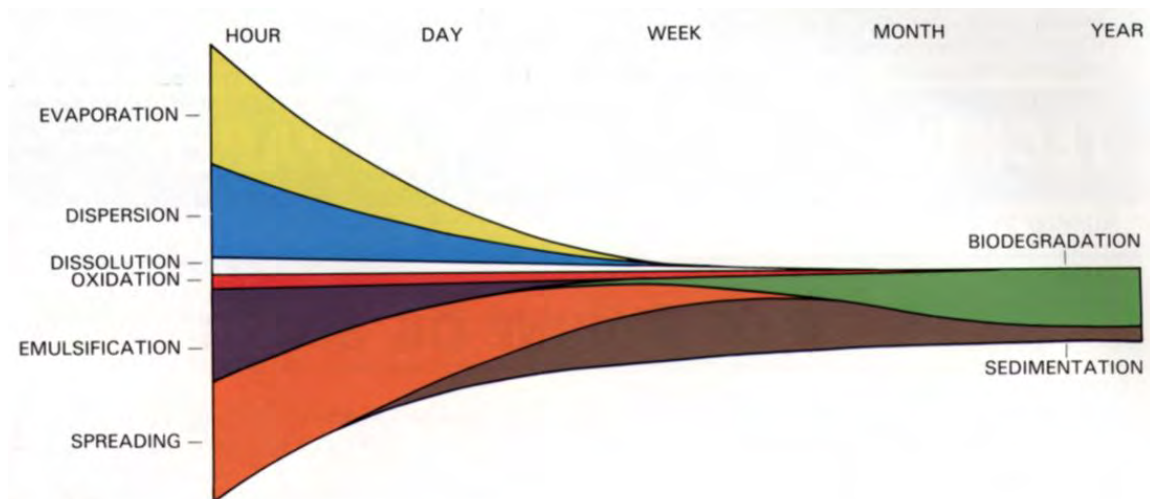
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tendency to disperse, which can persist for several weeks.

- d) **Emulsification:** Several oils have tendency to absorb water to form water-in-oil emulsions thereby increasing the volumes of the emulsified mass by a factor of 3 to 4. The rate at which the oil is emulsified is largely a function of sea state though viscous oils absorb water slowly. In turbulent sea conditions, low viscosity oils can incorporate as high as 80 % water by volume within 2 to 3 hours.
- e) **Dissolution:** The heavy components of crude oil are virtually insoluble in sea water while lighter compounds are slightly soluble. Hence levels of dissolved PHC rarely exceed 1 mg/l following a spill. Therefore, dissolution, does not make a significant contribution to the removal of oil from the sea surface.
- f) **Sedimentation:** Very few oils are sufficiently heavy to sink in sea water. However, the weathered residue gets mixed up with the suspended substances in water and may sink. This process becomes significant when water-in-oil emulsions attain specific gravity near to one and therefore need very little suspended substances to exceed the specific gravity of sea water (1.025).
- g) **Oxidation:** Hydrocarbon molecules react with oxygen and either breaks down into soluble products or combine to form persistent tars. Many of these oxidation reactions are promoted by sunlight and their effect on overall dissipation is minor in relation to other weathering processes.
- h) **Biodegradation :** Sea water contains a range of marine bacteria, moulds and yeasts which can use oil as source of carbon and energy. The main factors affecting the rate of biodegradation are temperature and the availability of oxygen and nutrient, principally compounds of nitrogen and phosphorous. Each type of micro-organism tends to degrade a specific group of hydrocarbons and whilst a range of bacteria exists between them which are capable of degrading most of the wide variety of compounds in crude oil, some components are resistant to attack.

Because the micro-organisms live in sea water, biodegradation can only take place at an oil/water interface. At sea, the creation of oil droplets, either through natural or chemical dispersion, increases the interfacial area available for biological activity and so enhances degradation.

The processes of spreading, evaporation, dispersion, emulsification and dissolution are most important during the early stages of a spill whilst oxidation, sedimentation and biodegradation are long-term processes, which determine the ultimate fate of oil. Fig.3.1 shows schematic diagram of weathering processes with time.



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Schematic diagram of weathering processes with time

It should be appreciated that throughout the lifetime of an oil slick, it continues to drift on the sea surface, independent of these processes. The actual mechanism governing movement is complex but experience shows that oil drift can be predicted by taking into account wind-induced effects and surface water currents. These can be calculated using mathematical modeling to determine the oil spill trajectory. The wind-induced effect is normally taken as 1-3% of the wind velocity, and the current effect as 110% of the current velocity. Reliable prediction of slick movement is clearly dependent upon the availability of good wind, tide and current data.

An understanding of the way in which weathering processes interact is important in forecasting their combined effect in changing the characteristics of different oils and the lifetime of slicks at sea. In order to predict such interactions, numerical models have been developed, based on theoretical and empirical considerations.

Accidental oil spills as indicated in 'Oil Spill Scenario' in section 2.1 of this plan might occur in the area of SPM. On the basis of the data modeled, the results indicate that

- a) about 38 % of hydrocarbons are lost by evaporation, 2.8 % by emulsification and 0.75 % by dissolution within 5 hours;
- b) the quantum of dissolved oil increases up to initial 5 hours and thereafter decreases as lighter (more soluble) hydrocarbons evaporate;
- c) after 50 hour, no oil dissolves;
- d) the trend of emulsified oil is similar to that of evaporated oil but emulsification occurs at a slow rate;
- e) the radius of oil slicks increases to nearly 1400 m at the end of 148 hours; and
- f) the maximum PHC concentration in water is about 39 µg/l.

The spill trajectories clearly reveal the dominance of wind in deciding the location of landfall of the weathered oil. Thus during June-August, the spill will be preferentially transported in the north east direction under the influence of south west winds while during October-November, and possible up-to February, the oil will be predominantly carried to the southern shore. It is also evident that under the influence of the southwest winds, the oil will be deposited on the northern shore within 60 hours, while it might take about 80 hours to reach the southern shore during north east winds.

2.4 Development of oil spill scenarios including worst case discharge

The scenario of the spill are classified under two categories:

- 1. Oil Spill at Mundra Port Multi-Purpose Terminals/ Basins
- 2. Oil Spill at SPM

Oil Spill at Mundra Port Multi-Purpose Terminals/ Basins

- a) Leak during cargo transfer operations Minor (250 liters)

This can occur at the start of cargo operations, during operation due to leakage in pipes, expansion joints, and at the time of disconnection of hose at manifold. However, such instances are remote on implementation of International Safety Management by Ships and Quality Management systems by Port.

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b) Slop tank / bunker tank overflow at, Jetty / Ship Minor (250 - 1000 ltrs.)

This source of pollution is purely of an accidental nature. The ship is expected to be ship shape with good trained crew and this has been emphasized to the Master of the vessel at the time of cargo transfer / bunkering. Based on a rate of 20 cbm/hr. and reaction time of 1 min, and hose content of 150 ltrs., likely spill is only 250 litres. A ship shore check list for cargo operations and bunkering is employed. A joint declaration is made by Marine Staff and Chief Officer / Master and enforced by Marine Manager. This results in good ship / shore co-ordination.

c) Spill during berthing (tug impact) Moderate (3000 liters)

Accidental contact with tugs or another marine structure is a possibility but quantum is not going to be significant because of Fendering system employed and training given to tug crews. Also with concept of double hull tanker the entire cargo compartments are protected by another hull, thus cargo spillage due to impact of tug is remote.

d) Grounding / Hull Damage :

APSEZL operates dry cargo & liquid cargo berths. Tankers mainly carry Furnace oil, Naphtha, Methanol, High Speed Diesel, Super Kerosene Oil and Vegetable oil. Oil transfer operations at the jetty are supervised by Liquid terminal staff. Manifold area has receptacle facilities to prevent accidental spills at connection / disconnection time. Berthing is done under controlled conditions and spill due to contact damage to underwater oil tanks is very remote. Radio officer controls movement of vessels in and around the berth and traffic presently is insignificant to pose any collision damage risk. Under water sea bed characteristic is soft sand. The berth area of about 500² m is surveyed monthly for any changes and underwater obstructions; hence grounding resulting into oil spill is very remote.

Oil Spill at SPM

a) Hose Puncture while unloading:

In such an event, crude oil, about 10670 Kgs may spill onto water. On spillage the oil slick will be carried away at a distant location depending upon water current and wind direction. The trained crew of the maintenance vessel patrolling the area during unloading, would control the oil slick movement by using booms and subsequently, the oil will be collected by the skimmer.

b) Failure of Swivel joint of SPM:

In this event about 17780 Kgs of crude oil may spill onto water. In this case the leakage may be detected visually by the personnel monitoring the operation from the ship tanker or by the detectors provided on the SPM.

c) Leakage of Crude oil at PLEM or from the submarine pipeline:

This case will occur at least 20 m below the water surface, oil being lighter than water will travel upward and float on to water. By the time oil water reaches the sea water surface, the oil droplets may start undergoing “weathering process” and it may form emulsion along with water.

d) Ship Collision Frequency :

Based on the statistical data and its analysis carried out by National Institute of Oceanography, the probability of this type of accident is about one in every seven years for the traffic projection and hence, this case is ignored.

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e) Ship Grounding Frequency :

Based on the statistical data and its analysis carried out by National Institute of Oceanography, the probability of this type of accident is about one in eleven years for the traffic projection and hence, this case is also ignored. Also with concept of double hull tanker the entire cargo compartments are protected by another hull, thus cargo spillage due to grounding is remote.

2.5 Shoreline sensitivity mapping

Gulf of Kutch is a typical semi-enclosed basin where the tidal forces interact with the open ocean waters of the sea, across its western open boundary at Okha. The currents of the region are tidal-driven and the water column is vertically well mixed. These features make the numerical modeling task easier, as a 2-D hydrodynamic model is sufficient to accurately reproduce the tides and currents for the study region in the Gulf of Kutch at Mundra.

The model domain of longitudes of 68° 50' 56.7" E and 70° 27' 36.9" E and the latitudes of 22° 14' 58.8" N and 23° 01' 49.1" N is selected for carrying out sensitivity analysis and predicting the fate and transport of oil spill that may take place at APSEZL's SPMs, Basins, berths and tanker route near Mundra coast in Gulf of Kutch.

The bottom roughness in the Gulf of Kutch varies due to the variation of bed sediment grain sizes. The bed consists of various sizes of clay, sand, silt and rocky soils. In the present study a uniform Manning's roughness coefficient has been used for numerical runs of hydrodynamic processes. The filled contours of Chezy's roughness coefficient are shown in Fig. A.1.4. The same roughness coefficient has been used to predict tides and tidal velocities in the Mundra area for prediction of oil spill trajectory.

The interpolated Chezy's coefficient calculated based on Manning's roughness and total water depth is shown in Fig.A1.4. The sensitivity analysis has been carried out with various Manning's value, which is the combined effect of d_{50} sediment size and bed configuration, to calibrate the model with respect to the tide data of March and October 1994, at Sikka. The computational runs were continued with various sets of various bed roughness values till computed and measured tide levels are within the acceptable limit.

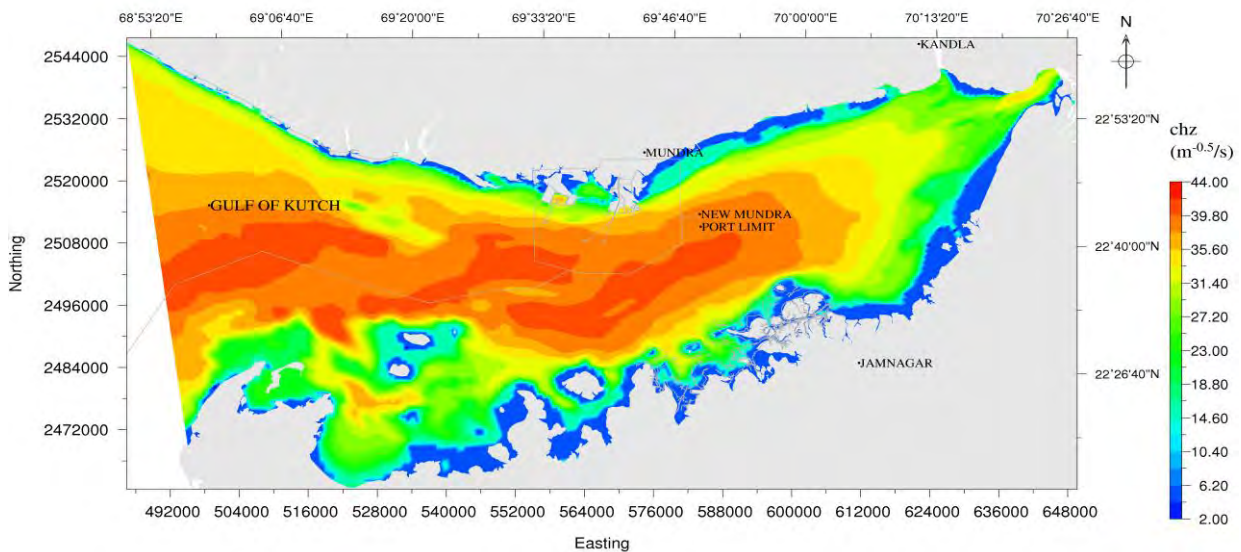


Fig.A1.4 Chezy's coefficient

For Shoreline sensitivity mapping refer Volume 2 (Annexure-V, VI and VII) of Oil Spill Risk Assessment.

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2.6 Shoreline resources, priorities for protection

The SPMs and the Marine facilities (Existing Berths, South Basin, West Basin, North Basin, East Basin and LNG Berth etc.) are located in the Northern side of Gulf of Kutch at Mundra. VLCCs bring Crude oil and unload at the two SPMs which are connected to the Shore tanks by means of Submarine pipelines. The Crude unloaded at these SPMs is pumped through Submarine pipeline to Shore tank farm area.

Various Marine craft / solid cargo/ liquid cargo vessels traverse through the Gulf waters to berth at the various Terminals / Berths located in the new Mundra port limit. The general layout of the various facilities like SPMs, terminals etc. within the Mundra port limit area are shown in Fig.1.1 to Fig.1.4 in chapter 1. There is a probability of spillage at SPMs, along the sub-sea pipelines and tanker route during unloading operations and transportation. Apart from these operations at the SPMs, loading / unloading operations at the different berths of the Mundra port – South Basin, West Basin, North Basin, East Basin, LNG jetty and existing berths also may give rise to accidental spills at the berth locations. The spills at these locations may affect the shore and other facilities along the coast of Gulf of Kutch. The coast of Mundra has tidal flats, sand bars and not much in the way of mangroves. The mangroves, Marine Park / Marine Sanctuary etc. are on the Southern side of Gulf of Kutch. As it was observed that the spills occurring at the various locations of the APSEZL Marine facilities may reach the Coast on the Northern side as well as on the Southern side of the Gulf depending upon the season, there is a need to protect the environment in the event of an oil spill at any of the APSEZL Marine facilities.

Shoreline Resources available with APSEZL, Mundra for deployment during shoreline cleanup/emergent situation:

Item	Quantity
Oil Spill Dispersants	15000 liters
Sorbent pads	2000 nos.
Portable dispersant storage tank: 1000 ltr capacity	1 no.
Portable pumps	2 nos.
Oil discharge hose, 3", 2 x 10 m	1 set
Tanker Trucks	04 nos.
Mini Vacuum Pump (30 m3 / hr)	05 nos.
Sorbent Boom Pack(12.5cm x 4 M)	500 mtr
Slurry Pump (60 m3 / hr)	01 no.
Start Tank with capacity 10000 liter(10 m ³)	02 nos.
OSD Applicator- Oil Dispersant Spry Unit(20 ltr) for use on beach and inter tidal zones	02 nos.

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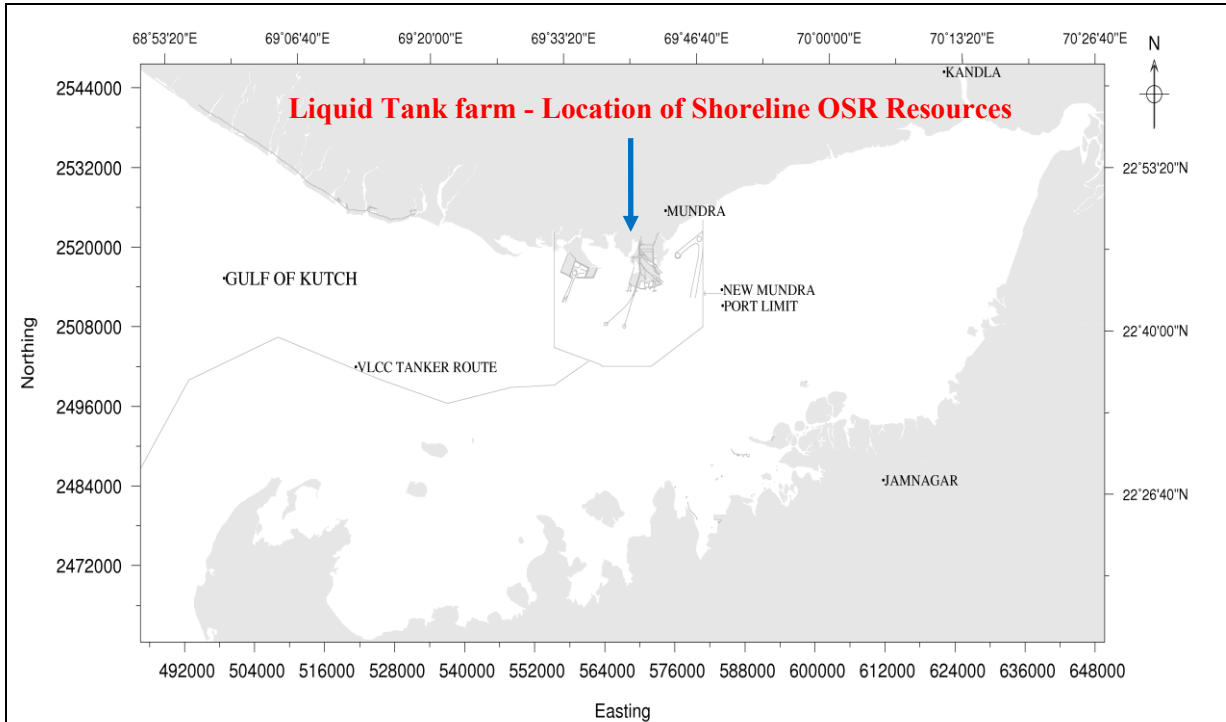


Fig.1.1 :General Arrangement of the marine facilities at Mundra port showing the VLCC route and facilities within the new Mundra port limit considered for carrying out the oil spill risk assessment studies.

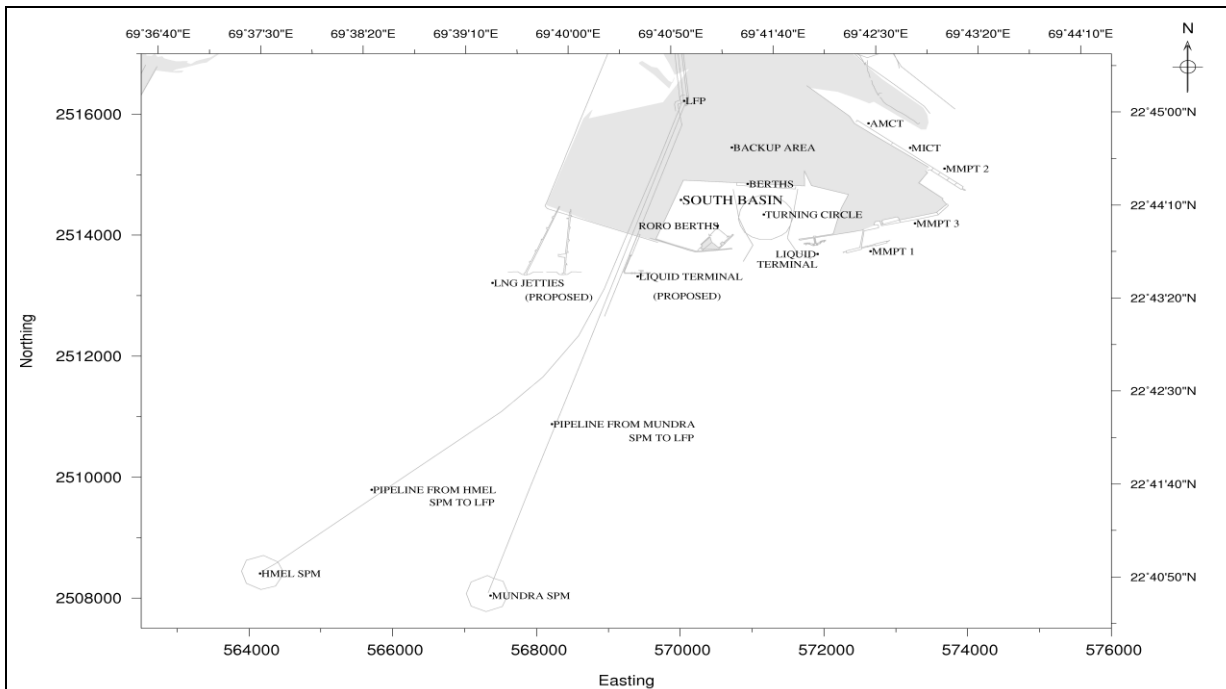


Fig1.2: Zoomed up portion of the South Basin showing the berths, turning circle, LNG jetty and existing berths as well as SPMs.

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Fig.1.3 Zoomed up portion of the West Basin showing the berth locations and the approach channel for the vessels

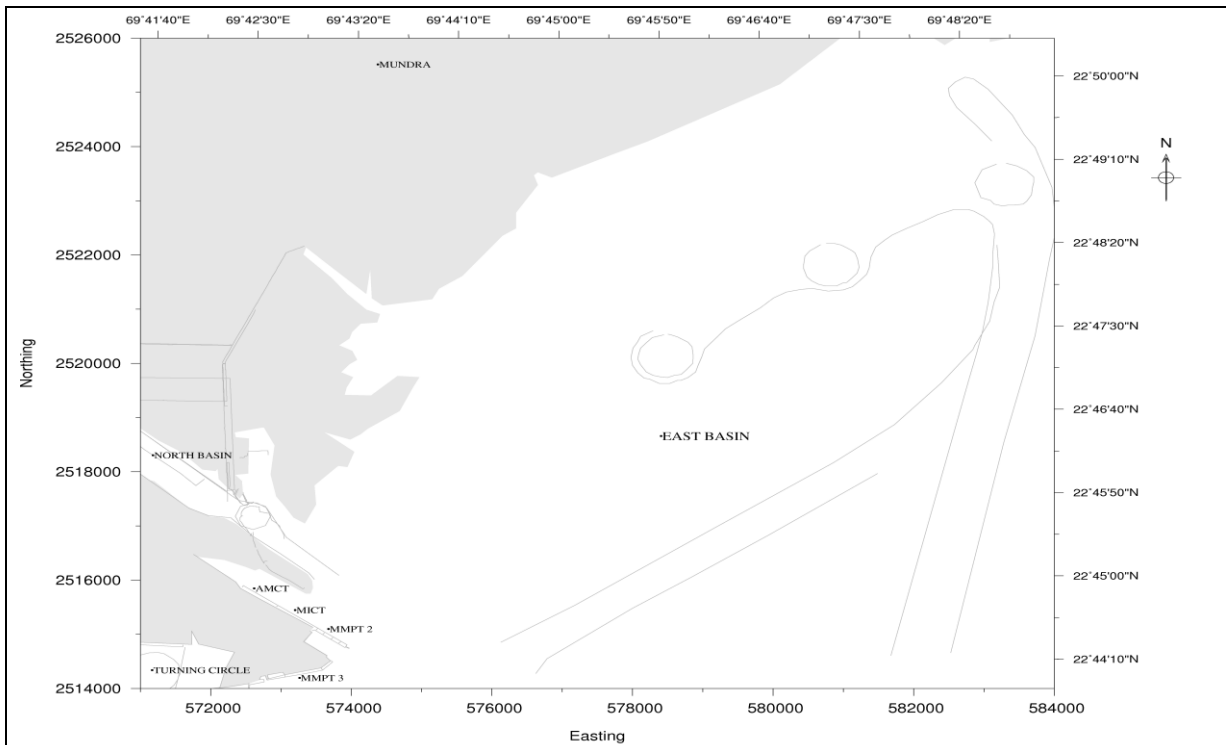


Fig.1.4 Zoomed up portion showing the East Basin & North Basin

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Marine resources in Gulf of Kutch

Phytoplankton

Phytoplanktons are vast array of minute and microscopic plants passively drifting in natural waters and mostly confined to the illuminated zone. In an ecosystem these organisms constitute primary producers forming the first link in the food chain. Phytoplankton long has been used as indicators of water quality. Some species flourish in highly eutrophic waters while others are very sensitive to organic and/or chemical wastes. Some species develop noxious blooms, sometimes creating offensive tastes and odours or anoxic or toxic conditions resulting in animal death or human illness. Because of their short life cycles, plankton responds quickly to environmental changes. Hence their standing crop in terms of biomass, cell counts and species composition are more likely to indicate the quality of the water mass in which they are found. Generally, phytoplankton standing crop is studied in terms of biomass by estimating chlorophyll and primary productivity, while in terms of population by counting total number of cells and their generic composition. When under stress or at the end of their life cycle, chlorophyll in phytoplankton decomposes to phaeophytin as one of the major products.

Phytopigments

During April 2010, the phytoplankton pigments viz. chlorophyll a (1.7 – 2.4 mg/m³; av 1.9 mg/m³) and phaeophytin (0.3 – 1.2 mg/m³; av 0.7 mg/m³) varied considerably. In October 2010, chlorophyll a ranged from 2.0 – 4.2 mg/m³ (av 3.1 mg/m³) and phaeophytin from 0.7 - 1.1 mg/m³ (av 0.7 mg/m³) (Tables 8.1 and 8.2). The average concentration (mg/m³) of chlorophyll a off Vadinar during different sampling events (2010) is listed in Table 8.1:

Table 8.1: Average chlorophyll a (mg/m³) off Vadinar (April 2010 to October 2010)

Area	Pathfinder	Nearshore	ESSAR DP	IOC SPM	ESSAR SPM	Salaya Creek	Gulf
April 2010	2.4	2.1	1.9	1.4	2.0	2.0	1.7
Oct 2010	2.1	4.2	2.8	4.1	2.0	-	3.7

The values of phaeophytin during the present monitoring period are given in Tables 8.2, while, the average concentrations (mg/m³) between different sampling events (April 2010 and October 2010) are listed in Table 8.2.

Table 8.2: Average phaeophytin (mg/m³) off Vadinar (April 2010 to October 2010)

Month	Pathfinder	Nearshore	ESSAR DP	IOC SPM	Essar SPM	Salaya Creek	Gulf
April 2010	1.2	0.6	0.8	0.3	0.6	0.8	0.6
Oct 2010	1.1	0.9	1.1	0.9	0.7	-	0.8

Phytoplankton population

As is generally the case with Coastal waters, the phytoplankton population density (68-332 nox10³/l; av 186 no x 10³/l) and generic diversity (11-30 no; av 18 no) varied over a wide range and in a random manner during April 2010 (Table 8.3). In October 2010 the phytoplankton population density ranged from 100-789.6 nox10³/l (av 329.4 no x 10³/l) and generic diversity ranged from 12-25 no (av 19 no) (Table 8.4) off Vadinar.

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Table 8.3: Average phytoplankton population density (no x 10³/l) and total genera (no) off Vadinar (April 2010 to October 2010)

Month	Pathfinder		Nearshore		ESSAR DP		IOC SPM	
	Cell count (nox10 ³ /l)	Total genera (no.)	Cell count (nox10 ³ /l)	Total genera (no.)	Cell count (nox10 ³ /l)	Total genera (no.)	Cell count (nox10 ³ /l)	Total genera (no.)
Apr-10	216.2	19	200.5	17	192.7	15	127.7	18
Oct 2010	203.1	19	446.6	20	323.6	23	360.4	18

Month	Essar SPM		Salaya Creek		Gulf	
	Cell count (nox10 ³ /l)	Total genera (no.)	Cell count (nox10 ³ /l)	Total genera (no.)	Cell count (nox10 ³ /l)	Total genera (no.)
Apr-10	124	16	198.5	18	211	15
Oct 2010	260	16	-	-	487.6	14

The above results indicated wide temporal and spatial fluctuations in the standing stock of phytoplankton between April 2010 and October 2010 off Vadinar. In general, the coastal waters revealed high average cell counts during October 2010 as compared to previous data. The generic diversity of phytoplankton during April 2010 widely varied with the dominance of genera such as Nitzschia (17.7%), Guinardia (16.7%), Skeletonema (9.1%), Thalassiosira (7.4%), Hemiaulus (7.2%), Navicula (6.1%), Rhizosolenia (4.5%), Biddulphia (3.4%) and Leptocylindrus (3.4%). In October 2010, the dominant phytoplankton genera were Leptocylindrus (57.6%), Guinardia (13.9%), Nitzschia (8.1%) and Chaetoceros (7.2%)

Mangroves

According to one estimate the dense mangrove cover of Narara Bet is spread over an area of 5.5 km². The mangrove area has increased in recent years due to extensive plantations made by the Forest Department. Mangrove cover and mudflat areas (km²) in Jamnagar, Lalpur, Khambalia and Kalyanpur Talukas estimated based on satellite data are given in Table 8.4 below:

Table 8.4: Mangrove areas (km²) along Jamnagar coast

Taluka	Mangroves (Dense)	Mangroves (Sparse)	Tidal mudflats
Jamnagar	12.03	23.91	83.53
Lalpur	1.96	3.95	50.50
Khambalia	3.86	11.48	101.94
Kalyanpur	0.04	0.01	0.78

*Singh H.S., 2000. Mangrove in Gujarat, GEER foundation

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Mangroves at Vadinar

The intertidal expanse in the vicinity of Dargah ranged in 1 – 1.2 km. Lower intertidal zone was muddy with dense algal growth. The mid and upper intertidal zone sustained mangrove vegetation of ~ 500 m width. The zone around HTL was dominated by a sandy beach with ~ 5 m width and a narrow beam at the backshore. The distribution of mangroves at Vadinar during the present monitoring (April 2010) is given in Table 8.5 below:

Table 8.5: Distribution of mangroves at Vadinar (Dargah - North side)

	Location	Species	% FQ	Density	Height (m)	DBH (cm)	Seedling (no/m ²)
D1	22° 26' 42.6''N 69° 42' 07.8''E	<i>A. marina</i>	100	Sep-67 -38	0.5 - 3.5	<2.6 - 6	0 - 2
D2	22° 26' 50.5''N 69° 41' 52.9''E	<i>A. marina</i>	40	0 - 5 -2	0.5 - 1.5	<2.5 - 4	0 - 1
Vadinar (Dargah - south side; afforested area)							
D3	22° 26' 30.8''N 69° 42' 05.6''E	<i>A. marina</i>	100	(20 - 75) -50	1.0 - 2.3	<1.5 - 5	0 - 15

As evident from above data, the stand density of *A.marina* at two locations (D1 and D2) along North-east of Vadinar Dargah varied from nil to 67 plants/100 m² with higher density of plants noticed at location D1. Frequency of occurrence ranged from 40 - 100% in the mid and upper intertidal zones. The height varied from 0.5 to 3.5 m. Mostly the plants were dwarf (av 1 m) with occasional tall plants of 3.5 m. Diameter at Breadth Height (DBH) varied from <2.5 to 6 cm. The seedling density was poor and varied from 0 - 2 no/m². The mid intertidal segment was the popular feeding site for flocks of flamingos.

The upper intertidal expanse along South-west of Vadinar Dargah (D3) showed good growth of afforested mangroves (Table 8.5). The density of mangroves ranged from 20 - 75 plants/100 m² with an average of 50 plants/100 m². The plant height varied from 1.0 to 2.3 m and the DBH ranged from <1.5 to 5 cm. The seedling density was low (0-15 no/m²), however, better than that noticed along North-east of Vadinar - Dargah (D1 & D2). Present results are comparable with earlier monitoring studies (2007 - 2009).

Mangroves at Narara

The intertidal expanse along the IOCL pipeline corridor varied from 2000 - 2200 m. The mangroves vegetation from upper intertidal region was observed to be healthy, dominated by *A.marina* on both sides of the pipeline corridor. Four locations (N1 to N4) were selected for monitoring of mangroves at Narara as detailed in below given Table 7.6.

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Table 8.6: Distribution of mangroves at Narara

	Location	Species	% FQ	Density	Height (m)	DBH (cm)	Seedling (no/m ²)
N1	22° 27' 56.8''N 69° 43' 43.2''E	<i>A.marina</i>	100	20-45 (38)	2-3	3-8	0-85
		<i>C.tagal</i>	10	0.7*	-	-	-
		<i>R.mucronata</i>	5	0.2*	-	-	-
N2	22° 27' 59.1''N 69° 43' 21.3''E	<i>A.marina</i>	100	60-90 (85)	2-4	25-12	0-7
N3	22° 28' 03.5''N 69° 43' 27.4''E	<i>A.marina</i>	100	28-85 (50)	0.5-2.5	<15-7	0-55
		<i>R.mucronata</i>	3	-	-	-	-
N4	22° 28' 07.2''N 69° 43' 24.6''E	<i>A.marina</i>	100	30-130 (80)	0.5-3.5	<2.0-3.5	0-10

* no/500 m²

As can be noticed in the above table, the plant density of *A.marina* varied from 20 - 130 plants/100 m² with a frequency of occurrence of 100% at Narara. The species like *Ceriops tagal* (7 plants/500 m²) and *Rhizophora mucronata* (2 plants/500 m² - 3 plants/100 m²) were rarely noticed. The locations N2 (85 plants/100 m²) and N4 (80 plants/100 m²) revealed better average density of *A.marina* as compared to the rest. The height of *A.marina* varied from 0.5 to 4 m with N2 and N4 locations indicating better plant height than the rest. The DBH varied from <1.5 to 12 cm at the monitoring locations. The seedling density ranged from 0 - 85 no/m² with N1 and N3 locations sustained better seedling density than the rest. Few new plants (30 - 45 cm in height) of *C.tagal* and *R.mucronata* were noticed at the EOL pipeline corridor during the present monitoring.

Sand dune vegetation

The narrow beach of ~ 5 m width around HTL along Narara Bet is marked with berm of ~ 1.5-2 m width, followed by back shore sandy zone. Occasional shrubs of *Salicornia brachiata* and *Suaeda maritima* are observed on the backshore sandy zone. The sand dune flora is more predominant on berm and immediate back shore zone of ~5 m width. Sand dune flora is represented by seven species viz; *Crassa sp*, *Cyperus arenarius*, *Launea sp*, *Suaeda maritima*, *Salicornia brachiata*, unidentified *Poaceae* member and unidentified *Fabaceae* member.

Seaweeds and Seagrasses

Seaweeds, which are known as a source of food, fodder and manure, are mostly found attached to various substrata like sandy, muddy and coralline sediments as well as rocky areas and play a significant role in enriching the sea by adding dissolved organic matter, nutrients and detritus besides serving as nursery areas for the larvae and juveniles of innumerable marine organisms. Some green Seaweeds are edible, red algae are the important source of agar and some of the brown algae are used for manufacturing algin and alginic acid. Seaweeds are also used to produce some bioactive compounds.

The algal zone of Narara Bet is confined to 1.2-2.5 km width. A total of 62 species of algae and 3 species of sea grasses are recorded from this region. Among them *Lyngbya*, *Caulerpa*, *Cladophora*, *Ulva*, *Cystoceira*, *Dictyota*, *Hydroclathrus*, *Padina*, *Sargassum*, *Acanthopora*, *Amphiroa*, *Champia*, *Centraceros*, *Gracilaria*, *Hypnea* and *Polysiphonia* were common with the dominance of *Padina* and *Gracilaria* at the lower reef flat. The open mudflats of Narara Bet are dominated by algae like *Enteromorpha*, *Ulva*, *Lyngbya* and *Polysiphonia*, while, the upper sandy shore and mangrove areas are associated with *Enteromorpha* and *Ulva*. Seagrasses such as *Halophila ovata* and *Halodule uninervis* are common in patches on sandy regions of the reef, while, *Halophila beccarii* occasionally occurred on mudflats along the tidal channels.

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Open mudflats near Dargah and Narara pipeline corridor supported growth of twelve marine algae dominated by Enteromorpha spp (Table 8.7). The biomass of Enteromorpha estimated at ~ 4 kg/m².

Table 8.7: Marine algal flora along Narara/Vadinar

Sr. No.	Species	% FO*	ES*
1	<i>Enteromorpha clathrata</i>	100	D
2	<i>Enteromorpha intestinalis</i>	100	D
3	<i>Caulerpa racemosa</i>	50	C
4	<i>Ulva fasciata</i>	100	D
5	<i>Ulva lactuta</i>	100	D
6	<i>Ulva reticulate</i>	90	D
7	<i>Codium elongatum</i>	30	O
8	<i>Sargassum ilicifolium</i>	45	C
9	<i>Sargassum tenerimum</i>	60	CD
10	<i>Gracilaria corticata</i>	55	C
11	<i>Gracillaria verrucosa</i>	85	C
12	<i>Polysiphonia platycarpa</i>	20	O

*%FO: Percentage Frequency Occurrence, ES: Ecological Status, D: Dominant (% FO = 80-100), CD: Co-dominant (% FO = 60-79), C: Common (% FO = 40-59), O: Occasional (% FO = 20-39).

The intertidal zone of Kalubhar Tapu harbours 47 species of marine algae and three species of seagrasses. The reef areas of this island are dominated by *Dictyota*, *Gracilaria*, *Padina*, *Hydroclathrus*, *Ulva* and *Hypnea*. The open mudflats and sandy areas at the upper intertidal are preferred by *Enteromorpha*, *Ulva*, *Lyngbya* and *Polysiphonia*. The sandy region of the reef flat supported seagrasses like *Halophila* and *Halodule*.

Zooplankton

The zooplankton standing stock in terms of biomass and population density during April 2010 (Table 8.8) varied from 0.2 to 121.2 ml/100m³ (av 3.3 ml/100m³) and 2.2-722.7 x 10³/100m³ (av 39 x 10³/100m³), respectively while during October 2010 the zooplankton biomass and abundance ranged from 0.2 to 12.0 ml/100m³ (av 3.5 ml/100m³) and 2.5-157.8 x 10³/100m³ (av 48.4 x 10³/100m³) respectively suggesting normal secondary production off Vadinar during the monitoring period.

The average zooplankton biomass (ml/100m³), population density (nox10³/100m³) and total groups (no) off Vadinar during the monitoring period varied in accordance with the data presented in Table 8.8.

Table 8.8: Average values of zooplankton (A) biomass (ml/100m³) (B) Population density (nox10³/100m³) and (c) total groups (no) off Vadinar (April 2010 – October 2010)

Area		Pathfinder	Nearshore	ESSAR DP	IOC SPM	Essar SPM	Salaya Creek	Gulf
April 2010	A	8.3	1.1	1.1	0.9	1.4	2.5	3.5
	B	89.9	24.6	14.4	22.7	12.7	20.4	37.4
	C	17	15	12	16	13	16	17
Oct 2010	A	4	3.9	1.5	3	5.7	-	2.1
	B	57.4	55.9	23.5	30.5	83.1	-	32.8
	C	13	11	10	10	9	-	7

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The overall zooplankton standing stock was low and highly variable off Vadinar which could be due to high patchiness and seasonal variability in their distribution apart from high grazing pressure at higher trophic levels.

During April 2010, 24 faunal groups were identified in the coastal waters off Vadinar during the monitoring period while 17 faunal groups were present in the samples of October 2010. The most common faunal groups were copepods (40.5%), decapod larvae (19%), gastropods (22.5%), lamellibranchs (10.7%), and foraminiferans (2.1%) in April 2010. In addition to the above, groups like chaetognaths, siphonophores, *Lucifer* sp, polychaetes, ctenophores, medusae, amphipods, ostracods, mysids, heteropods, isopods, stomatopod larvae, appendicularians and fish larvae were also frequently noticed but in less numbers during April 2010. During October 2010, the dominant groups were copepods (93.6%) and decapod larvae (4.8%). In general, the coastal waters off Vadinar revealed a moderate production of zooplankton associated with random fluctuations and seasonal changes.

Macro benthos

The organisms inhabiting the sediment are referred as benthos. Depending upon their size, benthic animals are divided into three categories, macrofauna, microfauna and meiofauna and macrofauna. Benthic community responses to environmental perturbations are useful in assessing the impact of anthropogenic perturbations on environmental quality. Macrobenthic organisms which are considered for the present study are animals with body size larger than 0.5 mm. The presence of benthic species in a given assemblage and its population density depend on numerous factors, both biotic and abiotic.

Intertidal macrofauna

During April 2010, Intertidal macrofauna was studied along 5 transects viz. 1 transect (Transect I) at Kalubhar Island and 4 transects at Narara Bet. Several locations were sampled along each transect between the HTL and the LTL viz; High Water (HW), Mid Water (MW) and Low Water (LW). The intertidal macrofaunal standing stock in terms of population density (50-7800 no/m², av 2292 no/m²) and biomass (0.1-37.2 g/m²; wet wt, av. 9.2 g/m²; wet wt) varied widely During the post monsoon, only the first three transects were sampled. In October 2010, the intertidal macrofaunal standing stock in terms of population density ranged from 0-3625 no/m² (av 1185 no/m²) and biomass from 0-67.8 g/m²; wet wt (av. 14.6 g/m²; wet wt). These results are compared with historical data in Table 8.9.

Table 8.9 Average of intertidal macro benthos off Vadinar during April 2010 to October 2010, (A) Biomass (g/m²) (B) Population density (no/m²) and (C) Total groups

Transect		I	II	III	IV	V
April 2010	A	11.2	4.2	13.7	10.7	6.1
	B	3983	1172	1292	2401	2614
	C	5	3	6	6	3
Oct 2010	A	11.9	16.8	15.1	-	-
	B	1495	904	1156	-	-
	C	5	7	5	-	-

Overall, the intertidal region sustained good faunal standing stock and diversity and the contribution of major faunal components are comparable over the past many years at Narara Bet/Kalubhar.

Subtidal macrofauna

Subtidal macrofauna was studied at 13 stations in the coastal system off Vadinar during April 2010 and at 10 stations during October 2010. The distribution of subtidal faunal standing stock in terms of biomass (0.3 - 41.0 g/m²; av 8.0 g/m² wet wt) and population density (150-8925 no/m²; av 1902 no/m²) during April 2010. In October 2010 the biomass ranged from 0.3 – 23.9 g/m² (av 7.1 g/m²; wet wt) and population density ranged from 125-14975 no/m² (av 2282 no/m²) The current data is listed (April 2010 – Oct 2010) in Table 8.10.

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Table 8.10 Average of subtidal macrobenthos off Vadinar during April 2010 to October 2010, (A) Biomass (g/m²) (B) Population density (no/m²) and (C) Total groups

Area		Pathfinder	Nearshore	ESSAR DP	IOC SPM	ESSAR SPM	Salaya Creek	Gulf
April 2010	A	11.2	2.9	2.0	6.1	1.3	15.5	6.4
	B	3833	338	388	694	2375	1553	1865.5
	C	7	3	4	6	5	6	4
Oct 2010	A	12.1	7.7	1.9	4.9	1.8	-	10.6
	B	5019	2967	400	1169	181	-	1652
	C	8	5	4	4	2	-	7

The macrobenthic population was dominated by polychaetes (50.1%), amphipods (18.5%), pelecypods (8.2%), decapod larvae (7.4%), tanaids (3.6%) and foraminiferans (3.2%) during April and by polychaetes (76.3%), amphipods (12.3%) and pelecypods (5%) during October 2010.

Corals and associated biota

Live corals at the Narara and Kalubhar reefs are mainly confined to the lower littoral (reef flat) and shallow subtidal zones (< 8 m). They are absent at the upper reef flat probably because of high rate of sedimentation and long exposure during low tide.

Narara Bet

The eastern segment of Narara Bet represents a formation of vast mud flat, which resulted in significant negative influence on the live coral population. Many regions along the reef flat on the western side are exposed during low tide for prolonged periods because of which the distribution of live corals was poor. In all 30 and 22 Scleractinian species have been identified in the intertidal and subtidal zones respectively of Narara Bet with *Montipora*, *Goniopora*, *Porites*, *Favia*, *Favites*, *Goniastrea*, *Platygyra*, *Cyphastrea*, *Pseudosiderastrea*, *Turbinaria*, *Leptastrea* and *Symphyllia* as the dominant genera.

In general, the live coral density decreased with depth. The live corals were absent beyond 8 m (CD). However, the subtidal area at Narara sustained good coral populations within 5 m (CD). Distance-wise corals were rich within 250 m towards the sea from the LTL. The corals of the genera *Montipora*, *Porites*, *Favites*, *Goniastrea*, *Goniopora*, *Cyphastrea*, *Leptastrea*, *Favia* and *Turbinaria* dominated the subtidal area.

Kalubhar

In general, Kalubhar reef sustained relatively healthy live corals at the lower intertidal and subtidal (<7 m depth) zones as compared to the population at the Narara reef. The north and north-west regions of Kalubhar had better coral density and diversity as compared to the east and south-east regions because of high sedimentation of the reef flat and the subtidal zones. Overall, 30 and 7 species of Scleractinians in the intertidal and subtidal zones respectively at Kalubhar have been identified. The corals at Kalubhar were mainly represented by genera *Montipora*, *Favia*, *Favites*, *Porites*, *Goniastrea*, *Goniopora*, *Cyphastrea*, *Platygyra*, and *Symphyllia* and *Turbinaria*. The live corals were absent at the reef edge of 50 m width due to total exposure for longer period whereas their coverage increased (90 to 100%) at the reef slope below 1 m depth.

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A rich reef associated flora and fauna was noticed at Kalubhar. The common and dominant seaweed genera were *Sargassum*, *Gelidiella*, *Acanthophora*, *Ulva*, *Caulerpa*, *Codium*, *Dictyota*, *Padina*, *Halymenia*, *Enteromorpha*, and *Gracillaria*. Varieties of sponges were associated with coral boulders. The fauna consisted of coelenterates (*Zoanthus* sp., *Discosoma* sp., *Stoichactis giganteum*, *Cerianthus* sp. and variety of corals), annelids (various polychaetes), echiuroid (*Ikedella misakiensis*), crustaceans (amphipods, isopods, *Acetes* sp., shrimps and crabs), molluscs (*Octopus* sp., *Sepia* sp., *Loligo* sp., gastropods, bivalves, nudibranchs etc.) echinoderms and variety of reef fishes.

Fishery

Gujarat ranks number one position in marine fish production in India. The Gulf contributes about 22% to the fish production of the state. The share of the Jamnagar District is between 5 and 14% (av 10%) to the State's total marine fish landings. The important fish landing centres in the vicinity of IOCL SPM area which falls under Khambalia zone are Vadinar, Bharana, Nana Amla and Salaya which together contributed about 6823 t, 8253 t and 5330 t of fish landings in 2006-07, 2007-08 and 2008-09 respectively to the total landings of the Jamnagar District. Similarly, the important fish landing centres in the vicinity of Sikka which falls under Jamnagar zone are Sachana, Baid, Sarmat, Bedi and Sikka which together contributed about 4768 t, 5122 t and 5848 t of fish landings in 2006-07, 2007-08 and 2008-09 respectively. Within the Jamnagar zone, the major landings (98%) were from Sachana (32%), Baid (27%), Sikka (19.7%) and Bedi (18.9%) during the last 3 years. Within the Khambalia zone, the major landings (81-89%) were at Salaya during the period 2006-09. On an average the Khambalia zone (56.5%) contributed to about 13% higher fish landings than Jamnagar zone (43.5%) for the last 3 years. However, the landings at Sikka (1.3%) and Vadinar (0.5%) to the total landings of the district were negligible during the period 2006-2009.

Reptiles and mammals

The reptiles are mainly represented by marine turtles *Chelonia mydas* and *Lepidochelys olivacea* which breed and spawn on the sandy beach along the Sikka-Vadinar coast as well as on the islands.

Dolphin (*Dolphinus delphis*) and whale (*Balaenoptera* sp) are common in the Gulf. Though occurrence of Dugong (*Dugong dugon*) in the Gulf particularly along the Jamnagar coast has been reported, there are no recent sightings.

The resources discussed above likely to be threatened are tidal flats, Phytoplankton, Phytopigments, Mangroves, seaweeds and seagrasses, Zooplankton, Macrobenthos, Corals and associated biota, salt works fishing activities and other vocational related to marine sensitive areas in the coast of Vadinar and Sikka.

It has been observed from the modeling study that during pre-monsoon season, the spills occurring at the APSEZL marine facilities move towards the southern / southwestern part of the Gulf of Kutch nearer to the facilities depending on tide phase.

The spills taking place at the APSEZL marine facilities move towards northern coast of Gulf of Kutch during monsoon season and affect the coast near Mundra, Kandla etc.

During post - monsoon season, the spills taking place at the APSEZL marine facilities move towards south / southwest and affect the islands /coast on southern side of the Gulf of Kutch.

2.7 Special local considerations

Considering the distant proximity of various other installations with the port of Mundra, in case of a tier 1 spill, no other special considerations are deemed to be required apart from an active spill response close to the port facility itself.

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3 Response strategy

3.1 Philosophy and objectives

This plan is intended to assist APSEZL in dealing with an accidental release or discharge of oil. Its primary purpose is to set in motion the necessary actions to stop or minimize the discharge and to mitigate its effects. Effective planning ensures that the necessary actions are taken in a structured, logical and timely manner.

This plan guides the HOD– Marine and his Duty Staff through the decisions which will be required in an incident response. The tables, figures and checklists provide a visible form of information, thus reducing the chance of oversight or error during the early stages of dealing with an emergency situation.

For this plan to be effective, it must be:

- familiar to those APSEZL staff with key response functions;
- regularly exercised; and,
- Reviewed and updated on a regular basis.

This plan uses a tiered response to oil and chemical pollution incidents. The plan is designed to deal with Tier One spillage. The products handled are likely to pose a greater fire and safety, rather than an environmental risk; there may thus be additional factors involving the safety of personnel, which will take precedence over the pollution response. In this case, reference must be made to the APSEZL Emergency Procedures Manual. The salvage and casualty management of any vessel that poses a threat of pollution is priority considerations.

During oil spill response activities, account must be taken of the following:

- site hazard information
- adherence to permit procedures
- spill site pre-entry briefing
- boat safety
- APSEZL safety manual and material safety data sheets
- Personal protective equipment needs
- heat stress
- decontamination

3.2 Limiting and adverse conditions

APSEZL is situated in natural protected Gulf of Kutch and there are less incidences of heavy wind or any other factor affecting operation.

3.3 Oil spill response in offshore zones

SPM handles (unloading) crude oil and pumps it to shore tank farm area through sub-sea pipeline. The impact of such spills on marine environment is on the higher side. Hence, oil spill equipments are required for combating oil in case of such spills at the marine facilities at Mundra.

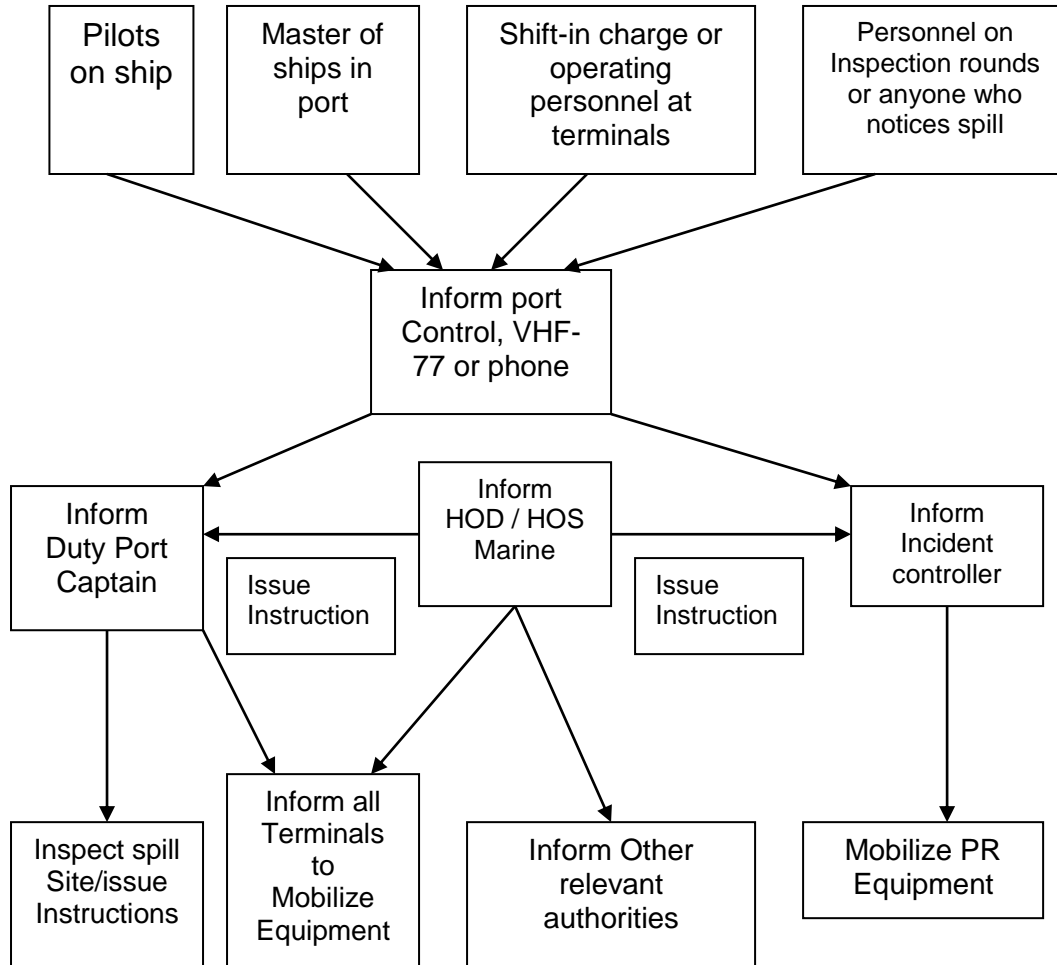
Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZL has already having facilities for combating a Tier-1 spill.

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3.4 Oil spill response in coastal zones

Contingency Chart to deal with Oil Spill



On-site Crisis Management Group – Action Group

In an emergency, the personnel available at or near the incident site play vital role. This concept is made use of in nominating the Key Persons. It is necessary to nominate a functionary as the Incident Controller who is invariably a shift-in-charge of the facility. The Incident Controller tackling the emergency in real times requires the support from various other services i.e. Fire & Safety, Medical Services covering communication, transport and personal functions etc. A key person for each of these services therefore, is nominated.

Overall in charge of these activities is **Chief Operating Officer – Mundra Port**. The different functional coordinators, designated, will co-ordinate with Chief Controller in their respective functional areas. It is suggested that key personal chart be developed, giving the names, designation, telephone nos. of top level personnel who will act as coordinators in different disciplines/services. The duties and the responsibilities of various Key Persons and Coordinators need to be written down on a chart and should be made available across the organization at the site / location.

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Roles & Responsibilities

Incident Control Officer – (HOS – Marine / Duty Port Captain)

- Directs and co-ordinates all field operations at the scene of the accident
- Assess incident/crisis at site, nature, location, severity, casualties, resource requirement
- Classifies incident - Advises Exe. Controller, Civil Defence, Dy. Conservator, Traffic Manager - regarding crisis severity status and emergency level, wind direction, temperature, casualties and resource requirements.
- **Conducts initial briefing to Chairman**
- Activates elements of the terminal emergency plan/ site response actions
- Protect port personnel and the public
- Directs security/fire fighting/oil spillage/gas leakage/vessel accidents/natural calamities, cargo operations shutdown
- Search for casualties and arrange first aid and hospitalization
- Brief or designate a person to brief, personnel at the incident scene
- Determine information needs and inform Crisis Management Group
- Coordinates all functional heads in field operations group to take action
- Manages incident operations to mitigate for re-entry and recovery
- Coordinate search and rescue operations
- Arrange evacuation of non-essential workers to assembly points –outside port
- Arranges tugs, mooring boats and pilot(s) for sailing vessel(s)
- Co-ordinates actions, requests for additional resources and periodic tactical and logistical briefings with Site Emergency Coordinator
- Coordinate incident termination and cleanup activities
- Instructs various emergency squads as necessary

Site Emergency Coordinator – (Senior Pilot and Duty Radio Officer)

- Direct operations from the emergency control center with assistance from Crisis Management Group
- Take over central responsibility from the Site incident controller (SIC)
- Decide level of crisis and whether to activate off site emergency plan
- Instruct SIC to sound appropriate alarm
- Direct the shutting down, evacuation and other operations at the port
- Monitor on site and off site personal protection, safety and accountability
- Monitor that casualties if any are given medical aid and relatives informed
- Exercise direct operational control of the works outside the affected works
- Monitor control of traffic movements within the port
- Coordinate with the senior operating staff of the fire, police and statutory authorities
- Issue authorized statements to the news media
- Review and assess possible developments to determine the most probable course of events
- Authorize the termination of the emergency situation by sounding the all clear siren-continuous long single tone siren for one minute
- Control rehabilitation of affected areas after emergency
- Arrange for a log of the emergency

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Fire Coordinator – (HOS - Fire / HOS -Safety)

(Under the direction of the Incident Control Officer)

- Announces fire incident point over the public address system and evacuates workers to the assembly points
- Informs fire station immediately and leads fire fighting team to the incident location
- Informs SIC if external fire tender / fire-fighting equipment / materials/mutual aid is required
- If necessary, arranges and activates other fire-fighting equipment
- Arranges safety equipment e.g. fire suits, protective gloves and goggles, breathing apparatus
- In liaison with Civil Engineering Department, ensures that adequate water pressure is maintained in the fire hydrant system/at the area supply
- Maintains adequate records

HOS - Security / Duty Security Officer

- Directs, gate security and facilitates evacuation, transport, first aid, rescue
- Controls the entry of unauthorized persons and vehicles-disperses crowd
- Permits the entry of authorized personnel and outside agencies for rescue operations without delay. Liaises with State police
- Allows the entry of emergency vehicles such as ambulances without hindrances
- Ensures that residents within port area are notified about disaster and instructs to evacuate if necessary
- Ensure that all people are aware of the assembly points, where the transportation vehicles are available
- Ensure that the people are as per the head count available with the assembly point section of that area
- Liaise with the Chief Medical Officer to ensure first aid is available at the assembly points
- Carry out a reconnaissance of the evacuated area before declaring the same as evacuated and report to SIC.

Medical Superintendent

- Direct medical team
- Set up casualty collection centre arrange first aid posts
- Arrange for adequate medicine, antidotes, oxygen, stretchers etc
- Contact and cooperate with local hospitals and ensure that the most likely injuries can be adequately treated at these facilities e.g. burns
- Advise Chief Emergency Controller on industrial hygiene and make sure that the facility personnel are not exposed to unacceptable levels of toxic compounds
- Make arrangements for transporting and treating the injured
- Inform the hospitals of the situation in case of a toxic release and appraise them of the antidotes necessary for the treatment
- Maintain a list of blood groups of each employee with special reference to rare blood groups
- Liaise with Govt. Hospitals/Red Cross

Marine Pollution Coordinator – Manager (Marine / pollution control)

- Minimizes the impact of an accident on the environment for which it would develop methodologies to control hazardous spills
- Monitors cooperation with emergency response squads to conduct the actual cleanup work during and after the emergency.

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- In case of fire and specially if the fire involves toxic/flammable materials, to ensure responsible actions for containing the run off fire water and other water from the damaged units
- Determines the level of contamination of the site as a result of the accident
- During cyclones/floods arranges sand bags and transfers important plans and documents to higher levels

Traffic Coordinator – Duty Port Captain

- Directs operation staff
- Prepares vessels to vacate from berth
- Arranges to protect cargo in vicinity from damage
- Arranges to segregate and shift cargo in sheds
- Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area
- Coordinates with ship owners / agents/C & F agents/stevedores

Communications Officer – (Duty Port Captain / Duty Marine Control officer)

- Ensure telephone operator/signal room advises entire emergency team
- On receipt of instructions from the chief Incident controller, notifies the fire brigade/police/hospitals/district collector/mutual aid partners
- Keep the switchboard open for emergency calls and transmit the same to the concerned personnel effectively
- Refrain from exchanging any information with authorized persons unless authorized to do so by the Chief Incident Controller
- Maintains contact with other vessels through VTMS

Chief Emergency Controller – (Head - HSE)

- Inform district emergency authorities-District Collector, Medical officer-Coast Guard Pollution control -Inspector of factories-Inspector of Dock Safety & Health,
- Activate the off site plan if necessary
- Liaise with Jt. Secy./Director MOST (Ministry of Shipping) or relevant Govt. authority
- Inform the media

Civil Coordinator – (HOS – Environment cell / HOS - Estate)

- Inform Gujarat Pollution Control Board and other environmental agencies about the incident for getting necessary guidance
- Instruct the contractors to carry out urgent civil works if required
- Hire the barges for collecting the spilled oil, if required

Marine Engineering Coordinator – (HOS – SPM / Diving Team in-charge)

- Organise the tugs for combating the pollution
- Start the rigging of pollution combating equipment on tugs/launches
- Hire additional crafts if required

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HOD- Corporate affairs:

- Collect detailed information periodically and liaise with press about the incident
- Arrange transport facilities, if required
- Inform local authorities/District Collector about the incident (as per EAP)

HOS - Legal & HOD - Estate:

- Issue notice under Major Port Trusts Act, Indian Ports Act(Prevention & Control of Pollution) Rules, etc; to the defaulting master/owner/agent
- Arrange for settlement of claims related to the pollution(as per EAP)

3.5 Shoreline oil spill response

Most oil spills reach the shorelines and cause visible oil pollution which is particularly sensitive to public opinion. The selection and correct application of clean up techniques are therefore essential. When an oil spill occurs on open water the optimal solution is to intercept and recover the oil before it reaches the shoreline. This is because:-

- The environmental damage is normally less critical in the open water environment
- The logistics of oil removal becomes more complex in the varied natural environment of coastlines compared with the open sea.
- The costs of oil recovery increases dramatically when oil reaches sensitive shorelines compared with open water operations.

Experience has shown that it is very difficult to avoid some oil reaching the shorelines. Mechanical equipment and chemical treatment at sea are often insufficient to recover all oil spilled at sea. When the oil reaches the shoreline, a number of different parameters specific for this particular situation have to be taken into consideration:-

- Quantity of oil
- Characteristics of the oil (for instance, toxicity and viscosity)
- Prevailing on-site conditions (weather, season, tides, temperature)
- Shoreline type or combination of types (cliffs, pebble, sand, marsh)
- Special Considerations

The four main steps in a shoreline clean-up operation are:

Step 1: Assessment

- Determine the need to clean, setting priorities in line with this contingency plan
- Determine required degree of clean-up for each area in accordance with priorities
- Attain agreement between clean-up team, ecological experts, government authorities

Step 2: Select Clean-up Method

- Choose method appropriate to type of shoreline, access, degree of oiling
- Minimize damage caused by choice of clean-up technique, degree of clean-up
- Address conflicts of interest (e.g. needs of amenity use versus environment or response speed versus aggressiveness)

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Step 3: Clean-up Operations

- Monitor clean-up, confirm choices made above, re-evaluate if necessary
- Minimize disturbance of shoreline features
- Minimize collection of un-oiled debris, sediments

Step 4: Termination / Monitoring

- Ongoing assessment of clean-up operations
- Determine when clean-up objectives have been met
- Post-spill monitoring to confirm recovery of shoreline features, biota

The four main methods for shoreline clean-up are as follows:-

A. Pumping and Skimming Techniques

- Applicable to shorelines that are heavily oiled.
- Often the first step in cleaning a heavily contaminated shoreline.
- Preferred option because it results in fluid wastes that are relatively free of sediments and debris, which are more easily dealt with in disposal.
- Pumping and skimming techniques can also be used in conjunction with flushing techniques.

B. Flushing Techniques

- Use water or steam to flush oil from the beach, and direct it to a recovery location.
- Applicable to heavily contaminated beaches, and substrates that are relatively impermeable (e.g., mud and saturated beaches, boulders, and man-made structures) that will not allow the flushed oil to penetrate the beach surface.
- Typically carried out in conjunction with a skimming operation. The flushed oil is directed down-slope to skimmers positioned at the water's edge, with booms deployed around the skimmers to prevent any loss of the water.
- Options of using low or high pressure water, and of using ambient temperature water versus warm water or steam.
- Low pressure, cold water is generally the least effective, particularly with sticky oils and emulsions, but is least harmful on the environment.
- High pressure water and heated water and steam are more effective, but may remove and/or kill beach-dwelling organisms.

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C. Sediment Removal Techniques

- Applicable to a variety of shoreline types, and in particular, when the shoreline is heavily contaminated, though likely to cause the greatest environmental impact
- The requirements are access for the heavy equipment required for transporting away oily debris and sediments for disposal and a surface which is able to support heavy equipment
- An important factor to consider is the depth of oil penetration
- Important to limit the depth of material removed in order to minimise disturbance to the beach, and to minimise disposal requirements
- The best option is to use manual labour to pick up the oily sediment and mechanical means to transport it away

D. Biodegradation Techniques

- Generally refers to "active" bioremediation, where nutrients and/or microorganisms are applied to enhance natural degradation
- Generally suitable for areas that are lightly oiled, especially lightly oiled salt marshes and tidal flats where the use of equipment could increase the environmental effects by forcing oil into the substrate
- It can also be used as a final clean-up step following more active efforts

The shoreline clean-up operation is normally not an emergency operation as is the case with an oil spill on open water. A clean-up project can last many weeks or months depending on the amount of oil spilled. Many wrong decisions can be made in planning and carrying out a shoreline clean-up operation. The contingency plan must be used in combination with consulting experts with experience of shoreline clean up. The agencies such as NIO, NEERI, Ports and Oil companies have experts with experience which is relevant for the specific oil spill situation and they should be consulted prior undertaking shoreline clean-up.

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3.6 Storage and disposal of oil and oily waste

After the natural degradation by coagulation and evaporation of oil on water, residual oil and waste material collected during a Tier 1 response will be disposed off by in-situ or terrestrial burning.

	Type of material	Separation methods	Disposal methods
LIQUIDS	Non-emulsified oils	Gravity separation of free water	Use of recovered oil as fuel or refinery feedstock
	Emulsified oils	Emulsion broken to release water by ; - Heat treatment - Emulsion breaking chemicals - Mixing with sand	Use of recovered oil as fuel or refinery feedstock. Burning Return of separated sand to source.
SOLIDS	Oil mixed with sand	Collection of liquid oil leaching from sand during temporary storage Extraction of oil from sand by washing with water or solvent Removal of solid oil by sieving	Use of recovered oil as fuel or refinery feedstock. Direct disposal Stabilization with inorganic material. Degradation through land farming or composting. Burning
	Oil mixed with cobbles, pebbles or shingle	Collection of liquid oil leaching from beach material during temporary storage Extraction of oil from beach material by washing with water or solvents	Direct disposal. Burning
	Oil mixed with wood, plastics, sea weeds, sorbents	Collection of liquids leaching from debris during temporary storage Flushing of oil from debris with water	Direct disposal. Burning. Degradation through land farming or composting for oil mixed with sea weeds or natural sorbents.
	Tar balls	Separation from sand by sieving	Direct disposal Burning

Location for Dug Pond for temporary storage of oily water:

To store the contaminated oily water, temporary dug pond will be excavated for storage of oily water. It is expected that 20 times volume of oil & water mixture will be generated if oil spill happen in the sea. Storage capacity of dug pond of volume 14000 m³ considering spill of level 1 (Tier-1) is required.

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Location Identified for Dug Pond behind Maruti Yard (Lat. 22° 45.252'N , Long. 69° 41.093'E) is roposed.



- Size of Dug Pond to be provided : 100 mtr X 100mtr X 1.5mtr
- Total storage capacity (m3) : considering 20 times oily water @ 700 m3 = 14000 m3

Once the contaminated mixture of oil and water is stored, the same will be transferred via tanker to following location. Following are the steps require to be followed.

1. Oil Water Separator: Capacity 25 m3/hr.
2. Effluent Treatment Plant: Capacity 120 KLD
3. Parallely oil recyclers will be approached for the collection and transportation of the oily water.
4. Contaminated Soil / Sediments will be directly sent to the Treatment Storage and Disposal Facility (TSDF) site. List of Oil recyclers and TSDF sites are shown in Annexure – 15
5. Different types of equipment & manpower require for creating dug pond:

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Name of Equipment	Quantity	Primary Responsibility of Equipment & Material	Secondary Responsibility
Excavator	10 Nos.	Marine Dept.	MHS section (Dry Cargo) / Asset Department / Procurement
JCB Machines	10 Nos.	Marine Dept.	ES Civil / Asset Department / Procurement
Material			
HDPE Liners for dug pond	10600 Sq. mtr.	Marine Dept.	Stores & Procurement

In phase wise manner stored oily water will be treated at both the above facility to separate oil from water to the possible extent. Whereas, after recovery of oil from water, water confirming to the effluent discharge limit of oil (< 10 ppm) will be discharged in to sea.

Whereas in case oily water will not capable of treat at OWS & ETP will be dispose through sending it to registered recyclers, for which APSEZL have already done tie up with the registered recyclers as mentioned in **Annexure – 15**.

APSEZL have also done necessary tie up with various institutes/agency/NGO as mentioned in **Annexure – 16** for providing service for rescue & rehabilitation of oil soaked birds as well as restoration of mangroves, when oil reaches to the sea shore and mangrove areas during oil spill. Mobile van / vehicle require for rescue of oil soaked birds to transfer from affected area to treatment facility center.

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4 Equipment

4.1 Marine oil spill response equipment

Detailed in Annexure 3

4.2 Inspection, maintenance and testing

The equipments are being kept in working condition. Routine inspection, maintenance and testing performed as per the stipulated requirements.

4.3 Shoreline equipment, supplies and services

The shoreline clean-up equipment which are essential for the oil removal operations at beaches are as follows:-

- Protective clothing for everybody (including boots and gloves), spare clothing.
- Cleaning material, rags, soap, detergents, and brushes.
- Equipment to clean clothes, machinery, etc., with jets of hot water.
- Plastic bags (heavy duty) for collecting oily debris.
- Heavy duty plastic sheets for storage areas especially for the lining of temporary storage pits.
- Spades, shovels, scrapers, buckets, rakes
- Ropes and lines
- Anchors, buoys
- Lamps and portable generators
- Whistles
- First Aid material.

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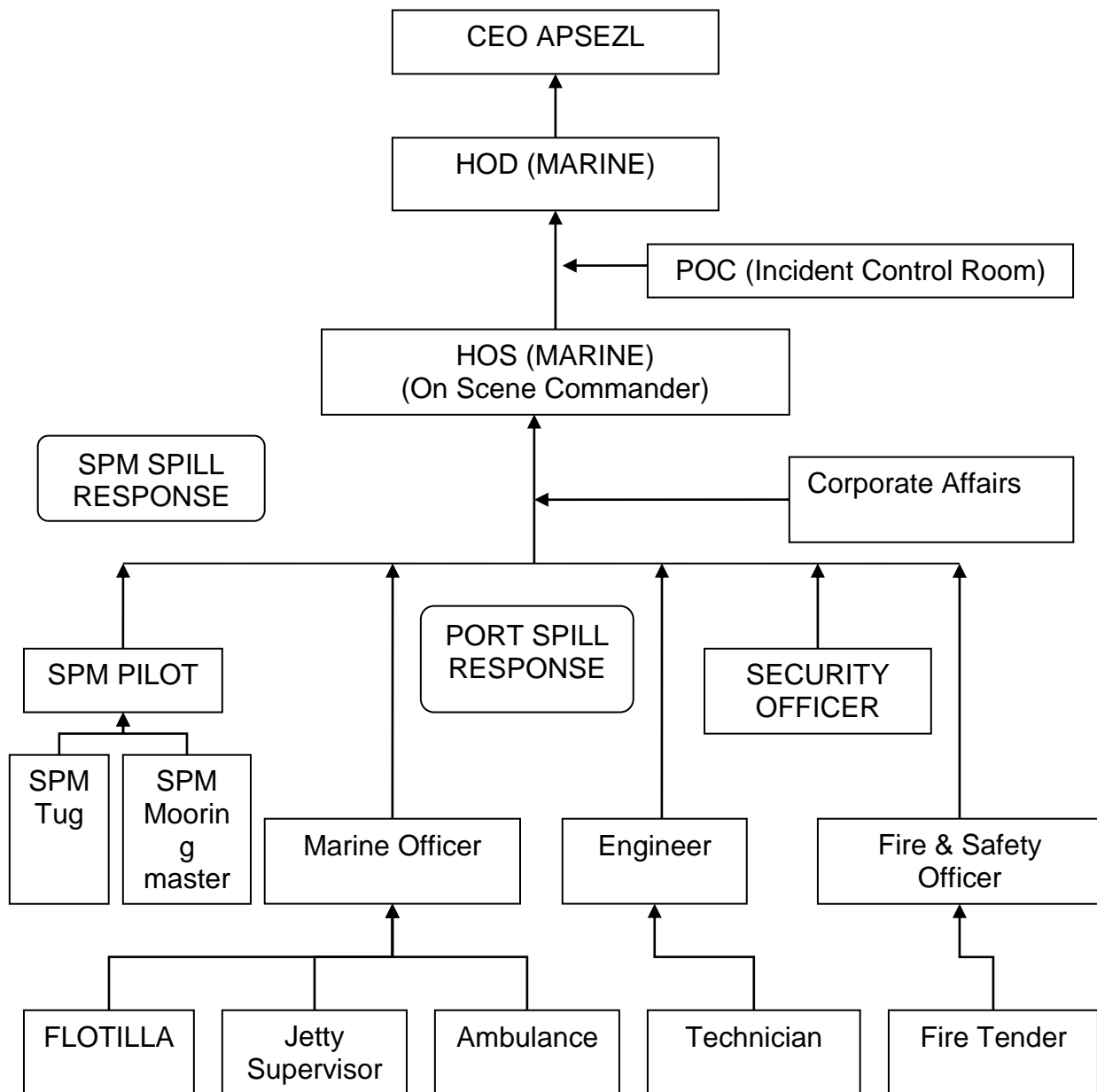
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5 Management

5.1 Crisis manager and financial authorities

The COO of APSEZL is the final authority of the oil spill response in case of a Tier 1 scenario. He is responsible for raising the level of the response if required and summoning additional help. The authority of all financial decisions rest with him.

5.2 Incident organization chart



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5.3 Manpower availability (on-site, on call)

In an event of incident Kandla Port Trust, Gujarat Maritime Board, Gulf of Kutch Ports, District and Regional plans are deemed to have been implemented. Adani Ports and Special Economic Zone Limited (APSEZL) manpower and resources will be put at the disposal and will be deployed as required, provided APSEZL is the polluter and spill is within the Port Limits.

In the event of APSEZL not being the polluter and any event outside the port limit of Adani Port, APSEZL equipment will be subject to mutual assistance plan and it will be the responsibility of the above forum.

5.4 Availability of additional manpower

Similarly in the event of APSEZL being the polluter, additional manpower and supplies can be requested from the resources which are part of this forum.

A numbers of private parties have their labor force working round the clock in the port and on call these can be available.

5.5 Advisors and experts – spill response, wildlife and marine environment

APSEZL, being the nodal agency in this LOS-DCP, will function as the main agency. In the event of the emergency getting raised to higher tier, i.e. in case the incidence becomes a national disaster, the help and advice of Indian Coast Guard will be taken.

5.6 Training / safety schedules and drill / exercise programme

Training of all APSEZL staff who may get involved in implementing this plan is acknowledged. In house and external facilities (of ICG) are used periodically to impart training as per matrix below. Marine Manager has been appointed as training coordinator and custodian of oil pollution equipment. He shall organize training, drills and inspection of equipment as per the plan in force.

Training Module	Duration	Frequency	Participants	Remarks
IMO Model Course	2-5 days	Once	Key persons	By Maritime Training Institute
Oil Spill	1-5 days	Once every 5 years	Key persons	Coast Guard
Oil spill equipment	1-5 days	Once every Year	Managers	In house
Oil spill Management course	1 day	Once every year	Managers & junior staff	In house for in-depth knowledge
Notification exercise	1-2 hours	6 months	Operational staff	Check systems & communication
Table top	2-6 hours	12 months	Managers	Interactive discussions
Incident	6-8 hours	12 months with others	All	Mock drill

Number of IMO Level-1 and IMO Level-2 qualified staff available with Adani Ports and SEZ Ltd, Mundra:

IMO Level-1 - 28

IMO Level-2 - 04

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6 Communications

6.1 Incident control room facilities

Detailed in Annexure 3

6.2 Field communication equipment

Detailed in Annexure 3

6.3 Reports, manuals, maps, charts and incident logs

A copy of the relevant manual is kept with HOD – Marine. Maps/ Charts of APSEZL are kept in Marine Control Tower and attached in Annexures

Action and operations

7 Initial procedures

7.1 Notification of oil spill to concerned authorities

The emergency (due to spill) should be initiated by the first person noticing it by activating the fire alarm from the nearest call-point or by contacting the fire control room immediately on the internal telephone or through mobile phone or through VHF Channel.

The SPM Pilot or On Scene Commander will report the spill to the Marine Control Room.

7.2 Preliminary estimate of response tier

The first few minutes after the incident / accident are invariably the most critical period in prevention of escalation. Therefore the person available at or near the incident site (and often responsible for carrying out that particular activity) on round the clock basis play a vital role in an emergency. The SPM Pilot or On Scene Commander will report the spill to the control room along with his estimate of the response tier.

7.3 Notifying key team members and authorities

Statutory First Information Report (FIR - given in annexure 1) is to be communicated by fastest means possible to President, GMB port and CG at Porbandar followed by full Pollution Report (POLREP – given in annexure 2). The report is to be updated, should the oil spill not be contained and likely to increase to Tier 2

7.4 Manning Control Room

Auxiliary control center is located at Port Operation Centre. Escalation of emergency if any is monitored here. Statutory reporting procedures of FIR and POLREP of developing situation and action taken are also sent from this center. The detail of the contacts to whom the information is to be given is placed at Annexure 4.

7.5 Collecting information (oil type, sea / wind forecasts, aerial surveillance, beach reports)

Marine Manager has the responsibility of arranging the collection of the relevant information which will help in mitigating the emergency

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7.6 Estimating fate of slick (24, 48, 72 hours)

Considering the prevalent tidal stream, wind and weather conditions, section 8.3 is to be used in estimating the fate of the slick

7.7 Identifying resources immediately at risk, informing parties

Depending on the quantity of fluid spilled and the prevalent wind & weather conditions, the resources / facilities immediately at risk have to be identified by the On scene commander and the concerned parties informed.

8 Operations planning

8.1 Assembling full response team

On being appraised of the spill, the duty marine officer will inform the marine manager, who will, in turn initiate the assembly of the complete response team which essentially involves relaying information to all relevant personnel, parties and authorities and informing them of the initial response requirements.

8.2 Identifying immediate response priorities

Depending on the initial estimated response tier and the prevalent weather conditions, the marine manager, in consultation with the on scene SPM pilot / marine officer will identify the immediate resources at risk and the response priorities.

8.3 Mobilizing immediate response

The Manager - Marine will initiate the mobilization procedure of the spill equipment, resources and personnel depending on the scale of emergency at hand.

8.4 Media briefing

No other person is authorized to communicate with any external party by any means whatsoever unless expressly permitted by the HOD – Marine or COO, APSEZL.

8.5 Planning medium-term operations (24, 48 and 72 hour)

The HOD – Marine will plan the subsequent action to be taken in response to the tier 1 spill after the initial response is well under way and its consequences / effectiveness are duly evaluated.

8.6 Deciding to escalate response to higher tier

After carefully assessing the scenario and appraising the efficiency of the initial response in the prevalent conditions, the HOD – Marine will decide whether or not to escalate the response.

8.7 Mobilizing or placing on standby resources required

It is recommended that in case of a doubt (as the exact estimate of the quantity of oil spilled is quite difficult and the boundaries between the tiers will inevitably be blurred) it is important to be prepared to involve the next higher tier from the earliest moments. It is easier to stand down an alerted system than to try to escalate a response by calling up unprepared reserves at a late stage.

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8.8 Establishing field command post communications

Communications between the Emergency Response Center/ Marine Control room and marine personnel during the response to any oil spillage will be primarily by VHF marine band radio on Channel 73 or 77

Communications between the Marine Control Room and other vessels will be established on VHF radio Channel 16 and will thereafter be conducted on Channel 73 / 77.

Use of cellular telephones will be minimized.

Communications between the Emergency Response Center/ Marine Control Room and external authorities and organizations will be undertaken by telephone and facsimile.

9 Control of operations

9.1 Establishing a Management team with experts and advisors

Detailed in Annexure 4

9.2 Updating information (sea, wind, weather forecasts, aerial surveillance, beach reports)

The Marine Control Room is well equipped in assimilating data on weather and its forecasts. In case of a Tier 1 response, aerial surveillance and beach reports are not deemed to be essential

9.3 Reviewing and planning operations

Ongoing response and its influence in mitigating the situation will have to be constantly under review in order to contain the spill at the earliest.

9.4 Obtaining additional equipment, supplies, manpower

While deciding not to elevate the tier of the response the HOD- marine may still request additional resources from nearby port facilities which are essentially members of the common forum and are obliged to assist.

9.5 Preparing daily incident log and management reports

A complete report will be submitted by the Marine Manager to the HOD (Marine) every morning (in case the response extends to more than 1 day).

Format for the above report in Annexure 9

9.6 Preparing operations accounting and financial reports

The Port's accounting department will assess the expenditure incurred in the ongoing operation and submit a report to the President's office.

9.7 Preparing releases for public and press conferences

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite press releases from time to time and hold press conferences.

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9.8 Briefing local and government officials

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite reports to brief local and government officials..

10 Termination of operations

10.1 Deciding final and optimal levels of beach clean-up

If at all a distant beach is affected, the COO APSEZL office will decide the optimal levels of cleanup in consultation with the conservator of the port – Gujarat Maritime Board Port Officer.

10.2 Standing down equipment, cleaning, maintaining, replacing

Considering the natural disintegration of the residual oil on water after the cleanup of the bulk amount, The HOD – Marine will decide when to stand down the response. The resources which have been used will have to be re-instated to the original condition by elaborate cleanup or replacement.

10.3 Preparing formal detailed report

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite reports to brief local and government officials and media.

10.4 Reviewing plans and procedures from lessons learnt

A complete spill response report will be produced by the Marine manager providing comprehensive and all-inclusive details of the circumstances leading to the spill, initial response and consequent affect of the same, subsequent follow up, effect of prevailing weather, adverse situations, safety issues, difficulties faced and lessons learnt.

Requisite changes will be affected to this plan on basis of such report.

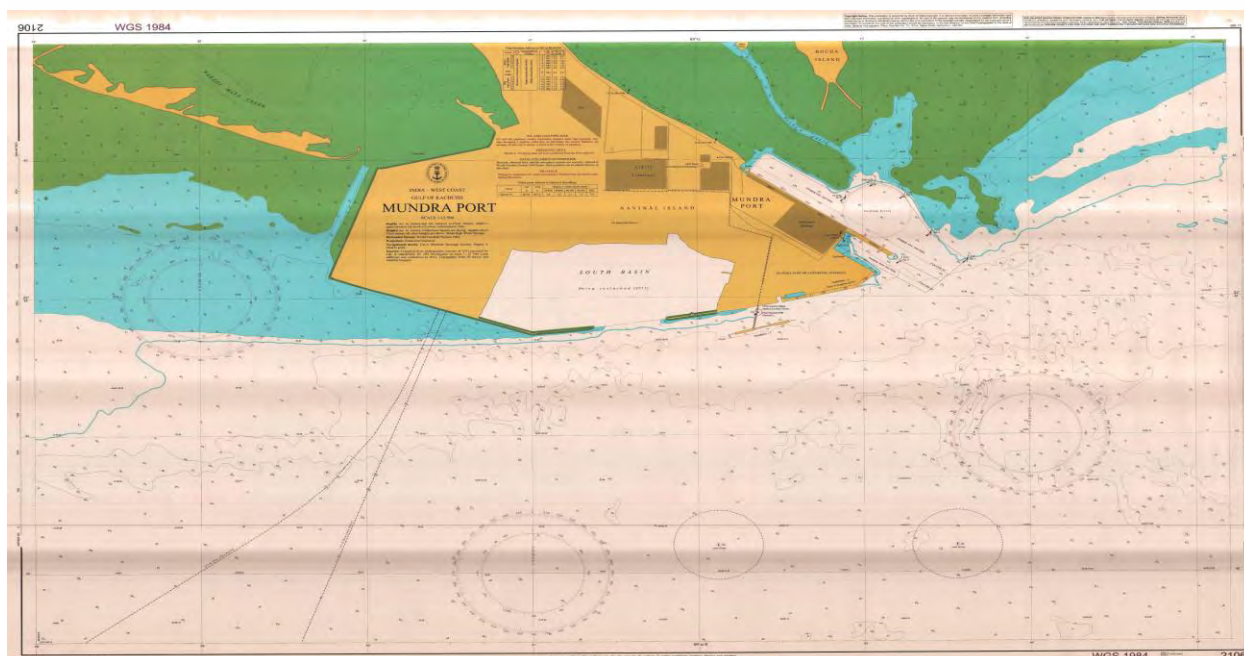
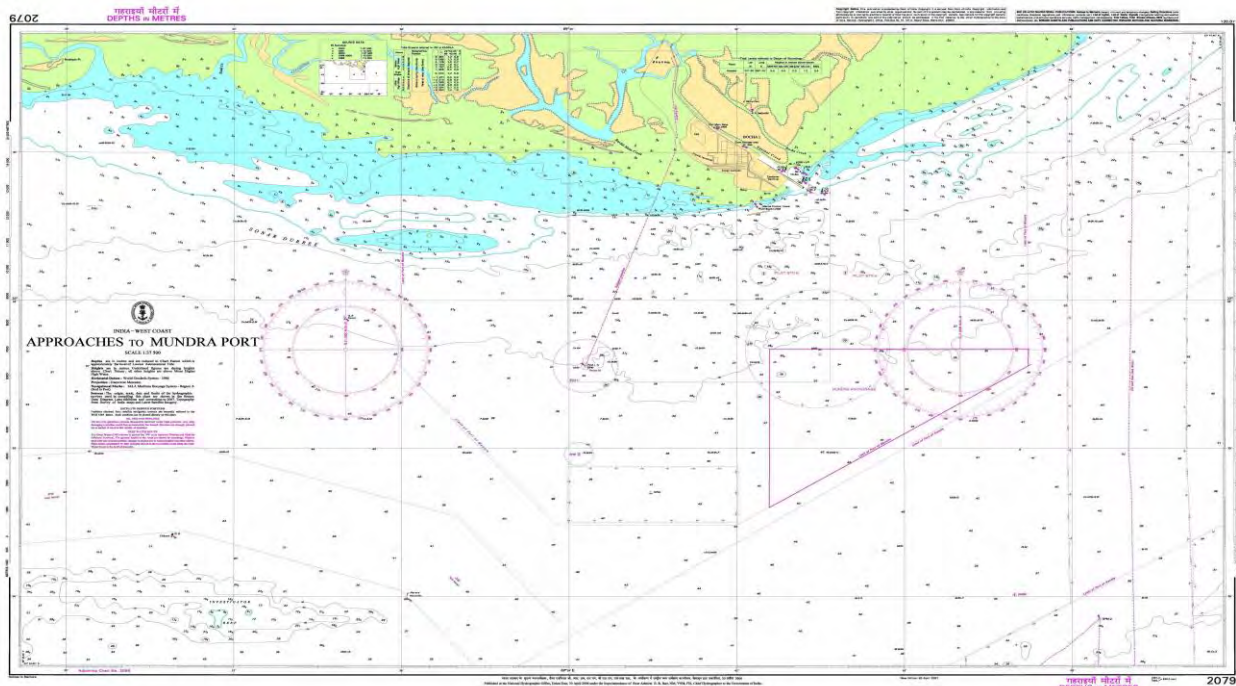
Such a report will also be prepared by the marine manager after each drill or training session and requisite modification(s) incorporated to the plan in order to enhance the overall efficacy of the same.

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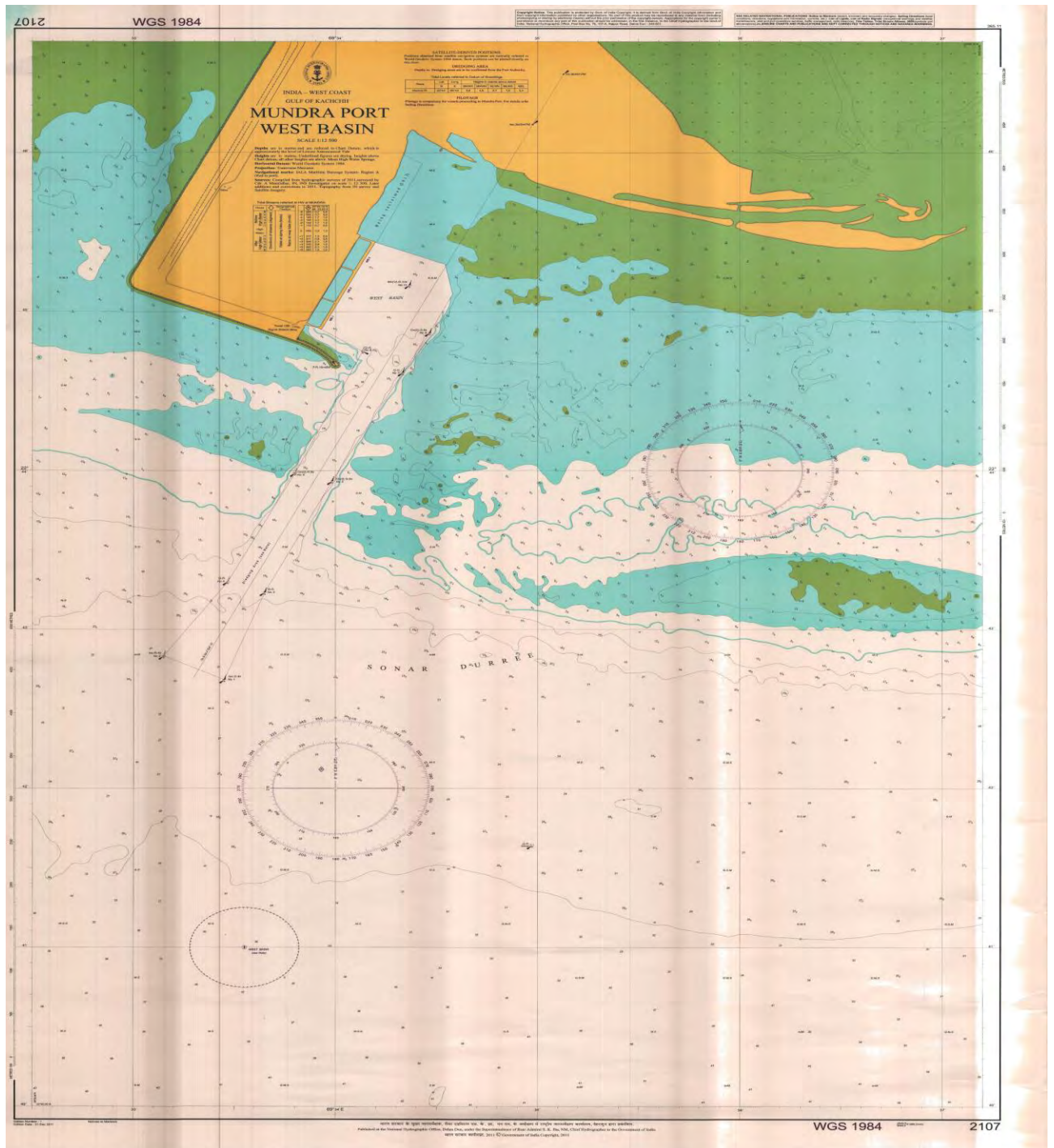
2. Coastal charts, currents, tidal information (ranges and streams), prevailing winds

Currents, tidal information (ranges and streams) : Detailed in Annexure- II, Annexure- III and Annexure- IV (Volume 2) of Oil Spill Risk Assessment



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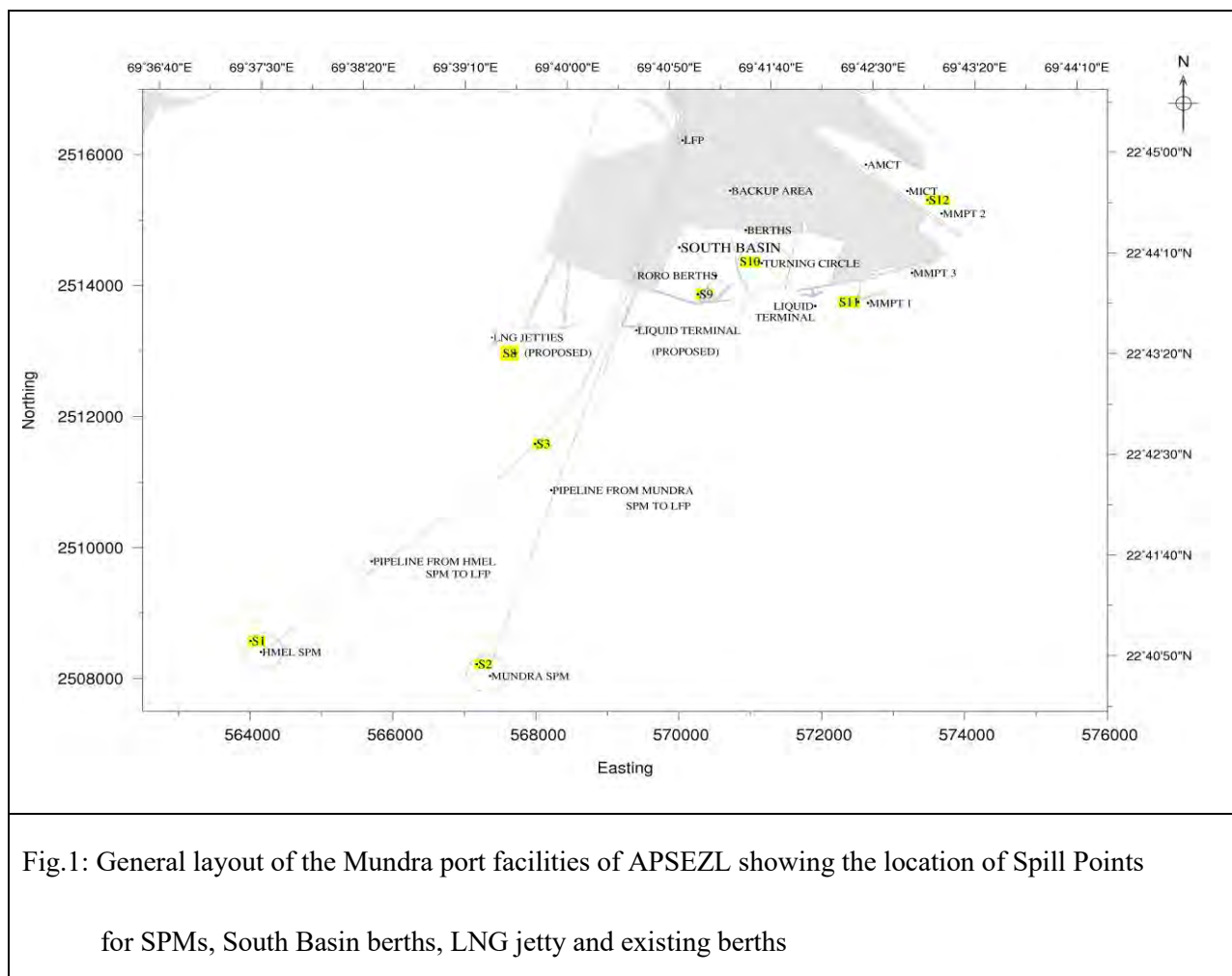
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3. Risk locations and probable fate of oil



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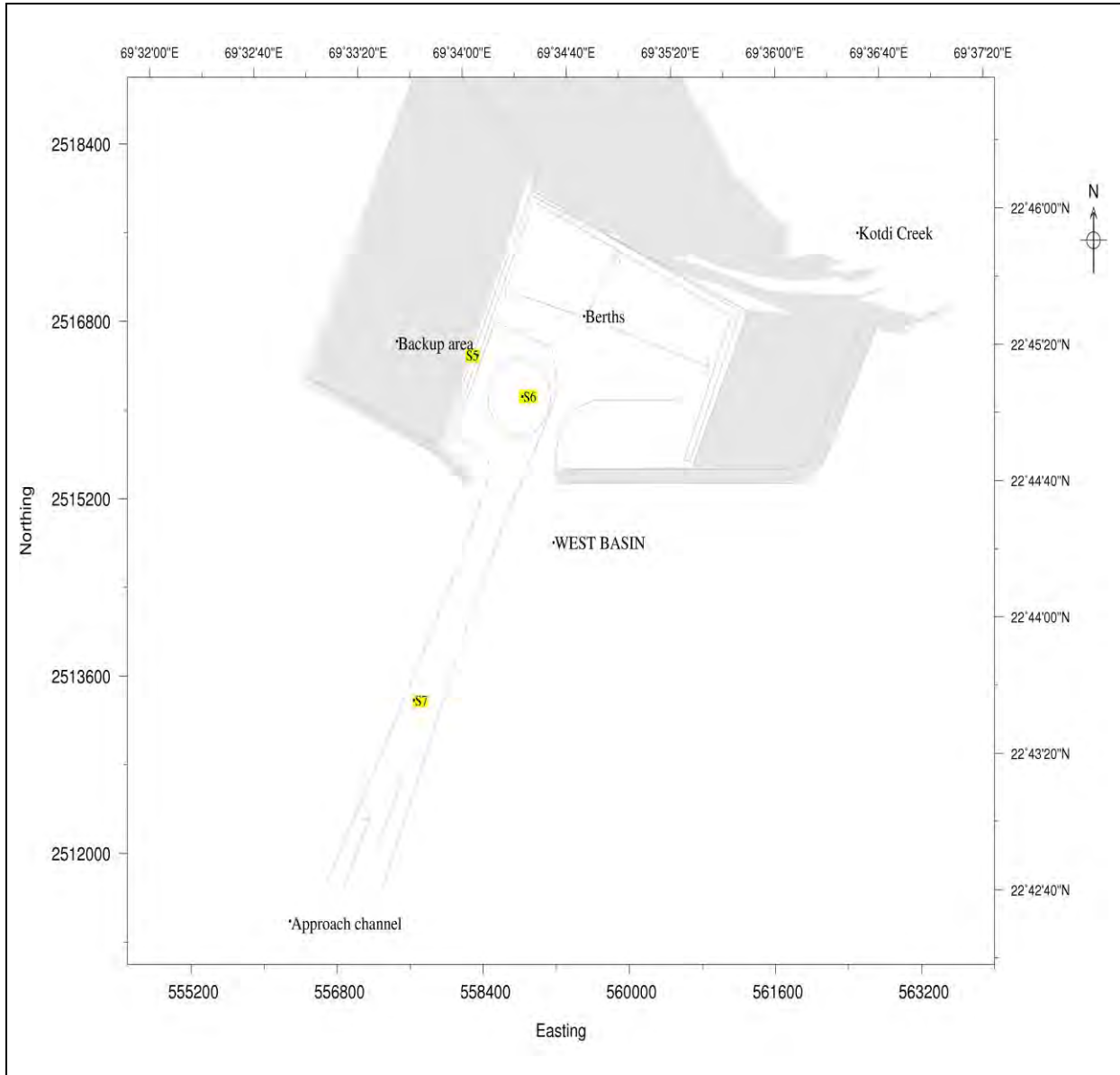


Fig.2: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for West Basin

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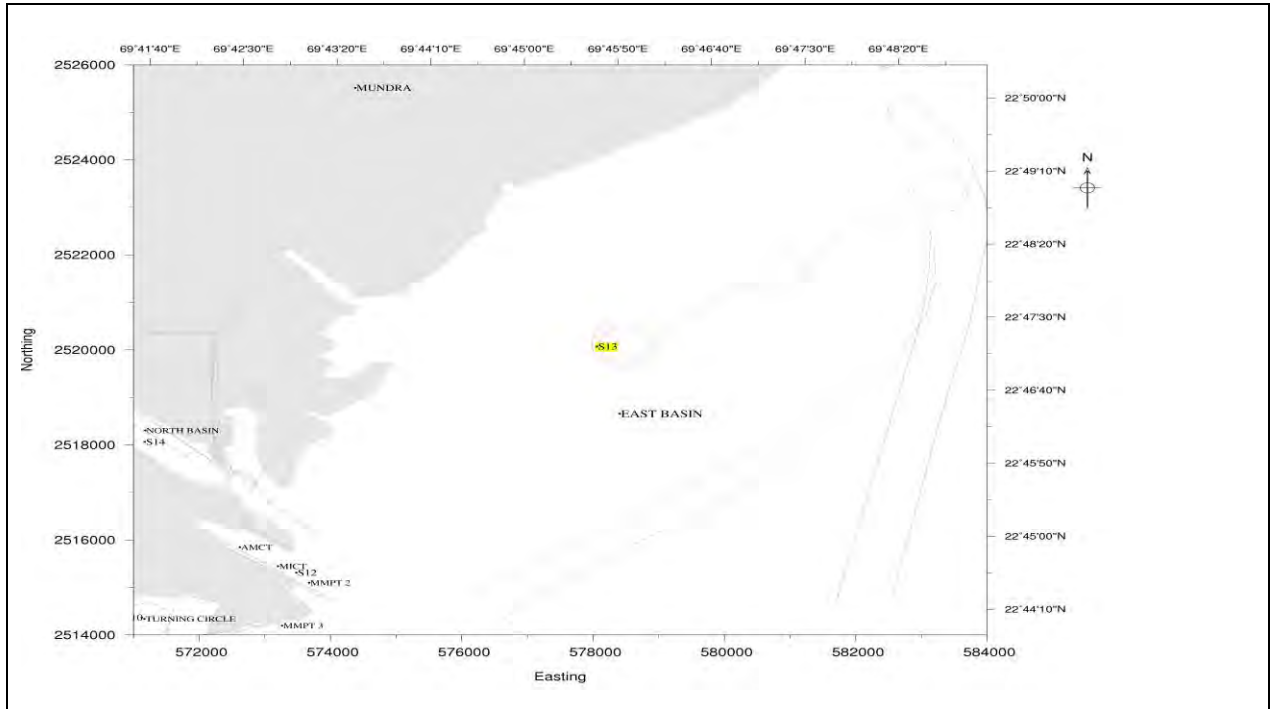
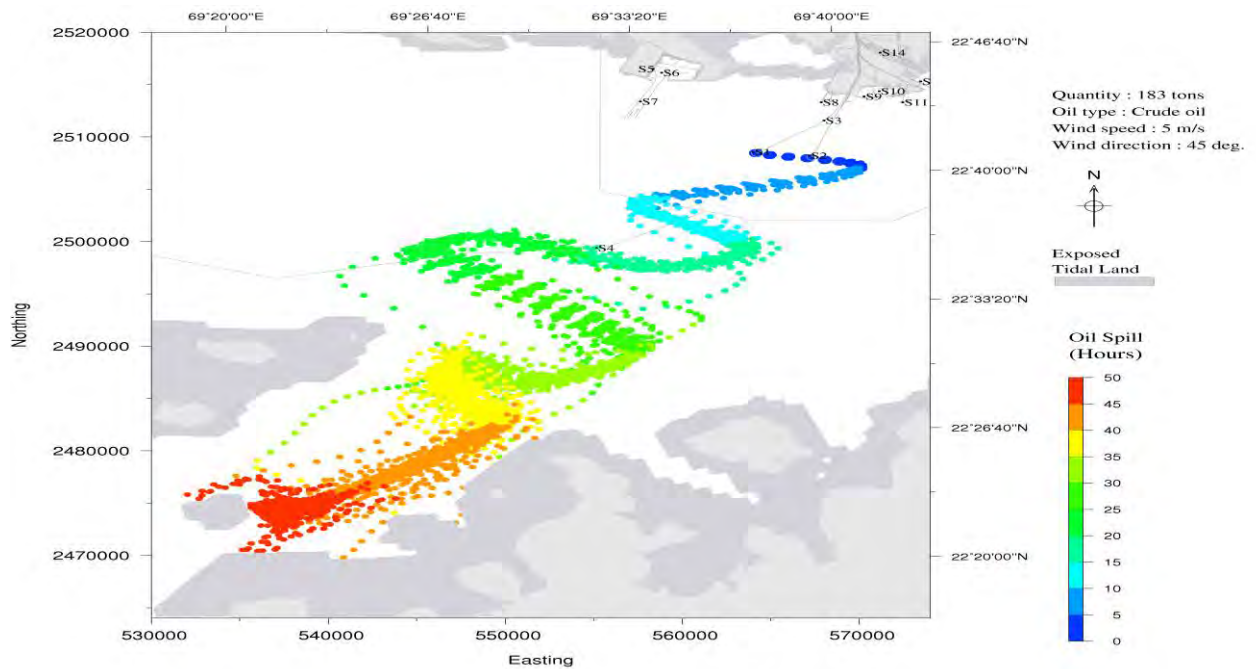


Fig.3: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for North Basin & East Basin

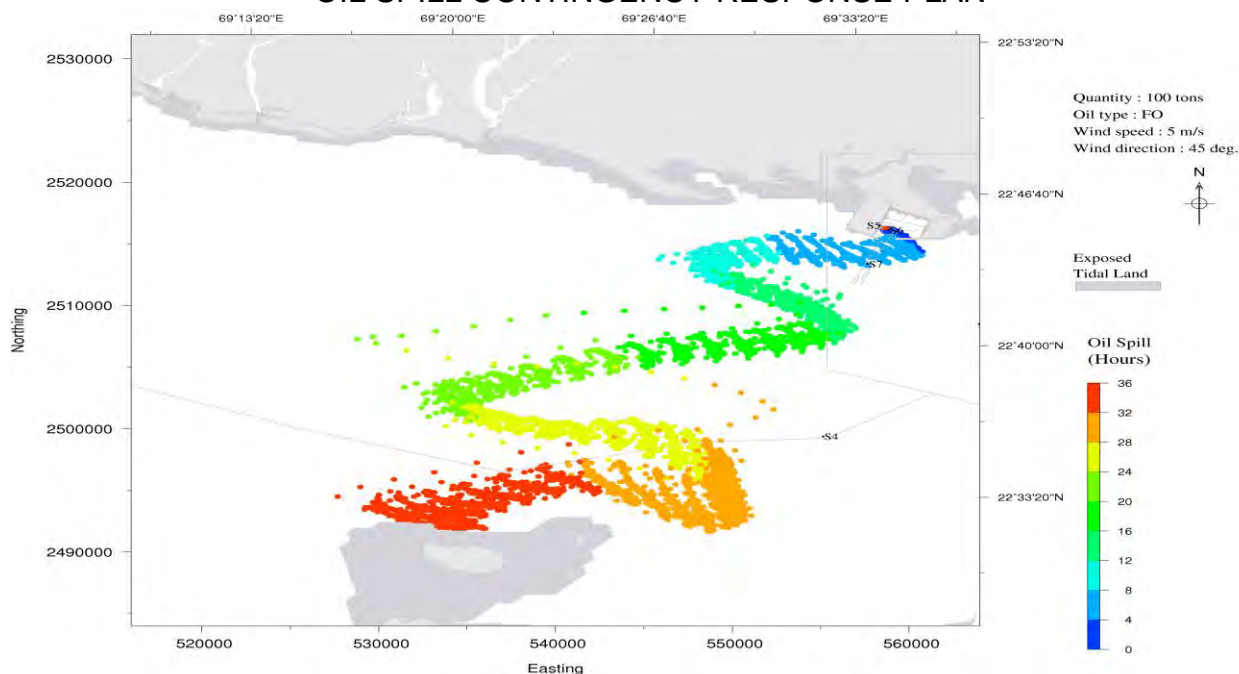


Oil Spill trajectory due to instantaneous crude oil leakage of 700 t (due to collision) at spill point S1 (H MEL SPM) after 50 hours during flood condition of the neap tide

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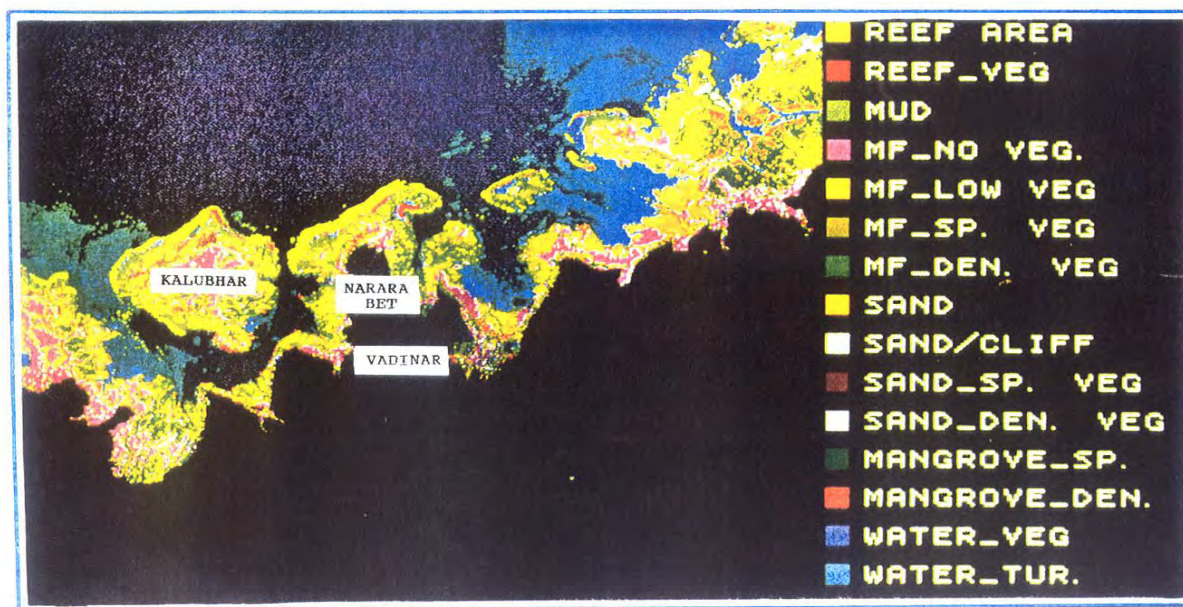
OIL SPILL CONTINGENCY RESPONSE PLAN



Oil Spill trajectory due to instantaneous FO leakage of 700 t (due to hull failure/ fire / explosion) at typical berth location in the West Basin

For Risk locations and probable fate of oil refer Annexure- V (Volume 2) of Oil Spill Risk Assessment.

Shoreline resources for priority protection

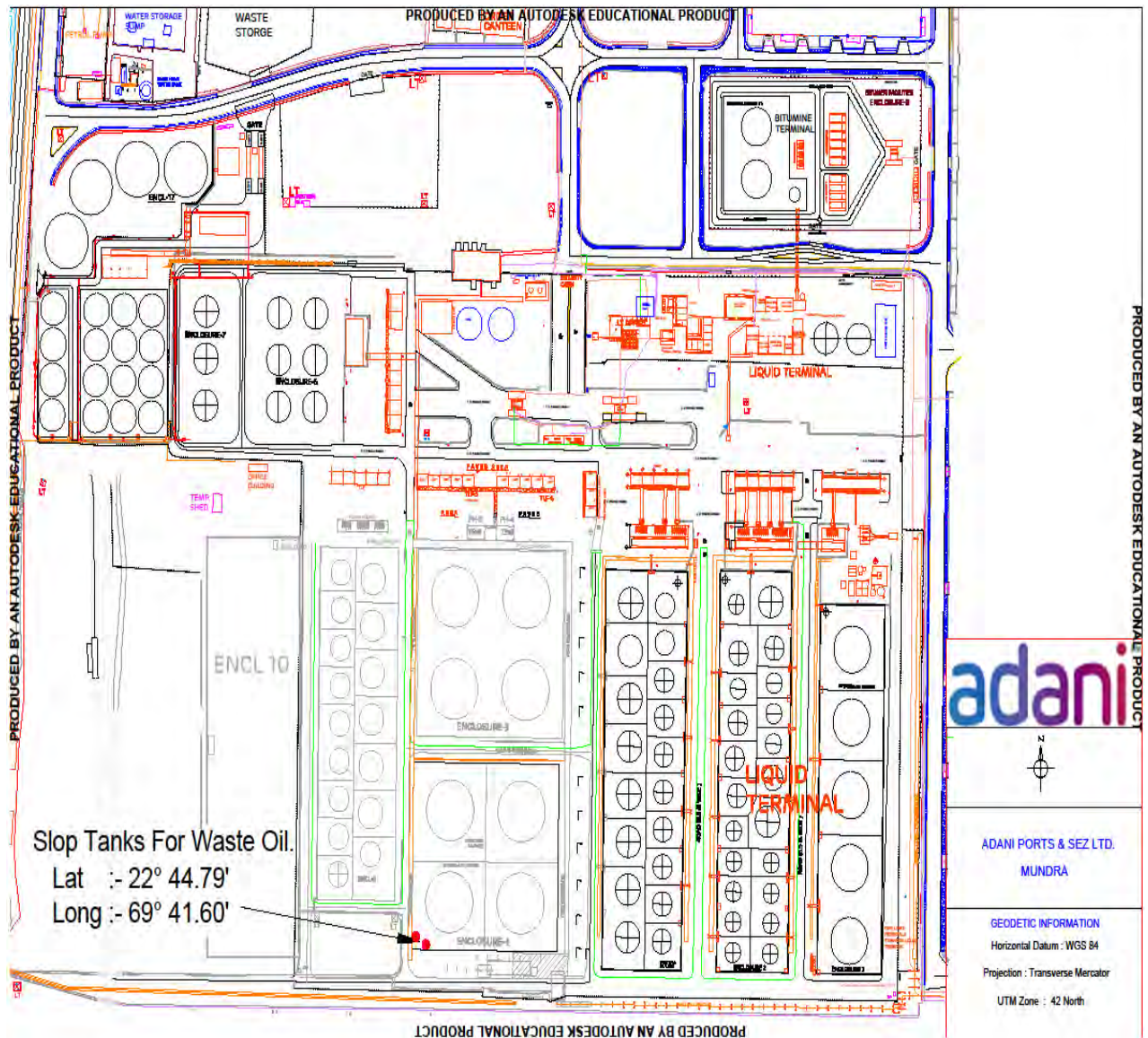


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Oil and Waste Storage / Disposal sites

Oil and Waste storage / Disposal tank No. 46, 109 and 110 are available within Liquid Tank farm.



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Sensitivity Maps/ Atlas

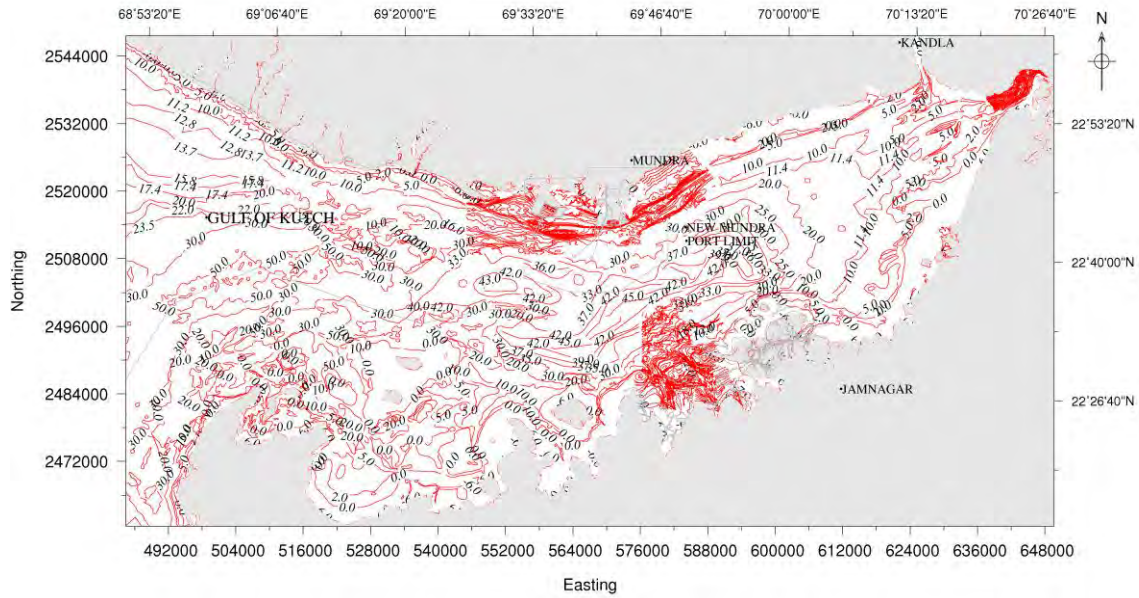


Fig.A1.1 Terrain features of study domain.

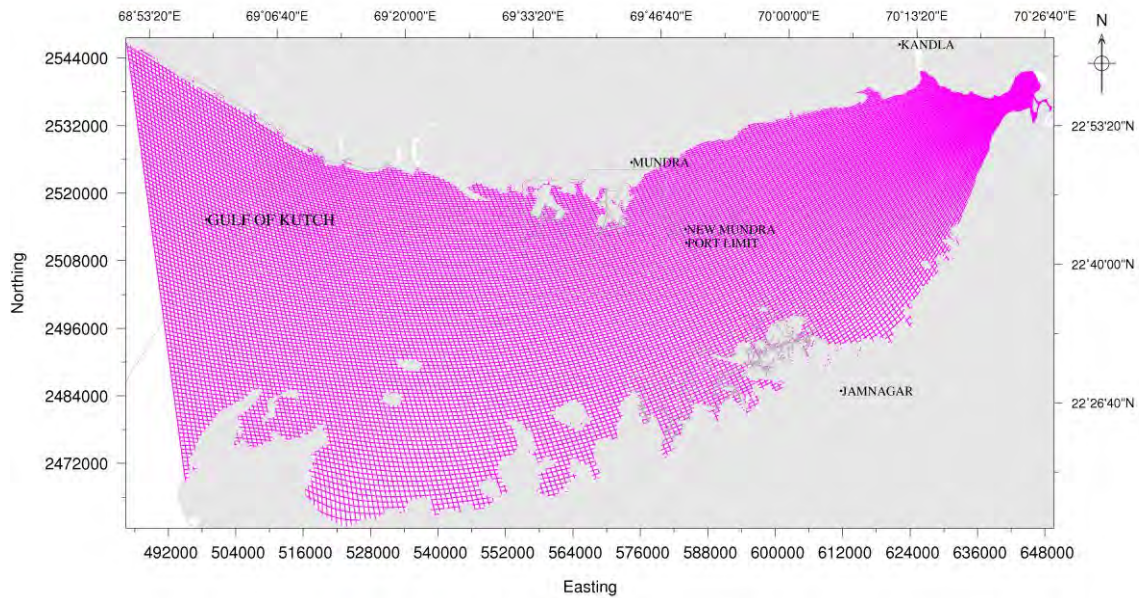


Fig.A1.2 Computational grid

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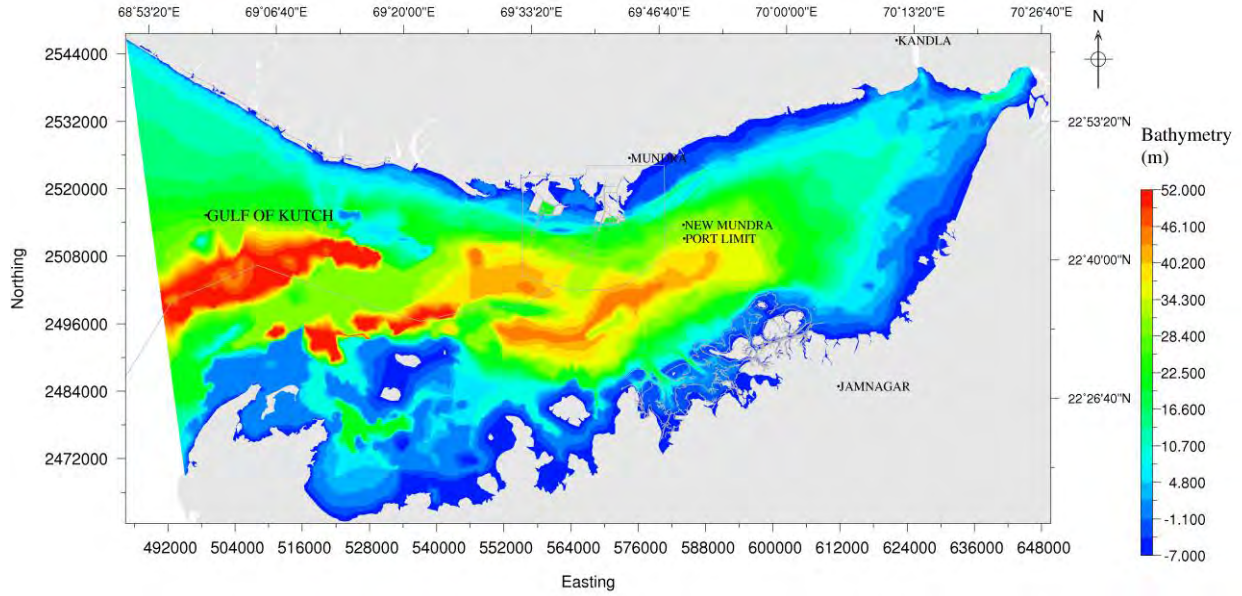


Fig.A1.3 Interpolated depth contours

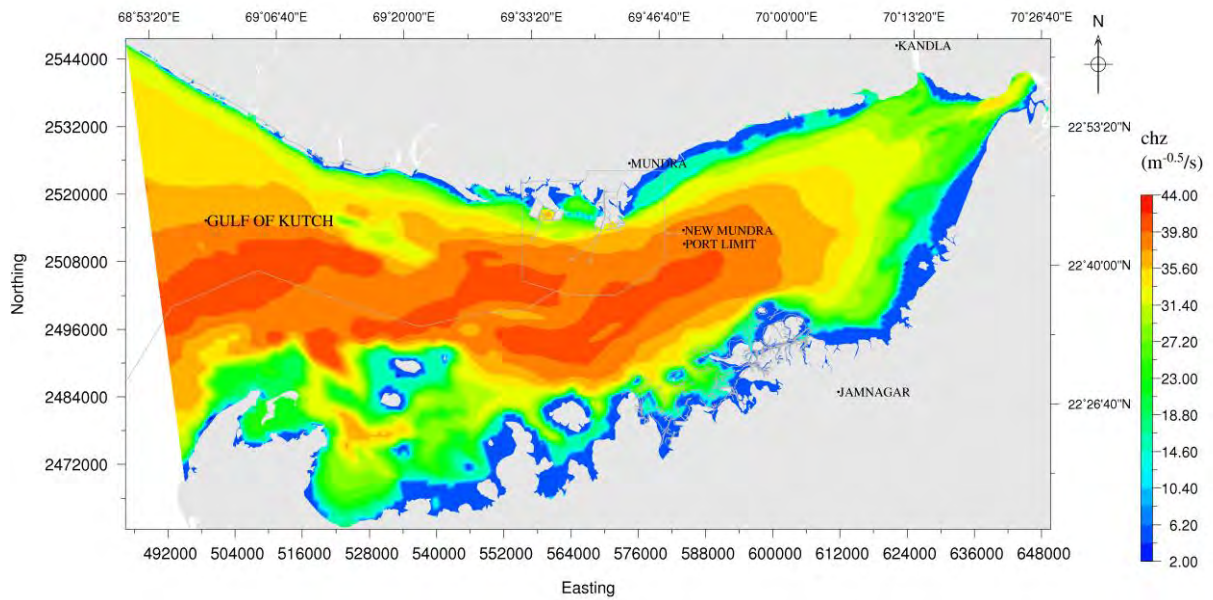


Fig.A1.4 Chezy's coefficient

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Lists

1. **Primary Oil spill Equipment:** booms, skimmers, spray equipment, dispersant, absorbents, oil storage, Radio communications etc.

Detailed in Annexure 3

2. **Auxiliary Equipment:** Tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communication equipment etc.

Detailed in Annexure 3

3. **Support Equipment:** Aircraft, communications, catering, housing, transport, field sanitation and shelter etc. (Availability, contact, cost and conditions)

Not applicable

4. **Sources of Manpower:** Contractors, local authorities, caterers, security firms (Availability, numbers, skills, contact, cost and conditions)

Refer Para 5.3

5. **Experts and Advisors:** Environment, safety, auditing (Availability, contact, cost and conditions)

Detailed in Annexure 4

6. **Local and National Government contacts:** Name, rank and responsibility, address, telephone, fax, telex.

Detailed in Annexure 4

Data

1. Specification of Oils commonly traded

At the liquid berth, the representative products that would be handled are petroleum products like FO/ HSD / SKO / MS / CBFS / CPO / Naphtha etc. Vessels calling at the port will be having FO and HSD for their propulsion requirements.. The products like MS, Naphtha etc are oils of non – persistent nature; they tend to evaporate fast and will not stay long on the surface of the sea waters. Hence spill studies have been carried out for FO and HSD spills at the berths.

At the SPMs, Crude oil unloading takes place.

Physical and Chemical Properties of products handled at the SPMs, Berths and of the propulsion fuels of the ships / tankers

Data on the properties for the hydrocarbons / products handled at the jetty is required for quantitative hazard identification and consequence calculations. The properties of the FO and HSD, the petroleum hydrocarbons likely to be spilled due to the operations at the jetty are given in Table-3.1.

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Table-3.1: Properties of Crude Oil, FO and Diesel

Sl. No	Chemical	Boiling Range (° C)	Specific Heat of Liquid (J/Kg ° K)	Heat of Evaporation (x 10 ⁵ J/Kg)	Heat of Combustion (x 10 ⁵ J/Kg)
1	Crude Oil	IBP - 700+	2385	3.4	425
2	HSD	200 - 350	2889	4.65	448
3	Fuel Oil	180 - 450	2500	3.4	452

The following characteristics of oil are used for modelling study:

(a) Crude Oil

Sp. Gr = 0.82 to 0.88

Surface Tension = 3.0 e-03

Molar Volume = 0.002

Viscosity: 275 CST at 37.8 deg C

Wax content: 12 – 19 %

Pour point of untreated crude: 30 deg C

Pour point of treated crude: 18 deg C

(b) FO

Sp. Gr = 0.92

Boiling point = > 260° C

Vapor pressure = < 0.1 psia at 21° C

(c) HSD

Sp. Gr = 0.86

Pour point = 6° C - 18° C

Vapor pressure = 2.12 to 26 mm Hg at 21° C

2. Wind and weather

Meteorological and Oceanographic Conditions

The met-ocean conditions have been previously ascertained at several stages in the course of various studies conducted in past in respect of Mundra port projects. Flow modeling for the Mundra port location has been covered in the model developed by Environ, India, who have developed the model for whole of Gulf as relevant to Mundra region. It has been observed during model studies that flow regime does not have significant changes due to the proposed developments. The following are the main hydro-meteorological parameters for planning and designing of the marine facilities described below.

Rainfall and Temperature

The Kutch is a semi-arid region with weak and erratic rainfall confined largely to June-October period. With a few rainfall days, the climate is hot and humid from April till October and pleasant during brief winter from December to February. Although the monthly mean maximum temperature recorded is 37°C during 2005, it occasionally exceeds 40°C. Rainfall alone forms the ultimate source of freshwater resource to the region. The average rainfall at Mundra is about 400 mm/year.

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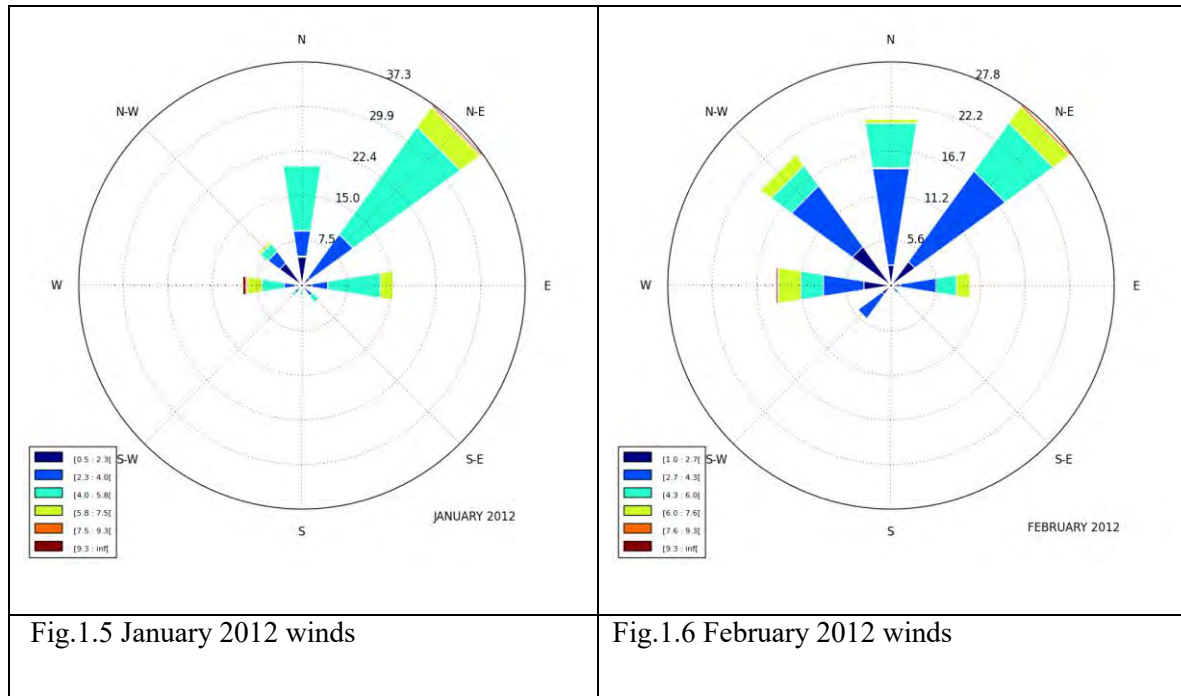
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Cyclones

Cyclonic disturbances strike North-Gujarat, particularly the Kachchh and Saurashtra regions, periodically. These disturbances generally originate over the Arabian Sea and sometimes the Bay of Bengal. Generally during June, the storms are confined to the area North of 15°N and East of 65°E. In August, the initial stages, they move along the northwest course and show a large latitudinal scatter. West of 80°E, the tracks tend to curve towards North. During October the direction of movement of a storm is to the West in the Arabian Sea. However, East of 70°E some of the storms move North-Northwest and later recurves North East to strike Gujarat-North Mekran coast.

Wind

There are strong winds at times at Mundra Port. The month wise wind rose diagrams for the year 2012 and for the months of January and February of the year 2013 are given below. In the period lasting over months March to May the wind direction is generally SWW (225° - 250°) and velocity varies from 20 to 25 Knots. From June through August, the wind direction is predominantly SW and velocity varies from 25 to 30 Knots with short gusts going up to 35 to 40 Knots. Towards end of September and through October wind direction changes to NE with velocities ranging from 7 to 10 Knots. Direction remaining same the velocity varies 10 knots to 25 Knots in the period November to January. February is the calm period when wind direction is Southerly with velocity in the range of 7 Knots. Stormy weather may generate winds having velocity up to 100 Knots which should be taken as the worst case scenario for design of tall structures and heavy duty cranes.



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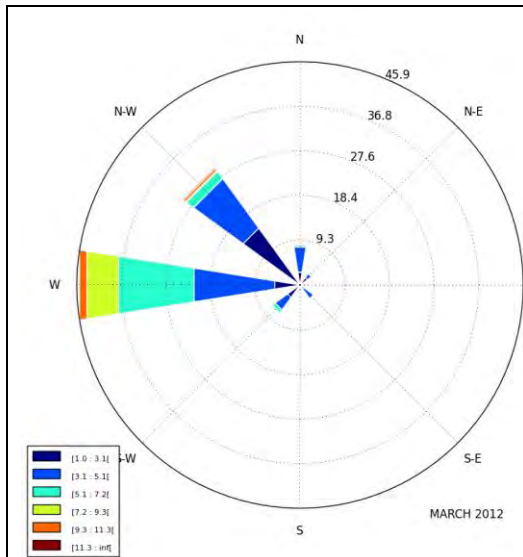


Fig.1.7 March 2012 winds

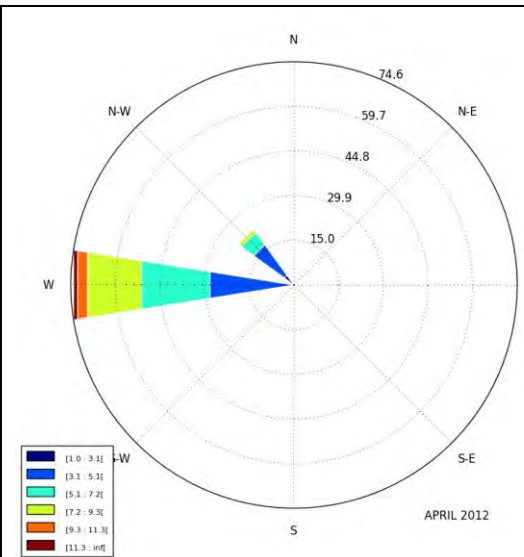


Fig.1.8 April 2012 winds

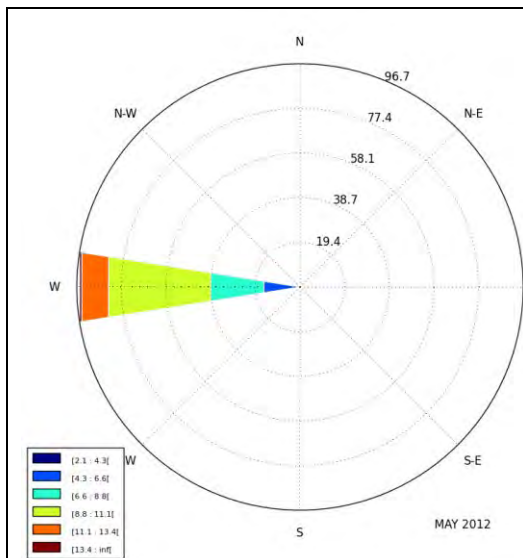


Fig.1.9 May 2012 winds

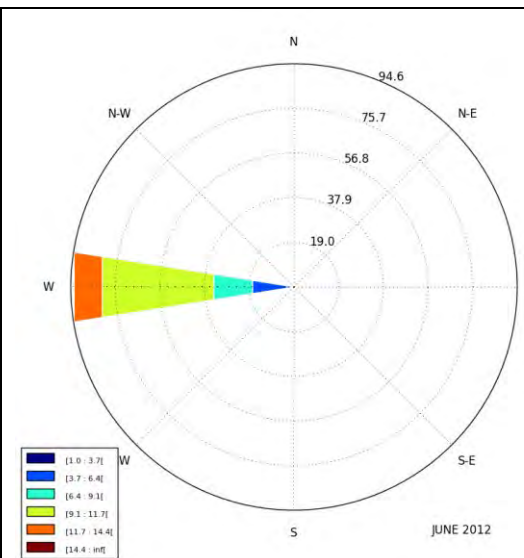
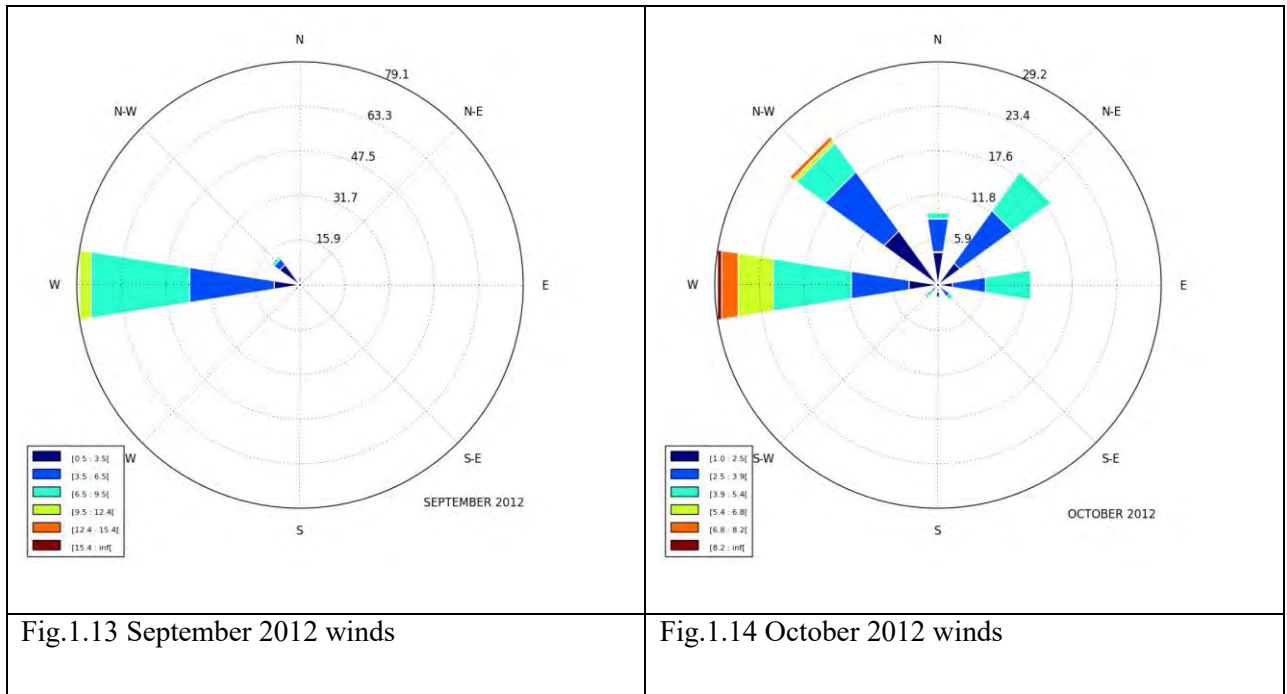
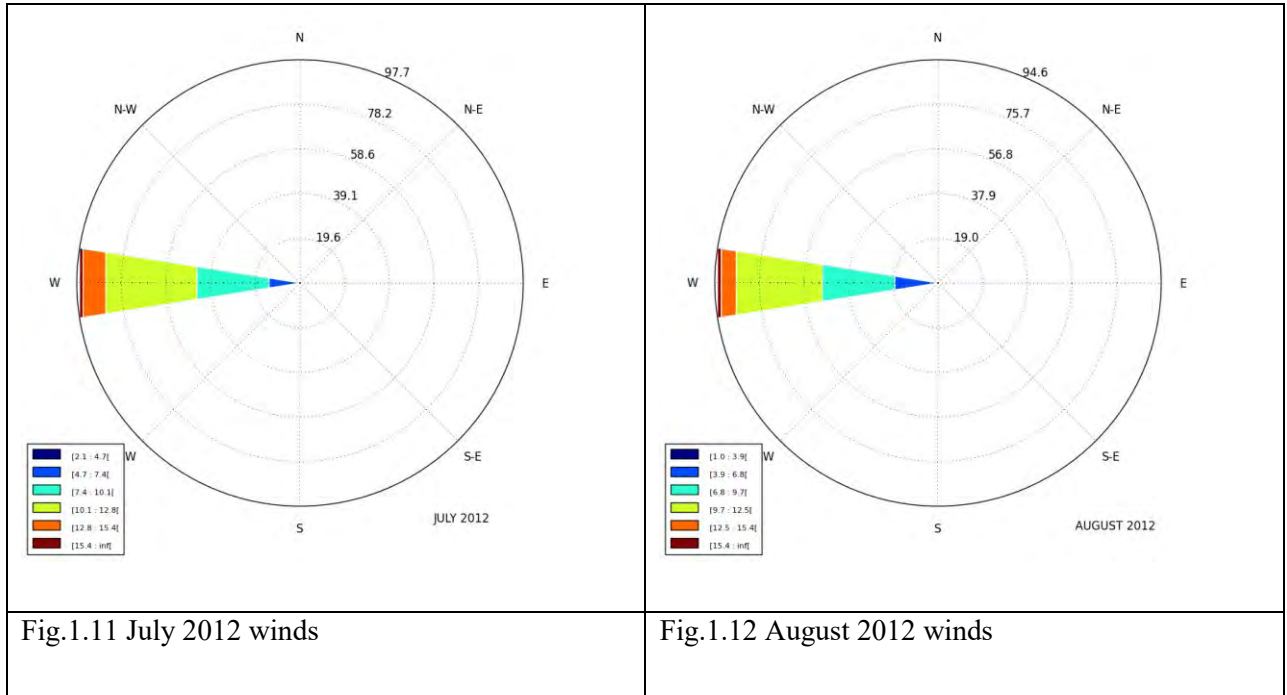


Fig.1.10 June 2012 winds

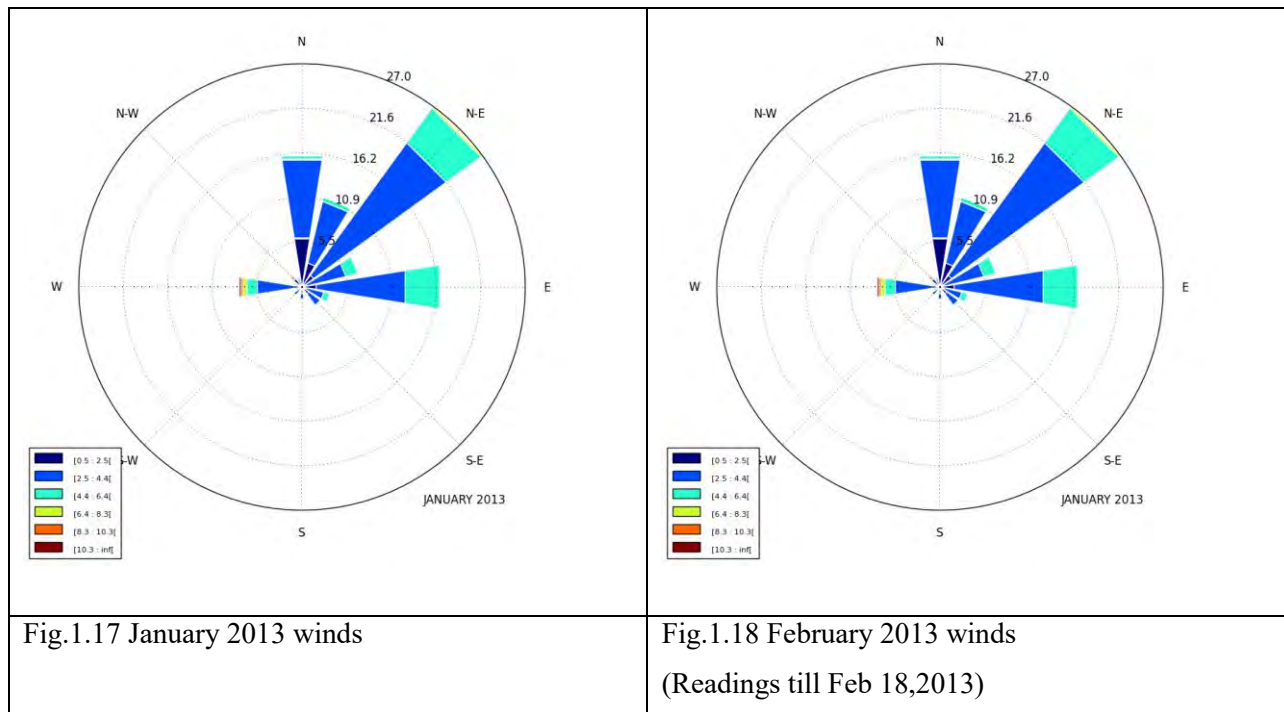
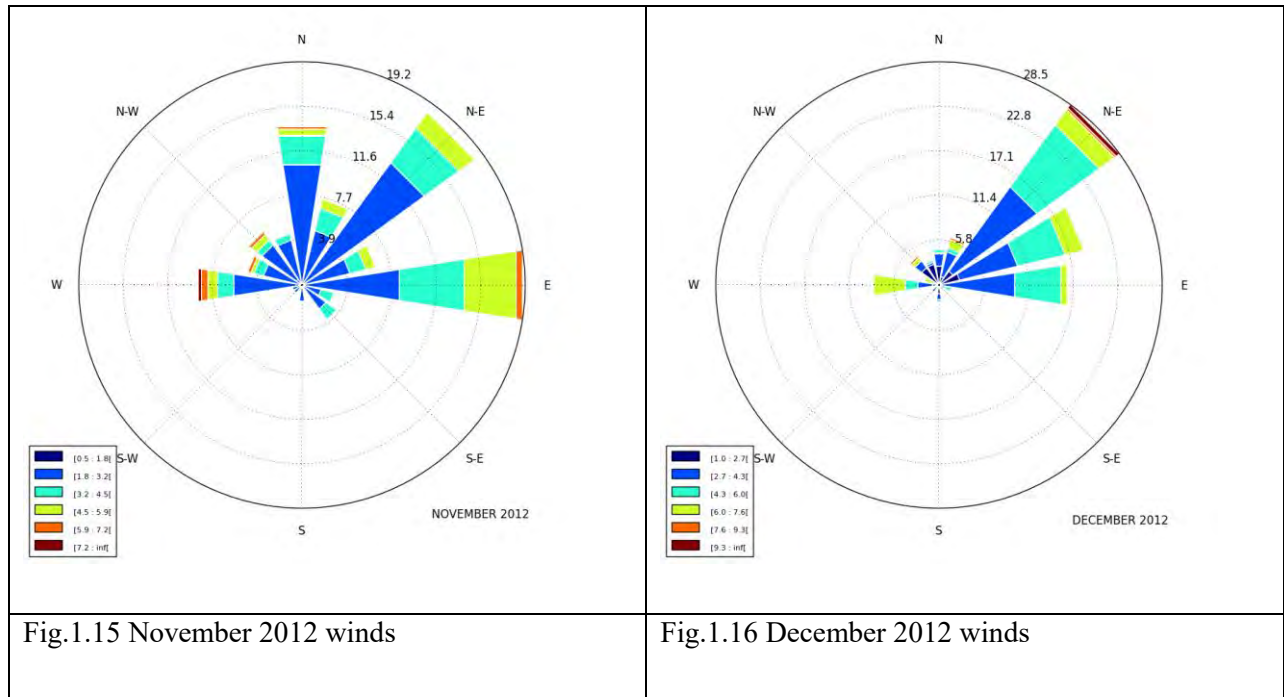
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Tides

The tidal planes were assessed in 1998 and are as shown in Table below.

The Highest Astronomical Tide (HAT) is estimated to be about +6.4 m above chart datum (CD), and the Lowest Astronomical Tide (LAT) to be at 0.0 m CD.

Tide	Height (m) above CD
Mean High Water Springs	5.8
Mean High Water Neaps	4.6
Mean Low Water Neaps	2.1
Mean Low Water Springs	1.0

Currents

Currents in the approaches to the port are dominated by the tidal flows, with predictable variations over diurnal, monthly and annual time scales. Currents in this part of the Gulf flow parallel to the natural sea-bed contours. Currents can be relatively strong, with speeds in excess of 3.0 Knots reported at sometimes of the year. The Admiralty Chart shows currents off Navinal point to be 3.0 Knots East & West bound. It is observed that the currents are usually aligned with the bed contours and are stronger in deeper waters off the coast. The impact of future development over the existing coast-line can be determined by the change in current speed resulting from the proposed developments.

Waves

In past HR Wallingford (HRW) has studied the wave climate considering wave energy from locally generated waves and swell propagating in to the Gulf of Kutch from the Arabian Sea. The results of the study carried out by HRW are presented in the Table below.

Design Waves at Mundra

Direction Sector (°N)	Return Period (years)	Inshore Direction (°N)	Hs (m)	T2 (sec)
210	1	222	1.2	5.0
	5	222	1.4	5.3
	20	221	1.6	5.8
	100	221	1.8	6.1
240	1	226	1.5	5.4
	5	226	1.7	5.8
	20	225	1.8	6.1
	100	225	2.0	6.5
270	1	239	1.4	5.5
	5	236	1.7	6.3
	20	236	1.8	6.7
	100	235	2.0	7.4
300	1	240	0.8	5.2
	5	240	0.9	5.6
	20	239	1.0	6.2
	100	238	1.2	6.7

Atmospheric stability is an important factor for predicting the dispersion characteristics of gases/vapours into the surrounding environment. Change in atmospheric stability is a direct consequence of the vertical

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temperature structure. The stability effects are mathematically represented through Pasqual parameters. The following stability classification is employed:

Stability Class	Atmospheric Condition
A	Very Unstable
B	Unstable
C	Slightly Unstable
D	Neutral
E	Stable
F	Very Stable

Condition of atmospheric stability is estimated by a suitable method that uses dispersion parameters viz., vertical temperature gradient, profile of the winds and roughness factor. The roughness factor for the Mundra area is small since it mainly comprises of plain land.

The following meteorological information has been taken in the calculations for the Mundra area (GMB-2010):

Average ambient temperature : 30°C
Average wind speed : Wind data for the whole year 2012 is available and is used
Stability condition : F (Very Stable)

3 Information sources

This plan is prepared in accordance with:

- a) Marine Environmental Impact Assessment of SPMs, COTs and connecting pipelines of APSEZL at Mundra dated February 2001, prepared by National Institute of Oceanography, Mumbai.
- b) Report on Risk assessment study and On-site disaster management Plan for SPMs, COTs and connecting Pipelines of Adani Ports and Special Economic Zone Limited, by TATA AIG Risk Management Services Limited, dated February 2001.
- c) HAZOP study report of SPM Terminal pipeline project by Intec Engineering, dated 26/02/2004.
- d) IPIECA guide to Contingency planning for oil spills on water.
- e) Oil spill risk assessment and contingency plan study done by M/s Environ Software Pvt. Ltd. (Copy enclosed)

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ANNEXURES

INITIAL OIL SPILL REPORT		ANNEXURE 1
Particulars of person, office reporting		
Tel No.		
Date & time of incident		
Spill location		
Likely cause of spill		Witness
Initial response action		By
Any other information		
<p>This FIR is to be sent to Marine Manager by fastest means of communication possible. It is an offence not to report oil pollution incident.</p> <p>This FIR is to be followed by company's incident report also.</p> <p>Following POLREP report to the Government through nearest CG information will also be required:</p>		
Identity of informant		
Time of FIR		
Source of spill		
Cause of spill		
Type of spill		
Colour code information (from CG)		
Radius of slick		
Tail		
Volume		
Quantity		
Weather		
Tide / current		
Density		
Layer thickness		
Air / Sea temp.		
Predicted slick movement		
Size of spill classification (Tier 1, 2 or 3)		

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POLREP		ANNEXURE 2
In case of an oil spill, APSEZ will provide information to Commandant Coast Guard District 1 Porbandar COMDIS 1 and Coast Guard Station Mundra in the following format:		
SN.	Parameter	Data
1.	Identity of the informant	
2.	Time of information receipt	
3.	Source of Spill	
4.	Cause of Spill	
5.	Type of oil	
6.	Colour code information	
7.	Configuration	
8.	Radius	
9.	Tail	
10.	Volume	
11.	Quantity	
12.	Weathered or Fresh	
13.	Density	
14.	Viscosity	
15.	Wind	
16.	Wave Height	
17.	Current	
18.	Layer Thickness	
19.	Ambient air temperature	
20.	Ambient sea temperature	
21.	Predicted slick movement	
22.	Confirm Classification of spill size	
Additional Information :		

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LIST OF RESOURCES AVAILABLE						ANNEXURE 3
Tugs Available for Oil Spill Containment						
Name of Tug	Type	BHP	OSD	AFFF	Capacity (cubm/Hr)	BP
Dolphin No. 4	ASD	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 7	ASD	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 10	ASD	3000 X 2	3000 ltr	-	-	70
Dolphin No. 11	ASD (DSV)	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 14	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 15	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 16	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 17	ASD	3000 X 2	3000 ltr	-	-	70
Dolphin No. 18	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Brahmini	ASD	2000 x 2	3000 ltr	2882 ltr	1200	65
Baitarni	ASD	2000 x 2	3000 ltr	2882 ltr	1200	65
Khushboo	Fixed screw	401 X 2	-	-	-	10
<p>Dolphin No. 4, 7, 10, 11, 14, 15, 16, 17, 18, Brahmini and Baitarni are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required. The tugs are also fitted with a fire curtain and remote controlled fire monitors.</p> <p>All above eleven Tugs have class notation as Harbour Tugs and are certified to work within the Harbour limits only.</p> <p>Reception Facility : 12" pipe line, connected to a slop tank at chemical tank farm.</p> <p>Dolphin 11 has fire fighting system of 1200 m3/hr along with 20 ton lifting "A" frame and diving support facility.</p> <p>Location of Oil Spill Equipment: The Oil Spill Equipment stored in SPM Store.</p>						

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Resources / Equipment Available with APSEZL, Mundra

Item	Quantity
Canadyne Fence Boom (Reel model 7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter	1 no
Power pack with boom reel with hydraulic hoses	2 nos.
Power pack - 20 KV with boom reel with hydraulic hoses	2 nos.
Lamor Side Collector system (Recovery Capacity 123 m³/ hr) (Side collector LSC-3C/2300(01CO2-P536). Oil transfer pump OT A 50 with oil transfer hose set	2 nos. 2 sets
Lamor Minimax 12 m³ skimmer	2 sets
Power pack for skimmers with hydraulic hoses	4 nos.
Power pack - 20 KV for skimmers with hydraulic hoses	1 no.
Floating tank (25 m³)	1 nos.
Foot pumps for floating tank	6 nos
Oil Spill Dispersants	5000 ltr
Portable dispersant storage tank: 1000 ltr capacity	1 no.
Portable pumps	2 nos.
Two – way hydraulic maneuvering panel	2 nos
Oil Containment Boom -Length 2000 metres, Height -1500 mm, Draft-900mm, Free Board-600mm	2000 mtr
Current Buster Boom -Fasflo -75 (for response in fast current)	2 Nos
Skimmer -KOMARA 15 Duplex Skimmer System with floating IMP 6 Pump.	4 Nos
12.5T Flexible Floating Storage Tank (PUA).	3 Nos
Diesel Driven Transfer Pump for Flex Barge	2 Nos
Site Hose Kit for the transfer Pump for the Flex Barge	2 Nos
3" & 2"Hose Adaptor for Transfer Pump and Hose	2 Nos
Shoreline Cleanup Equipment	
Mini Vac System	5 Nos
OSD Applicator - Oil Dispersant Spry Unit(20 Ltr) for use on Beach and Inter Tidal Zones	2 Nos
Startank with Capacity 10000 liter(10m ³)	2 Nos
Sorbent Boom Pack(12.5cm x4 M)	500 mtr
Sorbent pad	2000 Nos

Facilities in the Marine Control room:

1. Tidal stream gauge: This can accurately read the prevalent rate of flow and direction of current.
2. Tide gauge: For accurately calculating the height of tide at any given time.
3. Wind gauge: For direction and speed of wind.
4. VHF sets (fixed and portable) with complete range of marine frequencies to be used for field operations.

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LIST OF TELEPHONE NUMBERS OF EXPERT ADVISORS ANNEXURE 4			
List of Important Telephone Numbers of Govt. Officials and other neighboring Organisations (Expert and Advisors) related to Spill Combating Plan			
SN.	Company	Name and Designation	Telephone Numbers
1.	APSEZL, Mundra	Chief Operating Officer Head Marine Pollution Response Officer Port Control	02838-6272602838-255727 02838-255727 02838-255761 / 289170 (Fax) 02838-255739
2.	Kandla Port Trust	Chairman Dy. Conservator Harbor Master Signal Station	02836-233001 / 234601 02836-223585 / 220235 02836-270201 02836-270194 / 549
3	Indian Oil Corporation, Mundra	CM (Ops) Manager (Ops) Control Room	02838- 222194 02838- 222197 02838- 224444
4	Indian Oil Corporation, Vadinar	DGM (Ops) Manager Tech Services Port Control	02833-256527 02833-256464 02833-256555
5	Reliance Petroleum Ltd Jamnagar	Marine Chief Senior Port Captain Port Control	0288-4013607 0288-4013750 0288-4012600 / 4012610
6	The Commanding Officer Indian Coast Guard Station, Mundra	ICGS, Mundra Station Ops Officer	02838 - 271402 & 03 (Tel) 02838 – 271404 (Fax)
7	The Commander Coast Guard Region (North West), Gandhinagar	COMCG (NW) Regional Ops & Plans Officer	079-23243241 (Tel) 079-23243283 (Fax)
8	The Commander No.1 Coast Guard District (Guj), Porbandar	COMDIS-1 District Ops & Plans Officer	0286-2214422 (Tel) 0286-2210559 (Fax)
9	The Commander Coast Guard Region (West) Mumbai	COMCG (W) Regional Ops & Plans Officer	022-24376133 (Tel) 022-24333727 (Fax)
10	The Officer-in-Charge Coast Guard Pollution Response Team (West), Mumbai	PRT (W) Officer-in-Charge	022-23722438 (Tel) 022-23728867 (Fax)
11	Gujarat Maritime Board	Vice Chairman & CEO	079-23238346 / 23238363

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		Chief Nautical Officer	079-23234716
12	Ministry of Environment Govt. of Gujarat	Director (Environment)	079-23252154 / 23251062 079-23252156 (Fax)
13	Gujarat Pollution Control Board	Environmental Engineer	079-232 22756 079-232 22784 (Fax)

List Of Important Telephone Numbers Of Adani Group Personnel

S.No.	Description / contact person / designation	Telephone Nos.	
		Landline	Mobile
01	Capt. Sachin Srivastava, Head – Marine	02838 - 255727	+91 6359883102
02	Capt. Divya Gupta, HOS-Marine	02838 – 255730	+91 6359631088
03	Capt. Rajat Garg. , HOS-Marine	02838- 255947	+91 6357160037
04	Mr. Sanjay Kewalramani, Head-Marine Technical	02838- 255844	91 9925150056
05	Mr. Yogesh Nandaniya, Manager-SPM	02838- 2562379	91 6359775168
06	Mr. Hari Govindan V	91-2838 - 285072	91 9879104805
07	Marine control, APSEZL	02838 – 255333 / 255761	91 9825228673
08	Port Operation center, APSEZL	02838 –255762	91 9825000949
09	Port security Control, APSEZL	02838 – 289322	91 9825000933
10	Head - Security, APSEZL		+91 9109988165
11	Head - Health, safety & Environment, APSEZL	02838 - 255718	+91 9884869471
12	Head - Fire Dept. APSEZL	02838 – 255857	91 7069083035
13	Occupational Health Centre	02838 - 255710	91 8980015070
14	Head-Admin Department	02838 – 255159	+91 8660183841

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OIL SPILL CONTINGENCY RESPONSE PLAN

Marine Officer/ SPM Mooring master ANNEXURE 5		
Responsibilities	<ul style="list-style-type: none"> • Observe or receive report of oil or chemical spill incident • Initiate measures to prevent/ reduce further spillage • Maintain communication with other all vessels 	
Step	Actions	Additional Information
Alert	<input type="checkbox"/> (Marine Manager / On Scene Commander / SPM Pilot <input type="checkbox"/> Tugs and other support/ response craft	<i>VHF Channel 73 / 77</i>
Initial Actions	<input type="checkbox"/> Stop all cargo operations <input type="checkbox"/> Ensure all safety precautions taken/observed <input type="checkbox"/> Verify incident details <input type="checkbox"/> Advise all relevant information to (Marine Manager / On Scene Commander / or SPM Pilot <input type="checkbox"/> Initiate personal log <input type="checkbox"/> Place tugs/other response craft on stand-by	<i>Liaise with Terminal Shift Engineer</i>
Further Actions	<input type="checkbox"/> Brief (Marine Manager / On Scene Commander / SPM Pilot as necessary <input type="checkbox"/> Mobilize response equipment/ personnel as directed by (Marine Manager / On Scene Commander / <input type="checkbox"/> Maintain personal log of communications and events <input type="checkbox"/> Act as instructed by (Marine Manager / On Scene Commander / SPM Pilot	
Final Actions	<input type="checkbox"/> Submit personal log to HOD – Marine <input type="checkbox"/> Attend debrief	

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MARINE MANAGER / On Scene Commander ANNEXURE 6		
Responsibilities	<ul style="list-style-type: none"> Initially assess situation Verify classification Verify fate of spill Verify resources immediately at risk, inform parties Provide accurate situation reports to Radio Room/ HOD – Marine Collect evidence and/ or statements Liaise with HOD-Health, Safety, Environment & Fire Liaise with incident vessel regarding status of oil spill (if applicable) 	
Step	Actions	Additional Information
Alert	HOD – Marine	
Initial Actions	<input type="checkbox"/> Proceed to incident location, assume role of On-Scene Coordinator <input type="checkbox"/> Ensure all safety precautions have been taken <input type="checkbox"/> Initiate response / <input type="checkbox"/> Investigate cause/ source of spill <input type="checkbox"/> Communicate all information to HOD – Marine <input type="checkbox"/> Ensure samples of spilled oil taken <input type="checkbox"/> Initiate personal log <input type="checkbox"/> Take photographic evidence <input type="checkbox"/> Collect evidence and take statements	<i>Stopped or ongoing</i>
Further Actions	<input type="checkbox"/> Ensure resources are being deployed as required <input type="checkbox"/> Provide co-ordination at-sea response <input type="checkbox"/> Provide detailed situation reports to HOD- Marine <input type="checkbox"/> Liaise with -Health, Safety Environment & Fire Department.	
Final Actions	<input type="checkbox"/> Submit personal log to HOD – Marine <input type="checkbox"/> Attend debrief	

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SPM Pilot			ANNEXURE 7
Responsibilities	<ul style="list-style-type: none"> Initially assess situation Verify classification Provide accurate situation reports to Radio Room/ OSC Collect evidence and/ or statements Liaise with incident vessel regarding status of oil spill (if applicable) 		
Step	Actions	Additional Information	
Alert	<input type="checkbox"/> Marine Control Room <input type="checkbox"/> OSC <input type="checkbox"/> Tugs and other support / response crafts	<i>VHF Channel 73 / 77</i>	
Initial Actions	<input type="checkbox"/> Assume role of On-Scene Coordinator <input type="checkbox"/> Investigate cause/ source of spill <input type="checkbox"/> Communicate all information to Marine Control Room <input type="checkbox"/> Ensure samples of spilled oil taken <input type="checkbox"/> Initiate personal log <input type="checkbox"/> Take photographic evidence <input type="checkbox"/> Collect evidence and take statements	<i>Stopped or ongoing</i>	
Further Actions	<input type="checkbox"/> Ensure resources are being deployed as required <input type="checkbox"/> Provide co-ordination of the at-sea response <input type="checkbox"/> Provide detailed situation reports to HOD – Marine		
Final Actions	<input type="checkbox"/> Submit personal log to HOD – Marine <input type="checkbox"/> Attend debrief		

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HOD – Marine ANNEXURE 8		
Responsibilities	<ul style="list-style-type: none"> • Confirm/ amend initial classification • Manage the APSEZL response • Authorize expenditure after consultation with COO APSEZL • Brief COO, APSEZL • Liaise with Coast Guard • Approve press statements for release 	
Step	Actions	Additional Information
Alert	<input type="checkbox"/> Coast Guard <input type="checkbox"/> External organizations	
Initial Actions	<input type="checkbox"/> Verify/ amend spill classification <input type="checkbox"/> Ensure all safety precaution have been taken <input type="checkbox"/> Confirm external organizations have been alerted <input type="checkbox"/> Convene Emergency Response Team <input type="checkbox"/> Predict slick movement <input type="checkbox"/> Liaise with vessel Agents/ Owners as appropriate	
Further Actions	<input type="checkbox"/> Chair the Emergency Response Team meetings <input type="checkbox"/> Constantly review the strategy being employed and advise of changes where necessary <input type="checkbox"/> Approve all expenditure commitments <input type="checkbox"/> Brief President APSEZ <input type="checkbox"/> Agree press statements with Corporate Relations Chief <input type="checkbox"/> Confirm formal samples have been taken <input type="checkbox"/> Advise Coast Guard if oil migrates outside of Local Area	
Final Actions Final Actions (contd.)	<input type="checkbox"/> Terminate the clean-up <input type="checkbox"/> Collate personal logs. <input type="checkbox"/> Prepare the incident report. <input type="checkbox"/> Hold full de-brief involving all members. <input type="checkbox"/> Amend contingency plan as required. <input type="checkbox"/> General Report to President	

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OIL SPILL PROGRESS REPORT		ANNEXURE 9
Incident Name:		
Updated by:		
Date:	Time (local):	
Summary of Incident Response Operations:		
Summary of Incident Response Resource Utilization:		
Number of Aircraft:	Number of Vessels:	
Dispersant Used:	Liters	Length of Booms in Use: m
Number of Recovery Devices:	Number of Storage Devices:	
Sorbent Used:	kg	Bio-remediation Used: kg
Number of Personnel:	Number of Vehicles:	
Specialist Equipment:		
Oil Spill Balance Sheet:		
Total amount of oil spilled:	Tons	
Total amount of oil recovered:	Tons	
Outstanding amount of spilled oil:	Tons	
Mass balance:		
Estimated Natural Weathering:	Tons	
Mechanically agitated:	Tons	
Chemically dispersed:	Tons	
Skimmer recovered:	Tons	
Sorbent recovered:	Tons	
Manually recovered:	Tons	
Bio-remediated:	Tons	
Other:	Tons	

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[illegible]

Control Room Officer

HOD – Marine

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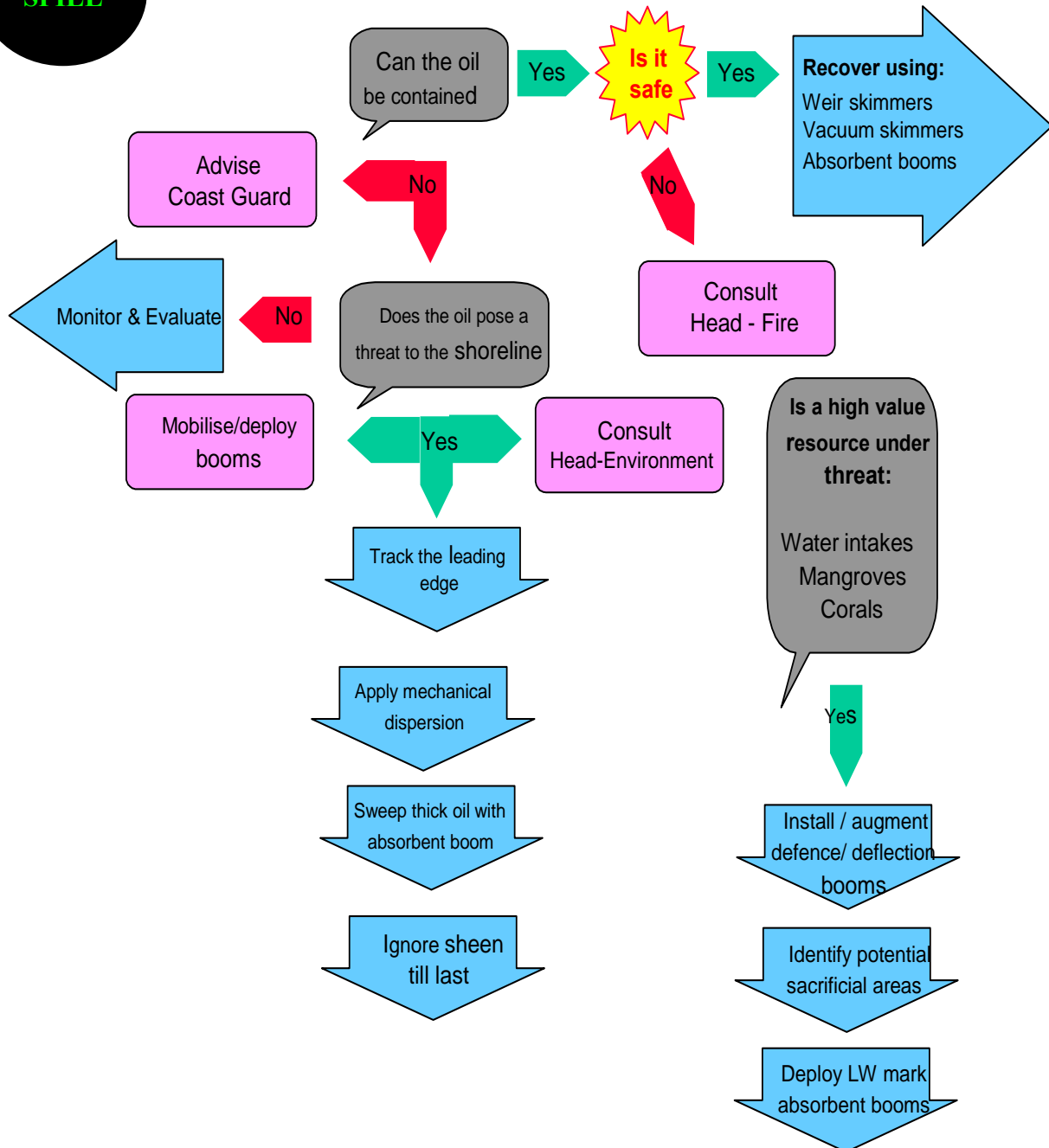
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Response Guidelines

ANNEXURE 12

OIL
SPILL

Light Oil Response Guidelines



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Heavy Oil Response Guidelines



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Site Specific Health and Safety Plan

ANNEXURE 13

Assessment Form

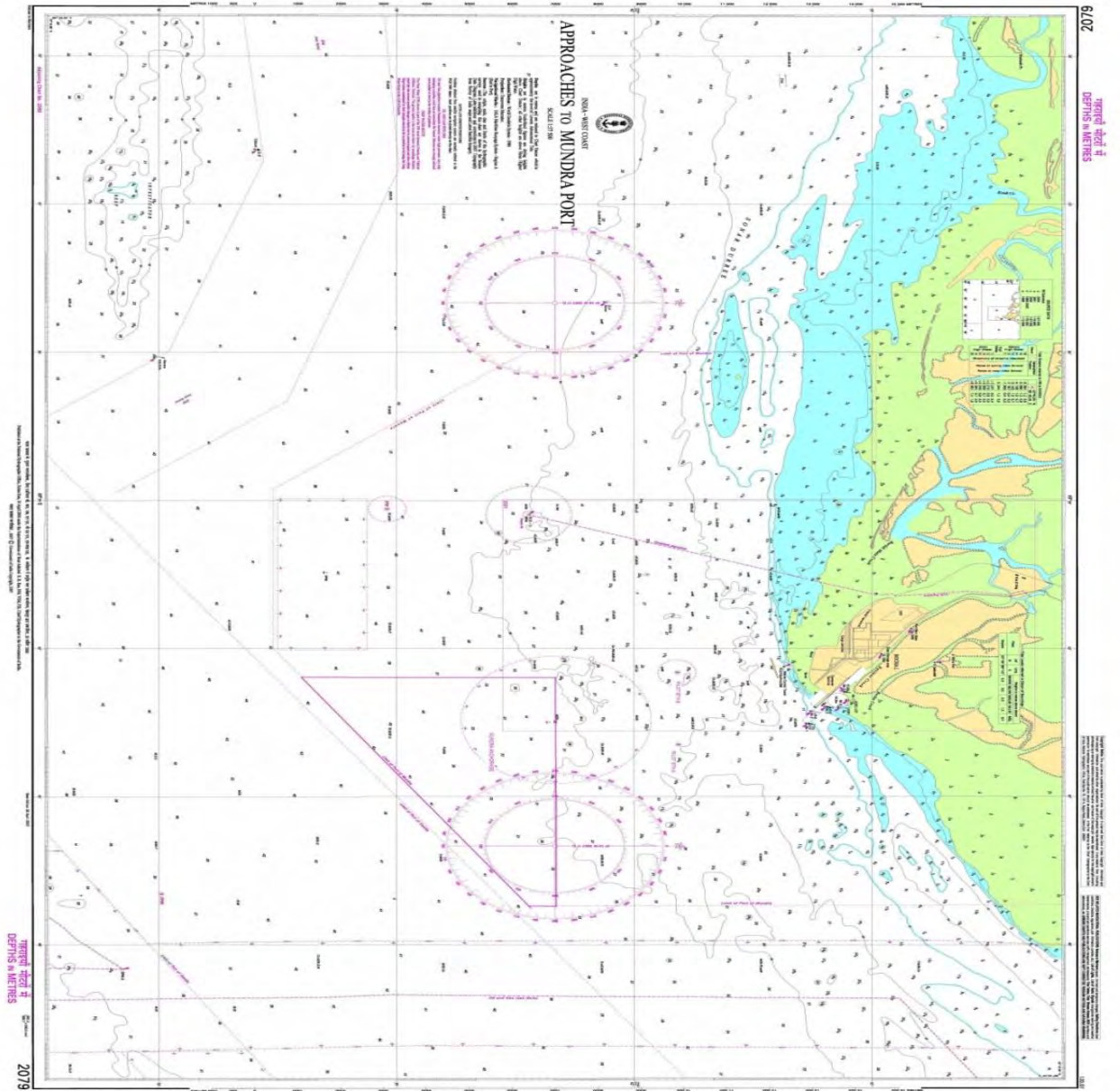
1. APPLIES TO SITE :					
2. DATE :		3. TIME :		4. INCIDENT :	
5. PRODUCT(S) :					(Attach MSDS)
6. Site Characterization					
6a. Area	<input type="checkbox"/> Open water	<input type="checkbox"/> Inshore water	<input type="checkbox"/> River / Creek	<input type="checkbox"/> Salt marsh	<input type="checkbox"/> Mudflats
	<input type="checkbox"/> Shoreline	<input type="checkbox"/> Sand	<input type="checkbox"/> Shingle	<input type="checkbox"/> Intake Channel	
6b. Use	<input type="checkbox"/> Commercial	<input type="checkbox"/> Industrial	<input type="checkbox"/> Public	<input type="checkbox"/> Government	<input type="checkbox"/> Recreational
	<input type="checkbox"/> Residential	<input type="checkbox"/> Other			
7. Site Hazards					
	<input type="checkbox"/> Boat safety	<input type="checkbox"/> Fire, explosion, in-situ burn	<input type="checkbox"/> Slips, trips and falls		
	<input type="checkbox"/> Chemical hazards	<input type="checkbox"/> Heat stress	<input type="checkbox"/> Steam and hot water		
	<input type="checkbox"/> Drum handling	<input type="checkbox"/> Helicopter operations	<input type="checkbox"/> Tides		
	<input type="checkbox"/> Equipment operations	<input type="checkbox"/> Lifting	<input type="checkbox"/> Trenches, excavations		
	<input type="checkbox"/> Electrical hazards	<input type="checkbox"/> Motor vehicles	<input type="checkbox"/> Visibility		
	<input type="checkbox"/> Fatigue	<input type="checkbox"/> Noise	<input type="checkbox"/> Weather		
	<input type="checkbox"/> Others	<input type="checkbox"/> Overhead/buried utilities	<input type="checkbox"/> Work near water		
	<input type="checkbox"/>	<input type="checkbox"/> Pumps and hoses			
8. Air Monitoring					
	<input type="checkbox"/> O ₂	<input type="checkbox"/> LEL	<input type="checkbox"/> Benzene	<input type="checkbox"/> H ₂ S	<input type="checkbox"/> Other
9. Personal Protective Equipment					
<input type="checkbox"/> Foot Protection		<input type="checkbox"/> Coveralls			
<input type="checkbox"/> Head Protection		<input type="checkbox"/> Impervious suits			
<input type="checkbox"/> Eye Protection		<input type="checkbox"/> Personal Floatation			
<input type="checkbox"/> Ear Protection		<input type="checkbox"/> Respirators			
<input type="checkbox"/> Hand Protection		<input type="checkbox"/> Other			
10. Site Facilities					
<input type="checkbox"/> Sanitation	<input type="checkbox"/> First Aid	<input type="checkbox"/> Decontamination			
11. Contact details :					
<input type="checkbox"/> Doctor		Phone			
<input type="checkbox"/> Hospital		Phone			
<input type="checkbox"/> Fire		Phone			
<input type="checkbox"/> Police		Phone			
<input type="checkbox"/> Other		Phone			
12. Date Plan Completed					
13. Plan Completed by					

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Indian Chart 2079

ANNEXURE 14



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List of recycler approved by state of Gujarat	ANNEXURE 15
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**LIST OF APPROVED VENDOR FOR COLLECTION & DISPOSAL OF OIL SPILL WASTE WATER
AND OILY SOIL**

Sr No.	Name of the party & Contact Detail	Date of Issue of Passbook alongwith validity	Capacity
1	M/s Jawrawala Petroleum, Plot No: 200/33, B/H Kashiram Textile Mill, Narol, Ahmedabad – 382405 Contact Detail - (079) - 25358099 (M) +91 9824045726	18/09/2012 to 17/09/2017	1. 4800 KLPA - Used Oil 2. 9000 KLPA – Waste Oil
2	M/s Reliance Barrel Supply co., 200/34, B/H- Kashiram Mill, Narol, Ahmedabad-382405 Contact Detail - (079) - 25356629 (M) +91 9824090021	03/09/2014 to 02/09/2019	1. 8280 KLA - Used Oil 2. 9000 KLA – Waste Oil
3	M/s Western India Petrochem Industry, Plot No-50, 51, GIDC Estate, Village Gozaria, Dist- Mehsana. Contact Detail - Tel:+91- 278- 420941 Fax:+91- 278- 429503	25/07/2014 to 24/07/2019	1. 3660 KLPA – Used oil 2. 11100 KLPA – waste oil
4	M/s Saurashtra Enviro Projects Pvt. Ltd.(SEPPL) 3rd Floor,K.G.Chambers, Udhana Darwaja, Ring Road, Surat, Gujarat, India-395002 Contact Detail - +91 261 2351248	TSDf Site	3,95,000 MT (Landfilling) + 7.50 Million Kcal/Hr. (Incineration)
5	M/s Bharuch Enviro Infrastructure Ltd, Ankleshwar Contact Detail - Phone 91-2646-253135 Fax 91-2646-222849	TSDf Site	23,00,000 MT (Landfilling) + 120 MT/Day (Incineration)
6	M/s Nandesari Environment Control Ltd. Nandesari, Vadodara, Contact Detail – Phone 265 – 2840818 Fax 265 – 2841017	TSDf Site	3,00,000 MT (Landfilling) + 700 Kg/Hr. (Incineration)

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LIST OF AGENCY FOR SUPPORT & GUIDANCE FOR RESCUE & REHABILITATION OF OILED BIRD & MANGROVES MANAGEMENT DURING OIL SPILL

ANNEXURE 16

Sr No.	Name of the party & Contact Detail	Contact Person	Contact Detail	Activity
1	Gujarat Institute of Desert Ecology P.O Box No. #83, Opp. Changleshwar Temple, Mundra Road Bhuj - 370001 Gujarat – India.	Dr. Thivakaran	EMAIL: desert_ecology@yahoo.com FAX: 02832-235027 02832-235025	Restoration of Mangroves
2	Kalapooranasuri Karunadham Karunadham Hospital, At – Shedata, Bhuj, Kutch		(M) 9925020776	Rescue of oil soaked birds / animals and medical treatment facility
3	Anchorwala Ahinshadham Bhagwan Mahavir Pashu Raksha Kendra, Pragpar, Mundra, Kutch.		Phone (02838) 22352	Rescue of oil soaked birds / animals and medical treatment facility
4	ASHA Foundation C/182, Ashoknagar, Opposite ISRO Satellite, Ahmedabad – 380015, Gujrat, India.	Lalubhai	Phone: 09824037521 ,09879877281 Email: ashahmedabad@yahoo.co.in Website: www.ashafoundationindia.org	Rescue of oil soaked birds / animals and medical treatment facility

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Terms, definitions and abbreviations used in this plan

APSEZL	Adani Ports and Special Economic Zone Ltd.
COO	Chief Operating Officer
DGM	Deputy General Manager
DGS	Directorate General of Shipping
ENGR.	Engineer
ESD	Emergency Shut Down
FIR	First Information Report
FO	Furnace Oil
GMB	Gujarat Maritime Board
GPCB	Gujarat Pollution Control Board
HOD	Head Of Department
HQ	Head Quarters
HSD	High Speed Diesel
ICG	Indian Coast Guard
IMO	International Maritime Organization
IPMS	Integrated Port Management System
KPT	Kandla Port Trust
LWS	Low Water State
MCLS	Maximum Credible loss scenario
MMD	Mercantile Maritime Deptt.
MOEF	Ministry of Environment & Forest
MSDS	Material Safety Data Sheets
NOS DCP	National Oil Spill Disaster Contingency Plan
OSC	On Scene Commander
PLEM	Pipe line end manifold
POLREP	Pollution Report
PPE	Personal Protective Equipment
PR	Public Relations Officer
R/O	Radio Officer
SKO	Super Kerosene Oil

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OIL SPILL CONTINGENCY RESPONSE PLAN
Certificate of Endorsement

(To be certified personally by an officer not below the post of Deputy Conservator of a port facility or the Installation Manager of an oil installation, or offshore installation, or equivalent legally responsible authority)

I hereby certify that:

- 1 The oil spill contingency plan for the facility under my charge has been prepared with due regard to the relevant international best practices, international conventions, and domestic legislation.
2. The nature and size of the possible threat including the worst case scenario, and the resources consequently at risk have been realistically assessed bearing in mind the probable movement of any oil spill and clearly stated.
3. The priorities for protection have been agreed, taking into account the viability of the various protection and clean-up options and clearly spelt out.
4. The strategy for protecting and cleaning the various areas have been agreed and clearly explained.
5. The necessary organization has been outlined, the responsibilities of all those involved have been clearly stated, and all those who have a task to perform are aware of what is expected of them.
6. The levels of equipment, materials and manpower are sufficient to deal with the anticipated size of spill. If not, back-up resources been identified and, where necessary, mechanisms for obtaining their release and entry to the country have been established.
7. Temporary storage sites and final disposal routes for collected oil and debris have been identified.
8. The alerting and initial evaluation procedures are fully explained as well as arrangement for continual review of the progress and effectiveness of the clean-up operation.
9. The arrangements for ensuring effective communication between shore, sea and air have been described.
10. All aspects of plan have been tested and nothing significant found lacking.
11. The plan is compatible with plans for adjacent areas and other activities.
12. The above is true to the best of my knowledge and belief.
13. I undertake to keep the plan updated at all times and keep the Indian Coast Guard informed of any changes through submission of a fresh certificate of endorsement.

Seal:



Name: Capt. Sachin Srivastava

Designation: Head - Marine

Organization: Adani Ports and SEZ Ltd, Mundra

Date: 01 Nov 2021

Place: Mundra

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

Appendix E5 to NOS DCP 2015

(Para 4.5 refers)

Contingency Planning Compliance Checklist

Name of the Port/ Oil Handling Agency	Adani Ports and SEZ Limited, Mundra
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DESCRIPTION		Complied Yes/No	Remarks
Risk Assessment			
1.	Whether the facility produces / handles / uses / imports / stores any type of petroleum product.	Yes	(Ref. OSCRP 2.2)
2.	Whether risk assessment is done	Yes	(Ref. OSCRP 2.0)
3.	Who did the risk assessment	Yes	Environ Software (P) Ltd. & APSEZ
4.	Whether maximum volume of oil spill that can occur in the worst case scenario is considered.	Yes	(Ref. OSCRP 2.4)
5.	Whether relative measures of the probability and consequences of various oil spills including worst case scenario are taken into account.	Yes	(Ref. OSCRP 2.4)
6.	Whether all types of spills possible in the facility are considered including grounding, collision, fire, explosion, Rupture of hoses.	Yes	(Ref. OSCRP 2.3 & 2.4)
7	Please specify the list of oils considered for risk assessment	Yes	(Ref. OSCRP 2.2)
8	Whether the vulnerable areas are estimated by considering maximum loss scenario and weather condition	Yes	(Ref OSCRP 2.1 Computational Scenarios)
9	Whether impacts on the vulnerable areas are made after considering the marine protected areas ,population ,fishermen ,salt pans ,mangroves ,corals, and other resources within that area	Yes	(Ref. OSCRP 2.6)
10	Whether measures for reduction of identified high risk are included by reducing the consequences through spill mitigation measures	Yes	(Ref. OSCRP 1.4, 2.3, 2.6. 3 & 5)
11	Whether steps have been considered to reduce risks to the exposed population by increasing safe distances by acquiring property around the facility ,if possible	NA	All facilities developed within SEZ keeping safe distances from the exposed population.
12	Whether risk levels are established for each month after considering the probability with tide and current and consequences of each such spill	Yes	(Ref. OSCRP 2.1 computational scenarios & 2.3)
13	Whether prevention and mitigation measures are included in the plan	YES	(Ref. OSCRP 4.0, 7.0, 8.0 & 9.0)
14	Whether the spill may affect the shoreline.(length of the shoreline with coordinated)	Yes	Ref. OSCRP 2.3 & 2.6)
15	Whether time taken the oil spill to reach ashore in each quantity of spill in various month are mentioned in the plan	Yes	(Ref. OSCRP 2.3)
16	Whether sensitivity mapping has been carried out	Yes	(Ref. OSCRP 2.5)
17	Does the sensitivity mapping clearly identify the vulnerable areas along with MPAs, corals fishermen community, salt pans, mangroves and other socio-economic elements in the area	Yes	(Ref. OSCRP 2.5 & 2.6)

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18	Do the sensitivity maps indicate area to be protected on priority	Yes	(Ref. OSCRP 2.6)
19	Does the maps indicate boom deployment locations	NA	Booms not deployed permanently
20	Whether any marine protected area will be affected	YES	(Ref. OSCRP 2.5 & 2.6)
21	Whether total number of fishermen likely to affected is mentioned in the plan	Yes	(Ref. OSCRP 2.6)
22	Whether any saltpan in the area is going to be affected	Yes	(Ref. OSCRP 2.6)
23	Whether any mangroves in the area will be affected by a spill	Yes	(Ref. OSCRP 2.6)
Preparedness			
24	whether any containment equipment is available	Yes	(Ref. OSCRP Annex 3)
25	Whether any recovery equipment is available	Yes	(Ref. OSCRP Annex 3)
26	Whether the facility is having any temporary storage capacity	Yes	(Ref. OSCRP Annex 3)
27	Whether location of the oil spill response equipment is mentioned in the plan	Yes	Has been included in Annex 3
28	Whether suitable vessels available for deploying the boom skimmer etc.	Yes	(Ref. OSCRP Annex 3)
29	Whether OSD held with facility	Yes	(Ref. OSCRP Annex 3)
30	Whether the OSD held with the facility is approved for use in Indian waters	Yes	
31	Whether the facility has MoU with other operator for tier -1 preparedness	Yes	(Ref. OSCRP 1.4)
32	Whether the list of oil spill response equipment available with each agency in deliberation	Yes	MoU document
33	Whether the facility has any MoU with private OSRO	NA	Port itself is equipped to deal with oil spill emergencies
34	Whether the procedure for evoking the mutual aid is clearly described in the plan	Yes	(Ref. OSCRP 1.4)
35	Whether additional manpower is available	Yes	(Ref. OSCRP 5.4)
36	Whether list of approved recyclers is mentioned in the plan	Yes	List of recycler approved by state of Gujarat is included in Annexure 15.
37	Whether NEBA (net environmental Benefit Analysis) has been undertaken	Yes	Before commissioning of any new project, various environmental aspects with their positive or adverse impact is considered under EIA Environment Impact Assessment stage.
38	Whether the areas from priority protection have identify in the plan	YES	(Ref. OSCRP 2.5 & 2.6)
39	Whether relevant authorities and stakeholder were consulted for NEBA and during the areas for property protection	Yes	Before commissioning of any new project Environment Impact Assessment & Public consultation is carried out, in which relevant authorities & stakeholders


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			were consulted.
40	Whether district administration has been appraised of the risk impact of oil spills?	Yes	District Level Disaster Management Plan is prepared and regularly updated at district level by District Collector of Kutchh. Under DMP Oil spillage contingency is identified as risk. During preparation & updating of disaster management plan, District Level Authority organises & compiles information from various industries of kutchh. APSEZL is regularly participating in the same & providing necessary information to district level administration.
Action Plan			
41	Whether the plan outlines procedure for reporting of oil spill to coast guard	Yes	(Ref. OSCRP 7.3)
42	Whether the oil spill response action is clearly mentioned	Yes	(Ref .OSCRP 3.1 to 3.6)
43	Whether the action plan include all duties to be attended in connection with an oil spill	Yes	(Ref. OSCRP 3.4)
44	Whether the action plan includes key personnel by their name and designation viz. C/C, S/C	Yes	Ref. OSCRP Annexure-4
45	Whether alternate coverage is planned to take care of the absence of a particular person [in cases where action plan is developed basic names]	Yes	(Ref. OSCRP 5)
46	Whether the plan includes assignment of all key coordinators viz.the communication controller ,safety coordinator ,Emergency management team, Administration and communication coordinator and safety coordinator	Yes	(Ref. OSCRP 3.4)
47	Whether contact directory containing numbers of key response and management personnel is intimated in the plan	Yes	Ref. OSCRP Annexure-4
48	Whether approved recyclers are identified for processing recovered oil and oily debris	Yes	List of approved recycler of Gujarat state is included in annexure 15. Membership of common disposal facility for disposal of oily debris is also attached annexure 16.
49	Whether the shoreline likely to be affected is identified	Yes	(Ref. OSCRP 2.5 & 2.6)
50	Whether final report on the incident is submitted to CGHQ as per NOS-DCP 2014	NA	No incident
51	Whether the spill incident and its consequences	NA	No incident

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	are informed to fishermen and other NGOs for environment protection through media		
	Training and exercises		
52	Whether mock fire /emergency response drills are specified in the plan	Yes	(Ref. OSCRP 5.6)
53	Whether the mock drills cover all types of probable oil spill	Yes	
54	Whether the plan mentions list of trained manpower	Yes	(Ref. OSCRP 5.6)
55	Whether record for periodic mock drill are maintained in a well-defined format	Yes	
56	Whether the plan updated according to the finding in mock-drills and exercises	Yes	
	DESCRIPTION		
57	What is the frequency of updation /review of contingency plan?	Yes	As Per NOSDCP 2015
58	Periodicity of joint exercises with mutual aid partner	Yes	
59	Frequency of mock-drills for practice	Yes	(Ref. OSCRP 5.6)
60	Whether the records for periodic mock drills are maintained in a well-defined format	Yes	(Ref. OSCRP 5.6)
61	Whether the plan is updated according to the finding of mock-drills and exercises	Yes	
62	Frequency of updation /review of contingency plan	Yes	As Per NOSDCP 2015
<p>I, hereby ,declare that the all information appended above and true and correct to my knowledge of belief</p> <div style="text-align: right; margin-top: 20px;">  </div> <p>Date: 01 Nov 2021 Chief conservator /Installation manager</p>			
VERIFIED			
<p>Date: (District commander ICG) or his representative</p>			
<p>Date: (Regional commander ICG) or his representative</p>			

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OIL SPILL CONTINGENCY RESPONSE PLAN

ANNEXURES

ANNEXURE 1			INITIAL OIL SPILL REPORT		
Particulars of person, office reporting		Capt. Sachin Srivastava- HOD Marine Capt. Divya Gupta - HOS marine, APSEZ			
Tel No.		+91 6359883102			
Date & time of incident		27.10.2021 / 0950 hrs			
Spill location		South Basin from SB 8 vessel MV MSC Anahita			
Likely cause of spill		Spill due to hose rupture while discharging sludge from vessel.		Witness – Jetty Supervisor	
Initial response action		Initiated OSCRP			
Any other information		NO			
Identity of informant			Jetty Supervisor		
Time of FIR			1112		
Source of spill			Vessel berthed at SB8		
Cause of spill			Hose rupture while discharging sludge		
Type of spill			Sludge Oil		
Color code information (from CG)			Yellow		
Radius of slick			10-12 m		
Tail			15 m		
Volume			0.5 to 0.7 cubic meter approx.		
Quantity			200 to 250 L		
Weather			NW' Ly x 6-8 knots.		
Tide / current			Ebbing / 0.1 to 0.2 knots.		
Density			0.2 to 0.86 kg/m cube approx.		
Layer thickness			0.02 mm approx.		
Air / Sea temp.			26 deg C / 25 deg C		
Predicted slick movement			SE'ly		
Size of spill classification (Tier 1, 2 or 3)			Tier 1		

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

ANNEXURE 2

POLREP

In case of an oil spill, MPSEZ will provide information to Commandant Coast Guard District 1 Porbandar COMDIS 1 and Coast Guard Station Vadinar CGS Vadinar in the following format:

SN.	Parameter	Data
1.	Identity of the informant	Jetty Supervisor
2.	Time of information receipt	0950 hrs
3.	Source of Spill	Vessel berthed at SB8
4.	Cause of Spill	Hose rupture while discharging sludge
5.	Type of oil	Sludge Oil
6.	Colour code information	Yellow
7.	Configuration	-
8.	Radius	10 to 12 m
9.	Tail	15 m
10.	Volume	0.5 to 0.7 cubic meter approx.
11.	Quantity	200 to 250 L
12.	Weathered or Fresh	Fresh
13.	Density	0.2 to 0.86 kg/m cube approx.
14.	Viscosity	-2-4.5 CST@40 deg centigrade
15.	Wind	NW' Ly x 6 - 8 knots.
16.	Wave Height	0.1 to 0.2 m
17.	Current	0.1 to 0.2 knots.
18.	Layer Thickness	0.2 to 0.4 mm approx.
19.	Ambient air temperature	26 deg C
20.	Ambient sea temperature	25 deg C
21.	Predicted slick movement	SE'ly
22.	Confirm Classification of spill size	Tier 1

Log Sheet of Drill

Page Number: 1 of 1	Date: 27-10-2021
Name: Saket Kumar/Santosh Ojha	Position: Radio Officer
Contact Number: 9825228673	Signature:

Activity Timeline:

- 0950- 100 sq. meters oil patches observed 150 mtrs off SB4 berth.
- 0951- Dol 11 informed to cast off with all spillage recovery gears and proceed on sight. All tugs on TB to prepare OSD boom and cast off at short notice.
- 0951- HOD/HOS/DPC/POC informed.
Weather – wind NWly 6-8 kts
Tide – Ebbing, low water 1205 hrs
- 0951 - Scene commander arrived on sight observed spill spreading and entering in south basin turning circle.
- 0952 - CT3 and CT4 terminal informed to stop cargo operation and investigate for spillage.
- 0953 - Dol 11 casted off and DOL 4, 7 10 15 17 stand by deployment.
- 1000- Dredging team informed to clear their crafts from spill areas.
- 1005 –1012: Admin, Environment, Cell, ISCR, Safety, Commercial, Corporate, Medical, Legal and Coo sir informed.
- 1009 - ICGS Mundra informed
- 1012 - Dol 11 arrived on sight and commenced laying down booms.
- 1013 - Shore commander advised scene commander to investigate source of spillage.
- 1023 -Dol 19 informed to cast off and patrol in area for sighting any spill outside and inside south basin areas.
- 1023 -Scene commander appraised spillage from SB8 vessel (MV MSC ANAHITA) occurred during sludge discharging operations.
- 1025- Scene Commander boarded vessel and confirmed with master spillage occurred during sludge discharge, they contained maximum spillage onboard but some quantity spilled in to sea.
- 1026 - Dol 11 laid down 150 mtrs of boom and contained spillage inside boom.
- 1046 - 200 mtrs boom laid down and making "j" for recovery of spillage.
- 1046: Weather – wind NNE 10-12 kts
Low Water – 1205 hrs
- 1047 - Spillage recovery commenced using skimmer.
- 1052 -Mostly spill recovered, one thin sheen observed in water.
- 1053 - Skimmer recovered.
- 1054- The sheen is dissolved using propeller wash of the tug.
- 1100 - All spillage recovered and no sign of spill in sea.
Qty recovered 350-400 ltrs (Oil with water).
- 1108 -Dol 19 reported no sign of spill in sea inside and outside south basin channel.
- 1110 - Drill called off, Dol 19 continue patrolling in area.
- 1110-1115: HOD/HOS/POC/ISCR/Safety/Security/Admin/Commercial/Env Cell/Medical/Corporate/COO sir informed.

Personnel & Boats Participated in Drill

Off Shore

- 01 Mr. M P Choudhary
- 02 Mr. Yogesh Nandaniya
- 03 Mr. Ramdas Pawale
- 04 Mr. Yugul Kishor Sharma
- 05 Mr. Diwana Thapa
- 06 Mr. Upinder Samkaria
- 07 Mr. Shashi kant Padave
- 08 Mr. Santosh Rasam
- 09 Mr. Vishwanath Chauhan
- 10 Mr. Dharamveer Yadav
- 11 Mr. Narayan Tamalkar
- 12 Mr. Ravinder - Diver
- 13 Mr. Sandeep Kumar - Diver
- 14 Mr. Sandeep Singh - Diver
- 15 Mr. Mahendra Kumar Ghritlahre-Env.
- 16 Mr. Bhagwat Swaroop Sharma-Env.
- 17 Mr. Radhesyam Singh-Env.
- 18 Mr. Ashvin Patni-Env.
- 19 Mr. Khagendra Dewangan – HMEL
- 20 Mr. Devender Singh – HMEL
- 21 Mr. Kuldeep – HMEL
- 22 Mr. Mehul Makwana
- 23 Crew of Tug Dolphin 11
- 24 Crew of Tug Khusboo
- 25 Crew of Boat Anjali
- 25 Tug Dol 4, 7, 10, 15 & 17

Onshore:

1. Capt Tushar Kinikar
2. Mr. Sudhakar Singh
3. Mr. Saket Kumar
4. Mr. Santosh Ojha
5. Representatives from Security Department

Drill Performance Monitoring:

Sl. No	Activity	Time Taken
1.	Time taken to shift OSR equipment from SPM Store to load on DSV tugs	NA. 200 meter Fence boom and 1- skimmer is kept 24 x 7 on Tug Dol 11.
2.	Time taken for Tug cast off from time information given.	02 min.
3.	Time taken from tug cast off to Reach at Location.	19 min.
4.	Time taken for deploying 200 meter boom and skimmer after reaching at site.	35 min.

Observations:

SR. NO.	POINTS	ACTION TAKEN	TARGET DATE	RESPONSIBILITY	REMARKS
1	The communication flow between onsite, jetty and Control Room was clear and satisfactory.	NA	NA	NA	
2	The HMEL be advised to keep at least 200 meter boom and one skimmer on offshore tug Ocean Citrin to reduce the deployment time.	Communication sent to HMEL	Completed	Yogesh Nandaniya	
3.	Liquid Team to be also involved whenever OSR drills are carried out.	The liquid team will be involved in OSR drills.	Completed	Yogesh Nandaniya/ Sudhakar Singh	
4.	A revised drill checklist to be prepared for oil spill at berths. Current checklist used is for Oil Spill at SPM.	Draft checklist being prepared.	10 Nov 2021	Sudhakar Singh/Arpan Chaudhary	

Drill snap

Boom laying from Dol 11



OSD Spraying from Dol 10



Lowering of Skimmer



Collection of spilled oil by Skimmer



OSR Team on Tug Dolphin -11



De-briefing



Annexure – 8

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

Date	:	10 th February 2022 Thursday
Time	:	14:37:00 Hrs.
Location	:	Central Store (Westbasin)
Department / Section	:	Commercial
Type/Text of the Scenario	:	Caught fire in stored paint and oil drums due to electrical short-circuit and its caused to two storekeeper got unconscenced by inhalation of dense smoke.

INTRODUCTION:

Routine material inspection work was going on by two store-keeper (Sh. Rambhai Gadhvi and Sh. Suman Mishra) inside the store opposite side of PQ Rack meanwhile accidentally stored paint and oil drums caught fire due to electrical short-circuit and its resulting to fire and produced the dense smoke due to inhalation of smoke both are got unconscenced.

Its required medical support from OHC Westbasin also required the support from fire services to searching / rescue casualties and simultaneously fire-fighting operation to deal with fire to extinguished the fire and also parallel action required for emergency evacuation of occupant's work / stay / available inside store office / material storage area (Total Occupancy – 12 Persons)

During the Mockdrill observers has drawn / scale the scope of improvement observations on Action / Role / Responsibilities / Responses of first responder / Evacuation Warden, Rescue Operation, Fire-fighting, Medical Aid (OHC), Central Control Room (Incident Control Room), Assembly point roll-call etc.

During Post briefing session of Mock Drill taken feedback from all participants for value addition in workplace safety, Emergency Action Plan etc.

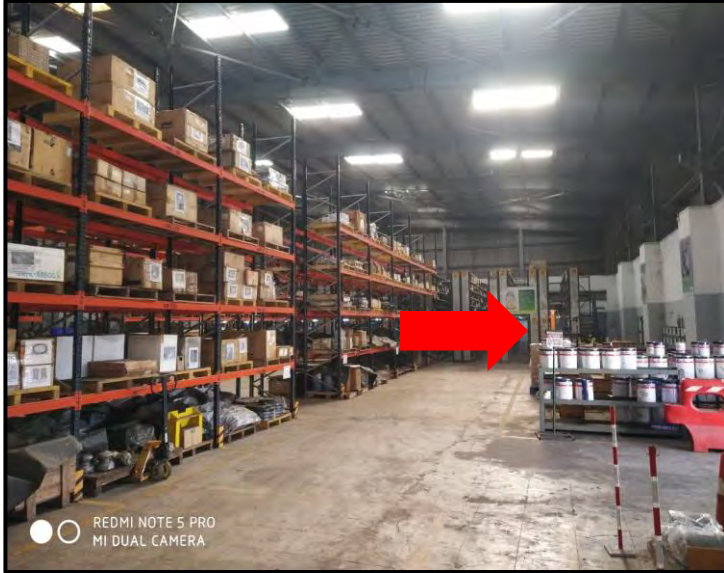
LOCATION (WITH PHOTOGRAPH):



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



Incident Spot | Fire Occurred in stored paint / oil drums



Unconscious casualties



First Responder – Sh. Manoj Kumar Yadav called to Central Control Room (CCR) by mobile to mobilized the emergency services (I.e OHC / Fire Services)



First Responder – Sh. Manoj Kumar Yadav has operate the Emergency Siren of Central Store to evacuate the occupants from Store Building / material storage area.

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MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



Evacuation of occupants – moving outside the store



Occupants – Stand @ Outside store for roster roll-call & head counting



Fire Tender turn-out along with Fire Crew for fire and rescue call at Incident spot at central store (1 – Fire SIC, 1 – DCPO, 2 – Rescuers & 2 – Firefighters)



Ambulance turn-out along with Paramedic Officer for medical emergency at central store (1 – Paramedic Officer & 1 – Ambulance Driver)

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MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



Fire Tender reached at incident spot (Central Store)



Ambulance reached at incident spot (Central Store)



Fire-crew disembark from fire tender and size up the situation and arranging firefighting appliances (I.e charge fire hose, foam mobile unit) and one fire crew donning SCBA and enter into Central store for searching casualties and rescue operation as per direction of Fire Shift Incharge.



Paramedic Officer co-ordinate with Fire Shift Incharge at incident spot for casualties handling and insist to Ambulance driver to be ready the ready stretcher to handle the casualties and medical treatment.

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



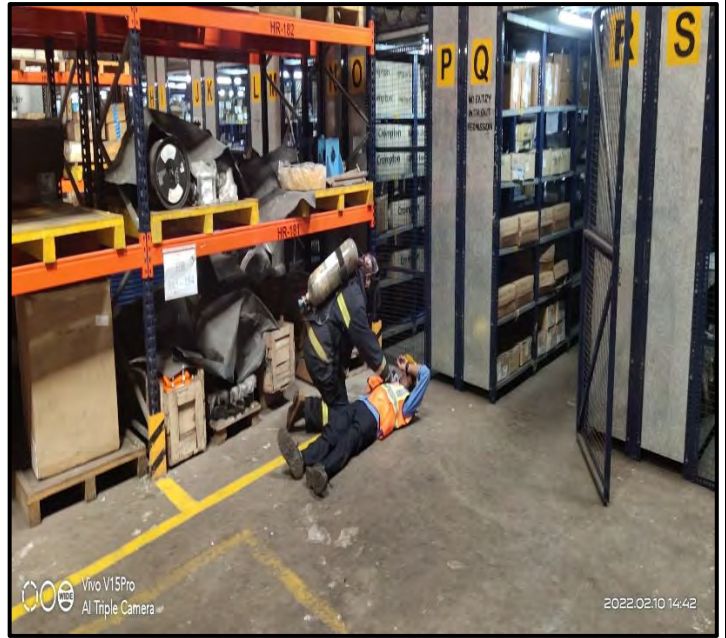
- Fire Shift Incharge reporting to Incident Controller
- Confirm Power-cut off prior to start firefighting with first responder / Area Incharge
- Area Incharge give the clearance to firefighting.



- As per direction of Fire Shift Incharge -
- Two Fireman has started the fire hose lying work under direction of Fire Shift Incharge.
- Two Fireman has started the searching of Casualties



Casualties searching and Rescue operation - Sh. Suman Mishra



Casualties Searching and Rescue operation - Sh. Rambhai Gadhvi

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



Casualties shifting into Ambulance - Sh. Rambhai Gadhvi (Fireman lift)



Casualties shifting into Ambulance stretcher - Sh. Rambhai Gadhvi



Fire-fighting Foam making by using FB-10 Branch from Foam Mobile Unit located / Installed at Central Store by water connectivity from Fire Hydrant network



Fire-fighting Foam making by using FB-10 Branch from Foam Mobile Unit located / Installed at Central Store by water connectivity from Fire Hydrant network

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



Ambulance left incident spot by carrying two at Occupational Health Centre for further treatment.



Ambulance reached at Occupational Health Centre and taken Casualties into treatment ward.



Cordon-off Area by Security team at incident spot and also control the traffic



Security team has assist to safety / store team for roll-call / head counting at Assembly point.

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:



HOD / HOSs / Section Incharge – Sh. Ravi V (RM - CREW), Sh. Tapan Kumar Sarkar (HOD DC - CREW) reported incident spot by hearing emergency siren.



Duty Safety Officer (Sh. Sachidanand Singh), Sh. Arha C (HOD – ES E&I – CREW) and ES – E & I Shift Incharge (Sh. Lavji Ahir) reported incident spot by receiving message from CCR.



Incident Controller / Sh. Kashyap Pandya / Sh. Bibhudatta Ray / Sh. Bharat Pokar received call from CCR regarding incident.



All clear emergency siren after termination of drill by first responder.

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

POST BRIEFING MOCKDRILL SESSION:



- Sharing of Observations by Drill Observers and Incident Controller
- During Post briefing session of Mock Drill taken feedback from all participants for value addition in workplace safety, Emergency Action Plan etc.
- De-briefing of Importance of Mock Drill and Vote of Thanks By Sh. Bharat Kumar Pokar (Safety Officer) and Sh. Jigneshkumar Panshuriya (Area Incharge)

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

MOCKDRILL CHRONOLOGY & RESPONSE TIME

#	Description	Exact Time
1.	First responder (Sh. Manoj Kumar Yadav) informed to MHS Control Room (CCR 1 – Sh. Bhavin Patel) through Mobile phone	: 14:37:00 PM
2.	Declaration of Emergency	: 14:37:45 PM
3.	First responder (Sh. Manoj Kumar Yadav) informed to Area Incharge (Sh. Jignesh Pansuriya)	: 14:37:50 PM
4.	CCR 1 (Sh. Bhavin Patel) informed to Fire Control Room	: 14:37:50 PM
5.	CCR 2 (Sh. Saorabh Dev) informed to OHC (Occupational Health Centre)	: 14:38:00 PM
6.	Fire tender with fire crew took turn-out for emergency	: 14:38:05 PM
7.	Fire Control Room operator called to Sh. Priteshkumar Modha	: 14:38:20 PM
8.	Fire Control Room operator called to MPT Fire Station	: 14:38:50 PM
9.	Sh. Rakesh Vind (Fire Shift Incharge) called to Shift Incharge ES - E & I to reached at Central Store for take clearance of "Cut-off Power Supply" prior to start fire-fighting	: 14:38:30 PM
10.	Ambulance took turn-out with paramedic officer for emergency	: 14:38:30 PM
11.	CCR 1 (Sh. Bhavin Patel) informed to Duty Safety Officer (At that time he was at central workshop for routine safety inspection)	: 14:38:40 PM
12.	CCR 2 (Sh. Saorabh Dev) informed to Duty Security Officer	: 14:39:05 PM
13.	Fire Control Room operator called to DGM Dr. Rakesh Chaturvedi (Fire Chief)	: 14:39:10 PM
14.	Fire Control Room operator called to Sh. Ravi V (RM - CREW)	: 14:39:15 PM
15.	Fire Control Room operator called to Sh. Mahesh Kumar (ES Head - CREW)	: 14:39:25 PM
16.	Duty Safety Officer (Sh. Sachidanand Singh) reached at incident spot	: 14:39:35 PM
17.	First Responder has operate the emergency siren to evacuate occupants	: 14:39:35 PM
18.	Fire Control Room operator called to Sh. Tapan Kumar Sarkar (DC Head - CREW)	: 14:39:50 PM
19.	CCR 1 (Sh. Bhavin Patel) informed to West Basin – Head (Sh. K Hari)	: 14:40:00 PM
20.	CCR 2 (Sh. Saorabh Dev) informed to Sh. Ravi V (RM – CREW)	: 14:40:20 PM
21.	Occupants are started the emergency evacuation from store building and storage area.	: 14:40:00 PM
22.	Fire tender with crew reached at incident spot	: 14:41:05 PM
23.	Ambulance along with paramedic officer reached at incident spot	: 14:41:20 PM
24.	CCR 2 (Sh. Saorabh Dev) informed to ES HOD – APSEZ (Sh. Kashyap Pandya)	: 14:41:10 PM
25.	Sh. Rakesh Vind (Fire Shift Incharge) has report to Incident controller (Sh. K Hari)	: 14:41:25 PM
26.	Sh. Rakesh Vind (Fire Shift Incharge) has confirmed the "Power Supply Cut-off" prior to start fire-fighting from first responder and Area Incharge	: 14:41:40 PM
27.	Sh. Rakesh Vind (Fire Shift Incharge) has Size up the situation and taking Temperature with Thermal Imagine Camera And Found 241°C	: 14:41:45 PM
28.	CCR 1 (Sh. Bhavin Patel) informed to DC HOD – APSEZ (Sh. Bibhudatta Ray)	: 14:42:00 PM
29.	Two fire-fighting crew and DCO of fire tender has started necessary standby arrangement of one stream of delivery fire hose from Foam Mobile Unit & put stand by water gel blanket to handle burning casualties.	: 14:42:04 PM
30.	Two rescue crew has started the Casualties searching operation by donning of SCBA.	: 14:42:10 PM
31.	CCR 1 (Sh. Bhavin Patel) informed to ES HOD - CREW (Sh. Mahesh Kumar)	: 14:42:35 PM
32.	Two fire-fighting crew has taken ready to fire-fighting position.	: 14:42:40 PM
33.	Casualties searching operation completed by rescue crew	: 14:42:50 PM
34.	Paramedic officer take ready position to handle casualties by using ambulance stretcher.	: 14:43:00 PM
35.	CCR 1 (Sh. Bhavin Patel) informed to DC HOD – CREW (Sh. Tapan Sarkar)	: 14:43:00 PM
36.	CCR 2 (Sh. Saorabh Dev) informed to Shift Incharge ES – E & I	: 14:43:10 PM
37.	One casualty (Sh. Suman Mishra) shifted in stretcher by rescue crew assist by supporting fireman.	: 14:43:26 PM
38.	CCR 1 (Sh. Bhavin Patel) informed to Sh. Bharat Kumar Pokar (Safety)	: 14:44:00 PM
39.	Rescue crew has handled the One casualty (Sh. Rambhai Gadhi) by fireman lift.	: 14:44:25 PM
40.	One casualty (Sh. Suman Mishra) handed over to Ambulance by rescue crew	: 14:44:05 PM



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

41.	Duty Security Officer has reported at Incident spot – following action are initiated – 1) Cordon-off Area 2) Depute Security guard to assist the safety / store team for rollcall muster at assembly point.	:	14:44:45 PM To 14:48:00 PM
42.	One casualty (Sh. Rambhai Gadhi) handed over to Ambulance by rescue crew	:	14:45:10 PM
43.	Paramedic officer has started the first-aid treatment.	:	14:45:30 PM
44.	Ambulance moved to OHC	:	14:46:10 PM
45.	Fire Shift Incharge reported to Incident controller that situation under controlled and casualty shifted to OHC by Ambulance.	:	14:47:00 PM
46.	Ambulance reached to OHC	:	14:48:10 PM
47.	Casualty shifting into treatment ward (inside OHC)	:	14:50:00 PM
48.	Termination of Emergency by Incident controller	:	14:52:00 PM
49.	All clear Emergency Siren	:	14:53:00 PM to 14:55:00 PM
50.	De-briefing of Mock drill observations by Observers and Incident controller at Incident Spot	:	15:05:00 PM to 15:40:00 PM
51.	First person at Assembly Point	:	14:40:23 PM
52.	Last person at Assembly Point	:	14:41:40 PM
53.	Maintenance/ Rescue Arrangement at site	:	--
54.	Corporate Affairs team reaching on site	:	--
55.	Liaoning officer reached at site	:	--
56.	Audibility of the scenario on PA system	:	--

COMMUNICATION & ACTIONS:

Action By	Information To / Action By	Remarks
First Responder	Information given to CCR about situation / scenario.	Yes
Site Incident Controller	Assess the site and declare emergency.	Yes
MHS Control Room (CCR)	Inform to OHC, Incident controller, HODs / HODs, Shift Incharge, safety etc.	Yes
Engineering Services	Electrical team reached at incident spot to "Cut-off the Power Supply"	NA
Corporate Affairs	NA	NA
HR/ Admin	HR Team reached at assembly Point and ensure manned and all persons reporting there properly with co-ordination of incident controller. Admin team reached at assembly point and ensure Arrange for hot drinks/ snacks/ foods as requires at incident location with co-ordination of incident controller.	NA
Safety	Discuss to mitigate catastrophic effects with incident controller and ask for any add or services required like PPE's, Ambulance etc.	Yes
OHC	Mobilize ambulance at OHC for further treatment.	Yes
Security	Controlling the traffic at main gate & scene.	Yes
Fire Crew	Firefighting and rescue operation	Yes

COMMUNICATION TO MUTUAL AID GROUP

(IF REQUIRED, AS AND WHEN MUTUAL AID IS CALLED) – **Not Required**

To	By Whom/ Media	Standard	Performance
IOCL		2 min. after receiving information to Emergency Control Room	
HPCL			
JINDAL SAW			
ADANI POWER			



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

CGPL			
HMEL			

RESPONSE TIME PERFORMANCE OF ACTION

Agency	Standard Response Time	Performance	Rating (Max. 9/ Block)	
			+VE Marks	-VE Marks
Ambulance	90 Second	170 Second	7	2
Safety	90 Second	55 Second	9	0
Fire Services	90 Second	180 Second	7	2

A. PERFORMANCE OF OHS & F SERVICES & RESCUE SERVICES

Performance	Performance	Rating (Max. 3 per Block)	
		+VE Marks	-VE Marks
Turn out time of Fire Team	Fire team reached at site within benchmark of response time.	3	0
Turn out time of OHC Team	OHC team reached at site within benchmark of response time.	3	0
Turn out/ response time of Safety Team and in coordination with incident controller mobilisation of personnel and resources.	Response time of Safety team is within benchmark and will coordinate with incident controller for mobilisation of personnel, resources, PPE's etc.	3	0
Firefighting at the site	Start the fire fighting with co – ordination of incident controller.	3	0
Medical attention at the site	Reported to incident Controller and discussed about injury and further treatment	2	0
Rescue of person	Causality shifted from incident spot to Ambulance	2	0

B. PERFORMANCE OF MAINTENANCE DEPARTMENT

Performance	Performance	Rating (Max. 3 per Block)	
		+VE Marks	-VE Marks
Power shut down/ cut off	First Responder was shut-off the Electrical power supply	3	0
Immediate arrangements at the site	Way / passage for emergency vehicle (i.e fire tender & ambulance) at Incident Spot	3	0
Mobilizing of personnel and resources	Maintenance team reached at site with tool kit and appropriate PPEs.	2	1
Maintenance activities being carried out at the site	As per guided by incident controller leak controlled by maintenance team with help of tool kit.	3	0
Clearing debris	NA	3	0
Other arrangement at required to meet emergency	Not required.	2	1



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

C. PERFORMANCE OF SECURITY SERVICES

Performance	Performance Rating	Rating (Max. 3 per Block)	
		+VE Marks	-VE Marks
Turnout of Security	Security team reached within time and barricade the area reported to incident controller for further update.	3	0
Performance of security guards	Security guards was closed the main gate & Exit lane (N/A)	3	0
Security officer's command & control	Security officers restrict the entry of unauthorized persons / also ensure that vehicles do not enter the gate.	3	0
Area cordoned off	Immediate barricade the area for restrict to entry at scene by security team as guided by incident controller.	3	0
Prevent unwanted/ unauthorized entry and traffic controlled at incident spot / location	Security officers restrict the entry of unauthorized persons / also ensure that traffic controlled and access / road free for Emergency Vehicle.	2	1
Closer of gates	Vehicle & man movement entry gates closed by security guard. (N/A)	3	0
Providing security coverage at main gate and directing concern person to the site	There is no proper guidance to emergency vehicle to reach at scene. (N/A)	3	0

D. PERFORMANCE OF OPERATION/ CONCERN DEPARTMENT

Performance	Performance Rating	Rating (Max. 3 per Block)	
		+VE Marks	-VE Marks
Immediately pass the communication message through VHF / other available media to subordinates & emergency response team.	Communication / Information on emergency conveyed to all concern except environment team by incident controller.	3	0
Stopping of operation / like critical operations first & on priority basis	All operations stopped by incident controller.	3	0
Emergency response of particular department at site	Response time of concern department found adequate.	2	1
Support for evacuation of people at site and head count.	Muster Roll call @ Assembly Point	3	0
Availability and response of emergency kit / equipment / Other available at site.	<ul style="list-style-type: none"> Yes, Fixed fire protection network and foam mobile unit Yes, Local Emergency Evacuation Siren Yes, First Aid Box 	3	0
Audibility of the scenario on PA System by Persons	Emergency Siren – loud and clear	3	0



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

Good Observations:

- Response of Emergency Agencies (i.e. OHC, Fire Services & Security Services) was satisfactory.
- First responder has guide & escorting to Emergency Services effectively.
- Paramedical Officer has carry / bring AED Machine at incident spot to use in-case CPR required to causality.
- Area Incharge (Sh. Jignesh Pansuriya) aware about source of power supply.
- Area Incharge (Sh. Jignesh Pansuriya) has cut-off the power supply and given the clearance to fire shift incharge without unnecessary delay to start fire-fighting.
- Occupants response on emergency evacuation is found satisfactory.
- Rescuer found with respiratory protection (i.e SCBA)
- First Responder kept ready MSDS for further reference to emergency services.
- Security Guard has assist to Store / Safety team for muster roll-call at Assembly point.
- Fire Shift Incharge has guide to Ambulance Driver for safe movement and route direction.
- All involved emergency services found with adequate PPEs.
- Emergency Exit / Escape route Signages found satisfactory at store office to guide evacuate occupants.
- First Responder is aware about Emergency declaration siren code.
- Emergency Contact Nos. are displayed at prominate places.
- Local firefighting system work effectively (FMU / Fire Hydrant).
- CCR act perfectly – Both CCR Operators convey the emergency information to all effectively.

Observer – I : (Incident Controller - Sh. K Hari)

- Fire Shift Incharge found without Fire Nomex suit
- No any provision of Emergency lights at store area which can be use during power failure or cut-off.
- Local Emergency Assembly point area is very congested / closed to diesel tanker parking area and approach road.
- Not using Smoke Exhauster to remove the dense smoke from material storage area / Building.

Observer – II : (Incident Spot – Sh. Kashyap Pandya & Sh. Bharat Kumar Pokar)

- First Responder has conveyed the emergency message to CCR to longer, It's should be well sort and one time understood.
- First Responder has act delay to operate Emergency Evacuation Siren.
[Took 2.5 Minute after give message to CCR to mobilized the Emergency Services]
- Ambulance Driver were not aware about alternate available direct safe route developed for cement storage room which was directly connected to Main Road (CGPL to SS 1).
- Make it habit when reaching at incident spot ambulance should be parked reverse and keep away from other emergency vehicle and equipment's use for fire-fighting to avoid unnecessary delay and hurriedness.
- During starting fire-fighting by foam branch delivery fire hose detached from foam mobile unit due to not proper locking.
- Ambulance wheeled stretcher not kept ready by Paramedic Officer and Ambulance driver prior to arrival of rescuer with casualty.
- Stretcher straps was not buckle-up while shifting casualty from incident spot to Ambulance.



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

Observer – III : (Incident Spot – Sh. Bibhudatta Ray)

- Delay in putting wheeled stretcher into Ambulance with casualty due locking issue / improper placement.
- Need to be familiar to OHC Paramedic Officer & Ambulance driver on IN / OUT / Emergency Exit of all Buildings, Locations, Equipments, Roads in forum of Westbasin orientation refresher training.
- Difficulty to find out Emergency Warden / First Responder / Incident Controller / Observer
Suggestion - Unique Identification required for Fire Shift Incharge / Paramedic Officer / Incident Controller / Observer / First Responder / Evacuation Warden by specific colour coded waist / reflective jacket.
- Beacon light not working in Fire Tender.
- Ambulance driver found without safety helmet.

Observer – IV : (CCR & OHC – Sh. Vishal Bhavsar)

- 1-minute Delay in shifting of casualty from Ambulance to OHC treatment ward.
- Facing difficulty by 2 persons to shift casualty into OHC due to arrangement of door opening by pushing.

Suggestion / Feedback - Mockdrill Participants

- Refresher training on sharing “**Role / Responsibilities**” of key persons in case of Emergency - (I.e First Responder / Area Incharge / HOS / HOD / CCR (Incident Control Room) / Emergency Services [I.e – Fire / Safety / Security / Medical / Evacuation Warden] / Engineering Services / Operation / Marine Services / Admin / HR)
- Refresher training on Basic firefighting.
- Existing Installed emergency siren is operating by “Push Button” which was engaging first responder / emergency evacuation warden till completion of emergency siren code (1 Minute – 5 Sec Gap – 1 Minute – 5 Sec Gap – 1 Minute – 5 Sec Gap – 1 Minute = 4 Minute 15 Sec).
- Manual operated siren need to be kept at office as a secondary provision which can be operate /use in-case of power cut off / isolate.
- Fire Alarm, Detection and Protection System need to be explore for offices and material storage area.

Overall rating

- Marks from 96 to 100 - Excellent
- **Marks from 90 to 95 - Very Good (Score – 92)**
- Marks below 90 - Needs Improvement

VOTE OF THANKS:

Vote of the thanks by Sh. Bharat Kumar Pokar (Safety) and Sh. Jignesh Kumar Pansuriya (Store / Area Incharge)



ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

SUPPORTING STAFF:

Drill Organized By	:	<ul style="list-style-type: none">Sh. Bharat Kumar Pokar (Safety)Sh. Pritesh Modha (Fire Services)
Drill Guided & Support Provided By	:	<ul style="list-style-type: none">Sh. Jignesh Kumar Pansuriya (Store / Area Incharge)Sh. Manoj Kumar Yadav (Store – CREW)
Exercise Performance Assessor	:	<ul style="list-style-type: none">Sh. Kashyap Pandya (ES – WB)Sh. Bibhudatta Ray (DC – WB)Sh. Vishal Bhavsar (ES – WB)
Site Incident Controller	:	<ul style="list-style-type: none">Sh. K Hari (Head – WB)
MHS CCR (Central Control Room) / Incident Control Room	:	<ul style="list-style-type: none">Sh. Sourav Sankar DevSh. Bhavin Patel
OHC	:	<ul style="list-style-type: none">Sh. Rishikesh Meena (Paramedic Officer)Sh. Bhavesh Maheshwari (Ambulance Driver)Ambulance Registration No. – GJ 06 BT 2449
Fire Services	:	<ul style="list-style-type: none">Sh. Rakesh Vind (Fire Shift Incharge)Sh. Hitesh Kasta (DCPO)Sh. Pankaj Solanki (Rescue Crew)Sh. Bhavesh Vansh (Rescue Crew)Sh. Avesh Rathore (Firefighting Crew)Sh. Sumer Singh Chauhan (Firefighting Crew)Sh. Ramesh Solanki (Fire Control Room – Leading hand)Fire Tender Registration No. – GJ 12 AN 0686
Security	:	<ul style="list-style-type: none">Mahendra Singh Rathore (DSO) with ERT team
Assisting Role	:	<ul style="list-style-type: none">Sh. Himanshu Gehlot (Fire Services – CREW)Sh. Rahul Kumar Jha (Safety – CREW)
Mockdrill Report Prepared By	:	<ul style="list-style-type: none">Sh. Bharat Kumar Pokar (Safety)

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

COMPLIANCE REPORT FOR MOCK DRILL

Plant/ Facilities : West Basin Terminal

Date of Mock Drill : 10th February 2022

Sr. No	Recommendations	Responsibilities	Target Date	Tracking ID (Gensuite ATS)
1	<p>Centralization of Electric Emergency Siren from MHS Control Room</p> <p>Emergency Siren "Push Button" need to convert into "Press Button" to evacuate building by "first responder" instead of pushing button till completion of emergency siren code.</p> <p>Option 1 - Centralization of all Emergency Siren installed at Central Store, Central Workshop, Sub Station 1 and Sub Station 3 from MHS Control Room (Incident Control Room) with timer [Emergency Declaration / All Clear / Testing]</p> <p>Option 2 - Exploring the timer set in locally siren [Emergency Declaration / All Clear / Testing] to eliminate the risk of first responder to staying to operate push button till completion of emergency siren code.</p>	Sh. Vishal Bhavsar / Sh. Deep Bhatt / Sh. Vimal Baldaniya / Sh. Arha C	24 th April 2022	42641
2	<p>Manual Operated Emergency Siren:</p> <p>Manual operated emergency siren need to be kept at offices [Amenity Building, Sub Store, CREW Office (Central Workshop), HEME Workshop Office, Central Store] as a secondary provision which can be operate /use in-case of power cut off / isolate.</p> <p>Comments by Fire Services (Report Review Mail Communication)</p> <p>The siren material code will be providing by Sh. Pritesh Kumar Modha for procurement of and operation will be done by respective area building owner.</p>	Sh. Bharat Kumar Pokar	24 th April 2022	42642
3	<p>Fire Nomex Suit:</p> <ol style="list-style-type: none"> 1) Evaluate the requirement of Fire Nomex Suit 2) Procurement of Fire Nomex Suit 3) Training on Technical Specification 	Sh. Pritesh Modha / Sh. Rakesh Vind	24 th April 2022	42653
4	<p>Emergency Lighting:</p> <p>Making provision / providing Emergency Lightings in store building and storage area.</p>	Sh. Vimal Baldaniya / Sh. Arha C	10 th March 2022	42654
5	<p>Emergency Assembly Point:</p> <ol style="list-style-type: none"> 1) Develop place for Emergency Assembly Point for Central 	Sh. Manan Bhatt / Sh. Bharat Pokar / Sh. Narendrasinh Jadeja	25 th March 2022	42658

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

	<p>Workshop, HEME Workshop, Store Area, Amenity Building. (Approx. Occupants – 150 Persons) @ open front area of HEME Workshop.</p> <p>2) Installation the Emergency Assembly Point Signages.</p> <p>3) Revision of Emergency Action Plan</p> <p>4) Revision of Safety Induction Training Module</p>			
6	<p>Emergency Evacuation Actions:</p> <p>1) Nomination of Emergency Evacuation Warden from all offices [Sub Station 1, Amenity Building, Sub Store, CREW Office (Central Workshop), HEME Workshop Office, Central Store]</p> <p>2) Role / Responsibilities Training - Emergency Evacuation Warden</p> <p>3) Basic Fire-fighting Training</p> <p>4) Procurement of “Special Reflective Jacket – Emergency Evacuation Warden”</p> <p>5) Display-board of Emergency Evacuation Warden @ Office.</p> <p>6) Display-board of Emergency Evacuation Plan @ Office.</p>	<p>Sh. Bibhudatta Ray / Sh. Devji Ayadi / Sh. Mahesh Kumar / Sh. Tarun / Sh. Dinadayalm / Sh. Manoj Kumar Yadav / Sh. Jignesh Pansuriya / Sh. Manan Bhatt / Sh. Bharat Pokar / Sh. Pritesh Modha / Sh. Narendrasinh Jadeja</p>	24 th April 2022	42659
7	<p>Procurement of reflective jacket with name to uniforming discipline during Mockdrill –</p> <p>1) First Responder</p> <p>2) Area Incharge</p> <p>3) Fire Shift Incharge</p> <p>4) Duty Safety Officer</p> <p>5) Incident Controller</p> <p>6) Dy. Incident Controller</p> <p>7) Drill Observer 1</p> <p>8) Drill Observer 2</p> <p>9) Drill Observer 3</p> <p>10) Paramedic Officer</p> <p>11) Rollcall Incharge - Emergency Assembly Point</p>	<p>Sh. Manan Bhatt / Sh. Bharat Pokar</p>	25 th March 2022	42660
8	<p>Smoke Exhauster & Building Ventilation:</p> <p>1) Feasibility check and Evaluate requirement of Portable Smoke Exhauster</p> <p>2) Procurement of Portable Smoke Exhauster</p> <p>3) Using of Portable Smoke exhauster to remove smoke from building or closed shed in-case of Emergency</p> <p>Comments by Fire Services (Report Review Mail Communication)</p> <p>Portable smoke exhauster is not feasible for building smoke management. It is suggested to explore feasibility for mechanical smoke management system by engineering team.</p>	<p>Dr. Rakesh Chaturvedi / Sh. Pritesh Modha / Sh. Kashyap Pandya</p>	24 th April 2022	42661 / 42662
9	<p>Plant orientation to OHC Staff:</p> <p>1) Permanent the OHC Staff for West Basin (Avoid repeat change)</p> <p>2) Conduct the refresher training on plant orientation to all OHC Staff to familiar the Entry / Exit of all Buildings, Locations, Equipments, Roads, Area in forum of Westbasin orientation</p>	<p>Sh. Manan Bhatt / Sh. Bharat Pokar / Sh. Subham Polai</p>	10 th March'2022	42666

ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

	<p>refresher training.</p> <p>3) West Basin Response time exercise for Ambulance.</p> <p>4) Turn-out / Response time of Ambulance tracking / monitoring.</p>			
10	<p>Ambulance Wheeled stretcher:</p> <p>1) Marking floor for safe placement and locking of Ambulance wheeled stretcher.</p> <p>2) Carried-out Once in weekly Drill – “Ambulance wheeled stretcher with dummy casualty”</p> <p>3) Ambulance wheeled stretcher should be kept ready to use prior to arrival of rescuer with casualty.</p>	Sh. Bharat Pokar / Sh. Subham Polai / OHC	2 nd March 2022	42667
11	<p>OHC Door Design Change requirement:</p> <p>Feasibility check and do the needful modification of OHC door w.r.t open by pulling to easy to handle casualty in stretcher</p>	Sh. Narendrasinh Jadeja / Sh. Bharat Pokar	25 th March 2022	42668
12	<p>Capability Building – Emergency Response & Mitigation:</p> <p>Refresher training of Emergency Preparedness and Emergency Action Plan to all in forum of Weekly Mass Safety Talk & Special Training.</p>	Sh. Bharat Pokar / Sh. Rahul Jha	25 th March 2022	42669
13	<p>Fire Alarm / Detection & Protection System:</p> <p>Exploring the Installation of Fire Alarm / Detection System for Office Buildings. [Sub Station 1, Amenity Building, Sub-Store, CREW Office (Central Workshop), HEME Workshop Office, Central Store]</p> <p>Comments by Fire Services (Report Review Mail Communication)</p> <p>In past Sh. Nirav Patel (Engineering team west basin) has already take up this case for capex item. You need to take update from electrical team of west basin.</p>	Sh. Deep Bhatt / Sh. Vishal Bhavsar	24 th April 2022	42670

Annexure – 9

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2019 - 20	2020 - 21	2021 - 22	2021 - 22
1.	Environmental Study / Audit and Consultancy	0.33	6.2	6.82	7.0
2.	Legal & Statutory Expenses	0.84	10.58	10.52	12.0
3.	Environmental Monitoring Services	21.74	19.17	14.31	20.0
4.	Hazardous / Non-Hazardous Waste Management & Disposal	108.43	83.55	107.09	114.10
5.	Environment Days Celebration and Advertisement / Business development	1.5	5.3	4.04	7.0
6.	Treatment and Disposal of Bio-Medical Waste	1.62	2.09	2.14	2.04
7.	Mangrove Plantation, Monitoring & Conservation	Nil	32.59	53.6	53.6
8.	Other Horticulture Expenses	734.18	689	921	921
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	252.27	299.5
10.	Expenditure of Environment Dept. (Apart from above head)	105.13	89.11	149.8	85.35
Total		1083.95	1086.08	1371.79	1521.59

Annexure – 10

APSEZL/EnvCell/2021-22/108

Date: 11/03/2022

To
The Regional Officer,
Regional Office GPCB (Kutch-East)
Gandhidham, 370201

Sub : Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference : GPCB Inspection letter dated 07.03.2022, PCB ID: 17739.

Respected Sir,

With reference to the above-mentioned subject, M/s. Adani Ports and Special Economic Zone Limited (APSEZL) hereby submitting the compliance details w.r.t. your observations as below:

Sr. No.	Inspection Remarks	Compliance
1.	Submit necessary compliance/ time bound plan for installation of Retro-fitting emission control device in to DG sets which having capacity of 125 and above as per Board Circular dated 27.08.2021.	<p>APSEZ is already in process to check the feasibility for installation of Retro-fitting emission control device into DG sets which having capacity more than 125 KVA in line with GPCB circular dated 27th Aug, 2021.</p> <p>In view of the same, we coordinated all the agencies mentioned in the circular. As per communication received from IOCL, they mentioned that procedure for Testing Emission Compliance of Retro-fit emission Control Device for D.G. Set is under finalization by CPCB. However, VRDE has not certified any vendors for emission control devices for retro fitment of D.G. Sets. Details are attached herewith as Annexure - 1.</p> <p>APSEZ will initiate for installation of Retro-fitting emission control device into DG sets above 125 KVA capacities once the Products / Technologies / Certified Vendors / Agencies to meet the subject emission criteria by CPCB.</p>
2.	Submit the SOP details for loading & unloading of fly ash.	APSEZ is handling only Dry Fly Ash in packed jumbo bags. The SOP for loading & unloading of fly ash is attached as Annexure - 2 .

U.N.D.
21/03/2022
Gujarat Pollution Control Board
Head Office
Sector No.-10-A,
Gandhinagar-382010

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Adani House,
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Sr. No.	Inspection Remarks	Compliance			
3.	To submit the vessel wise details of fly ash (dry & wet) exported during last one year.	APSEZ has exported only Dry fly ash in packed Jumbo Bags and vessel wise exported fly ash details for last one year is mentioned as below:			
		Sr. No.	Vessels Details	Month	Exported Qty. (MT)
		1.	MV ERISORT	March-2021	16500
		2.	MV NORD MELBOURNE	Feb-2022	8284
		Total			24784

Sir, kindly consider our compliance against the given written instructions and acknowledge the same.

Thank you
Yours Faithfully,

For, Adani Ports and Special Economic Zone Limited



Bhagwat Swaroop Sharma
Head – Environment

Encl: As above

Copy to:

The Unit Head,
GPCB – Head Office,
Paryavaran Bhavan Sector 10 A,
Gandhi Nagar 382010.

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Radheshyam Singh

From: MURALIDHARAN M (MR.)(□□ □□□□□□□□) <MURALIDHARANM@INDIANOIL.IN>
Sent: Thursday, September 16, 2021 5:00 PM
To: Nandan Kumar
Cc: MITTAL NEERAJ (MR.)(□□□□ □□□□□□); JAIN AVINASH (MR.) (□□□□□□ □□□)
Subject: RE: Retrofitting of emission control devices/equipment in DG sets with capacity of 125 KVA and above as per GPCB circular
Importance: High

CAUTION: This mail has originated from outside Adani. Please exercise caution with links and attachments.

Dear Sir/Madam,

This has reference to your query dt. 15.09.2021 on the subject.

On the issue we understand that the document on System and Procedure for Testing Emission Compliance of Retro-fit Emission Control Devices (RECD) for DG Set Engines upto Gross Mechanical Power 800 kW is under finalization by CPCB. The Products / Technologies / Certified Vendors / Agencies to meet the subject emission criteria through retrofitting is expected to be finalized upon publication of the System and Procedure by CPCB.

You are requested to keep track of further developments accordingly.

धन्यवाद और भवदीय/Thanks and Regards,

एम. मुरलीधरन / M. Muralidharan,
मुख्य प्रबंधक (टीपीएफ)/ Chief Manager (TPF),
इंडियन ऑयल कॉर्पोरेशन लिमिटेड / Indian Oil Corporation Ltd,
अनुसंधान एवं विकास केंद्र / Research & Development Centre
सेक्टर -13, फरीदाबाद / Sector -13, Faridabad - 121007
दूरभाष न / Telephone No. – 91-129-2294591, 91-9868246525 (मोबाइल / Mobile)

From: Nandan Kumar
Sent: Wednesday, September 15, 2021 10:36:33 AM (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
To: INFO RND IOCL
Cc: Harsh Yadav
Subject: FW: Retrofitting of emission control devices/equipment in DG sets with capacity of 125 KVA and above as per GPCB circular

CAUTION: External email. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Sir,

Gujarat Pollution Control board (GPCB) issued a circular (attached for reference) for the industries of Gujarat to Retrofit of emission control devices/equipment in DG sets with capacity of 125 KVA and above. As mentioned in circular, your organization is one of the 5 organizations in the list of recognized/approved agency.

Request you to kindly guide us that how can we avail the services for retrofitting and testing of DG sets as per attached circular through your organization.

With regards,
Nandan Kumar
Dy.Manager – HSE (Environment) | Adani Hazira Port Ltd
Mob +91 6359897581 | (Extn : 61531) | nandan.kumar@adani.com | www.adani.com
At & PO - Hazira, Choryasi, Surat 394 270, Gujarat, India



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अस्वीकरण

यह संदेश इंडियनऑयल मेसेजिंग गेटवे, भारत से भेजा गया है। इस इलेक्ट्रॉनिक संदेश में निहित जानकारी और इसके साथ कोई भी संलग्नक केवल प्रेषित व्यक्ति (यों) के लिए ही है और इसमें स्वामित्व, गोपनीय या विशेषाधिकार प्राप्त जानकारी हो सकती है। यदि आप वांछित प्राप्तकर्ता नहीं हैं तो आपको इस ई-मेल को प्रसारित, वितरित या कॉपी नहीं करना चाहिए। कृपया इसकी सूचना तुरंत प्रेषक को दें और इस संदेश की सभी प्रतियां और सभी संलग्नक नष्ट कर दें। राजभाषा हिन्दी में हम आपके पत्रों का स्वागत करते हैं।

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We welcome your communications in Rajbhasha Hindi.

भारत सरकार,
रक्षा मंत्रालय
रक्षा अनुसंधान तथा विकास संगठन
वाहन अनुसंधान तथा विकास स्थापन
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No. VRDE/NCAT/EMN/GEN EMAIL/8289

Date: 28 Sept 2021

To,
Adani Hazira Port Ltd
Hazira, Choryasi, Surat 394270
Gujarat

Kind attention: Mr. Nandan Kumar (Dy. Manager)

Subject: -Retrofitting of Emission Control Devices/Equipments in DC sets with Capacity of 125kVA and above

Ref: -Your e-mail dated 15th Sep 2021

With the reference of above subject, it is to inform that as on date VRDE does not have a necessary testing facility (Engine Dynamometer and Raw Emission analyser) to test Diesel Generator sets and its retro fitment devices. So far VRDE has not certified any vendors for emission control devices for retro fitment of DG sets. Hence you are kindly requested to contact the Original Equipment Manufacturer (OEM) of DG sets or any other certification agency as directed by Central Pollution Control Board (CPCB) for further information.

Sc 'G'
(G R M RAO)
For DIRECTOR VRDE

Dry Cargo



Doc. No. : DC/OPS/PROC/05

Rev. No. : 03

Rev. Date : 07/01/2019

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1.0 Purpose : Cargo received and exported in bagged cargo.

2.0 Scope :

In Scope - This procedure is applicable to all commodities received and Exported in Bagged form

- a) Sugar in Bags
- b) Bentonite in Jumbo Bags
- d) Any Others

Out of Scope - NA

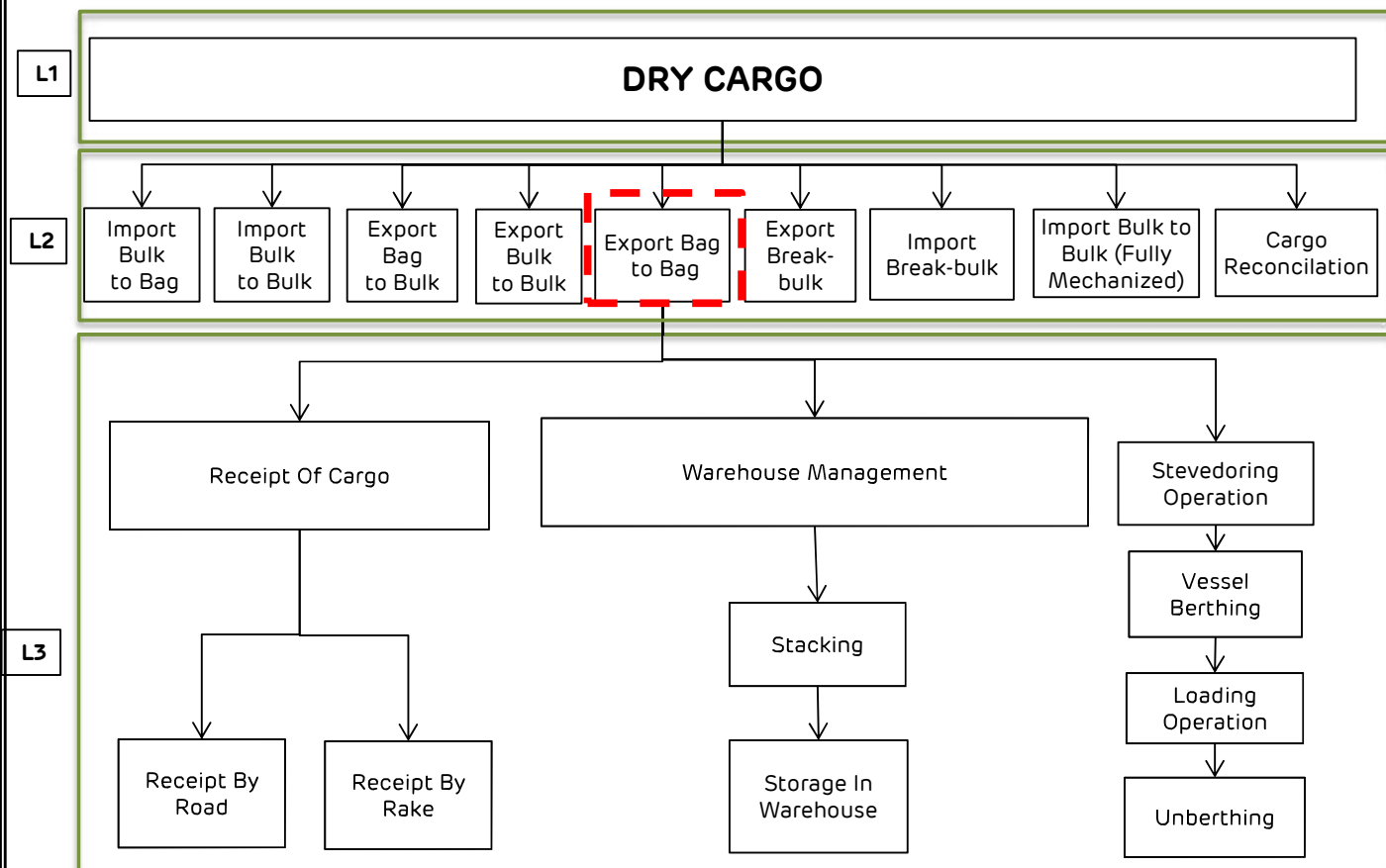
3.0 Reference :

- ISO 9001:2015 Standards
- ISO 14001:2015 Standards
- ISO 45001:2018 Standards
- ISO 50001:2018 Standards
- IMS Apex Manual

4.0 Responsibility :

- 1) The overall responsibility and authority for establishing, maintaining and updating this process lies with Head - Dry Cargo - Port and save energy wherever possible.
- 2) The overall responsibility for implementing this process lies with all HOSs.

5.0 Process Map :

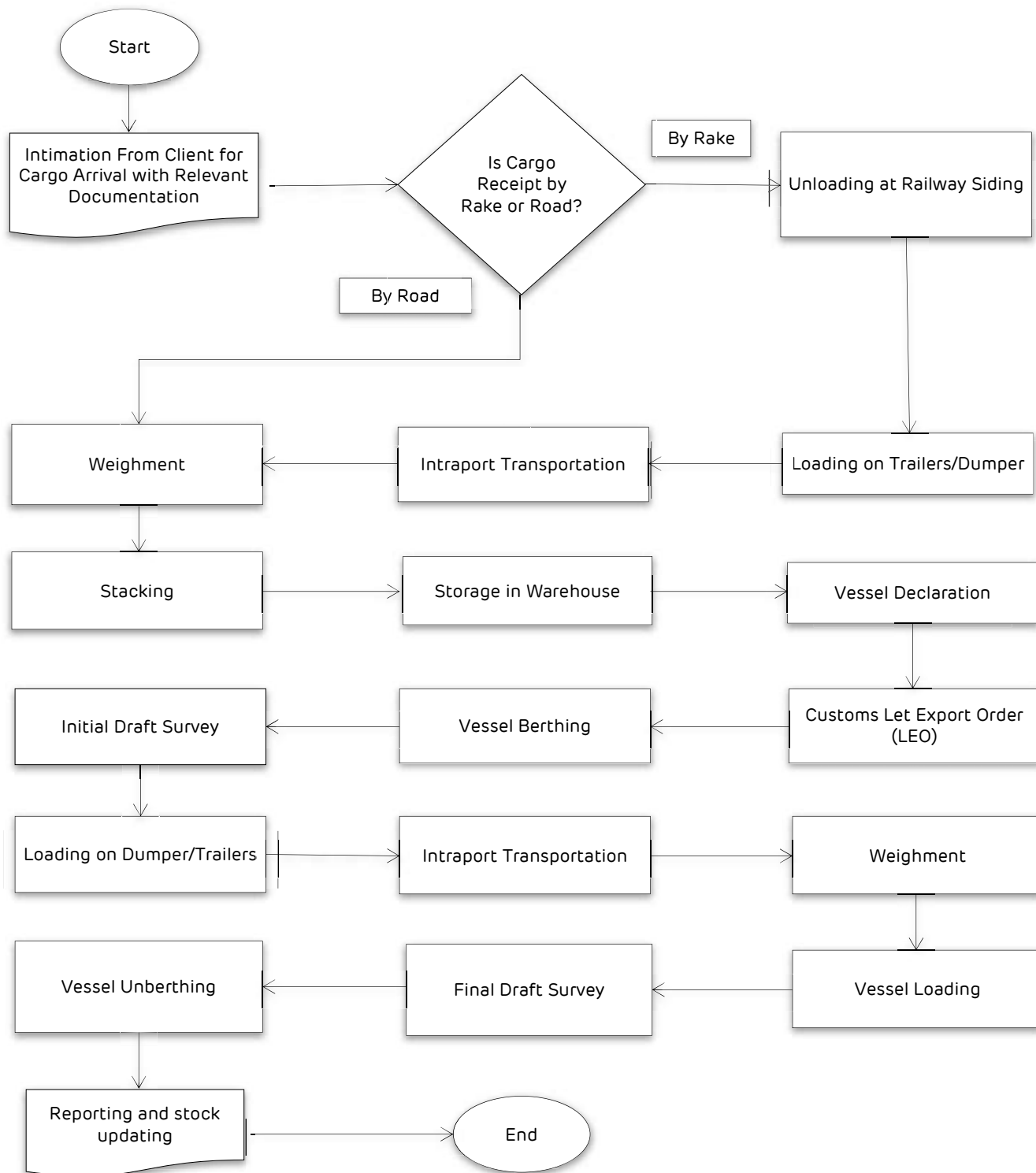


6.0 SIPOC Framework :

Proc Tag	Supplier	Input	Process	Output	Customer
6.1	Back-Up	Equipment / labor	Receipt – By Road	Cargo Unloading & Stacking	Back-Up
6.2	Back-Up	Dumper/ Truck / Trailer/ Equipment/ Labor	Receipt – By Rake	Cargo Unloading, Transportation & Stacking	Back-Up
6.3	Back-Up	Dumper/ Truck/ Trailer/ Equipment	Transportation to Jetty	Vessel Feeding	Stevedores
6.4	Stevedores	Cranes / Equipment / Gears	Vessel Loading	Cargo loading	Client

7.0 Key Performance Indicator :

- 1 Commodity wise per ton handling cost
- 2 Monthly vessel closer report for permitted cargo handling loss
- 3 Discharge Quantity as per internal benchmark
- 4 % cases where rake went to demurrage

8.0 Process Flow Diagram :

9.0 Procedure / Activity / Work Element / Task :

Sr.No.	Activity	Document Reference	Responsibility
9.1	Receipt Operation - By road		
9.1.1	Carting permission received from custom house agent.	Carting Permission File	DC Documentation section
9.1.2	Documentation centre generates Export Application number (EA) on system.	APMS	DC Documentation section
9.1.3	Driver submits delivery documents to dry cargo main gate supervisor and receives Gate Pass along with number.	Invoice/ Delivery Challan/ Lorry receipt	Dry cargo Supervisor at Port main gate
9.1.4	Driver gets gate entry slip from security dept.	PEP	Concern Supervisor
9.1.5	Driver shows Gate pass(PEP) to the security and security dept. does entry in APMS with actual entry time of the vehicle in port.	PEP	Port security
9.1.6	Vehicle approaches to allocated yard for unloading the cargo and gets signature from the nominated supervisor and surveyor.	PEP	Dry Cargo Backup Supervisor
9.1.7	Cargo receipt operation as per the work instruction.	WI Matrix	Dry Cargo Backup Supervisor
9.1.8	After unloading, the vehicle moves through the same weighbridge/out gate.	NA	Weighbridge Operator
9.1.9	Driver submits the PEP to security supervisor for exit and receives stamp from the security supervisor near main gate.	PEP	Dry Cargo Backup Supervisor
9.2	Receipt Operation - By Rake		
9.2.1	Intimation from client and receipt of RR.	RR	FCC/Railway Siding In charge
9.2.2	Cargo receipt operation as per WI.	WI Matrix	FCC/Railway Siding In charge
9.3	Storage Operation		
9.3.1	The warehouse is planned & prepared to receive the cargo arrivals.	MOM -planning	Backup Shift In charge
9.3.2	Cargo unloaded at designated warehouse for storage as per dry cargo work instruction.	WI Matrix	Dry Cargo Backup Supervisor
9.4	Vessel operation		
9.4.1	Port concern authority receives vessel inward declaration from Ship's Agent.	Email / APMS	DC Documentation section
9.4.2	Detailed vessel planning is done before arrival/ berthing the vessel. The Receiver, contractor, surveyor in-charge, Stevedoring Head & the concerned commodity manager.	MOM - Vessel planning	Stevedoring Section

Dry Cargo



Title: Export Bag to Bag

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9.0 Procedure / Activity / Work Element / Task :

Sr.No.	Activity	Document Reference	Responsibility
	To ensure realization of payment / concurrence by marketing or authorized person before vessel berthing.	N/A	Dry Cargo HOD
9.4.3	Documentation Centre receives shipping bill with LEO from CHA & in turn, informs Stevedoring Section of receipt.	Shipping Bill	Stevedoring Documentation
9.4.4	Vessel is cleared for loading. DC Supervisor is informed using VHF or Mobile Phone.	NA	Dry Cargo Stevedoring Supervisor
9.4.5	Vessel loading operation as per dry cargo work instruction.	WI Matrix	Stevedoring Supervisor
9.4.6	Communication of vessel performance to all concerned persons through mobile alert for dynamic course correction at every 2 hours.	APMS	Stevedoring shift in charge
9.4.7	Capturing of vessel performances data for the interval of 2 hours to be entered into the system at a pre defined interval by each port.	APMS	Stevedoring shift in charge
9.4.8	Daily ship working reports are prepared as per draught figures and surveyors tally sheets.	Daily Working Report	Stevedoring Supervisor
9.4.9	Cargo completion & Sailing documents that required to be signed by the Vessel's Master prior to vessel sailing: Statement of Facts Stevedoring Certificate No damage certificate to ship Equipment utilization on board if any Cargo damage statement, if any Cargo Loss on board certificate, if any Mates receipt. No stevedore staff on board.	Vessel Documents	Stevedoring Supervisor
9.4.10	Inform port concern authority, Stevedoring Section and Commodity Manager of completion of loading and receipt of documents.	Vessel Documents	Stevedoring Supervisor
9.4.11	Gangs off the ship, equipment's released and jetty cleared, marine is informed regarding completion of cargo and documentation over phone. Vessel agents file outward pilot memo.	Outward Pilot Memo	Stevedoring Supervisor
9.4.12	Categorization of vessels on the basis of performance Overachieved target Achieved target Under achieved target.	WI Matrix	Respective HOS

Dry Cargo	 Title: Export Bag to Bag	Doc. No. : DC/OPS/PROC/05 Rev. No. : 03 Rev. Date : 07/01/2019 Page No. : 6 of 6
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9.0 Procedure / Activity / Work Element / Task :

Sr.No.	Activity	Document Reference	Responsibility
9.4.13	Root cause analysis of underachieving vessels and generation of reports for future reference.	RCA Sheet	Respective HOS
9.4.14	Documentation centre receives copy of EGM from IBC Marine.	EGM	DC Documentation section

10.0 Risk & Control :

- 1) Refer Operational/ Business Risk Register
- 2) Refer Safety Risk Assessment - HIRAC book
- 3) Refer Aspect Register & Significance Analysis
- 4) Refer Significant Energy using Products/Equipments SWOT Analysis

11.0 Records :

Sr. No.	Record Title	Record No.	File Name / No.	Location	Maintained By	Retention Period
1	Carting Permission	-	-	DC office	Online APMS	3 Years
2	Transport Authorization (Soft Copy)	-	-	DC office	Online APMS	3 Years
3	Vessel Completion Documents	-	-	DC office	Online APMS	3 Years
4	Surveyors tally report	-	-	DC office	Online APMS	3 Years
5	Client wise reconciliation	-	-	DC office	Online APMS	3 Years

12.0 Note : NIL