

Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Monday, May 30, 2022 5:26 PM
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 -MSEZ -1840 Ha.part-1 for Period Oct'21 to Mar'22
Attachments: 11 EC Compliance Report_MSEZ 1840 Ha 2020-Oct 21 to Mar 22-part-1.pdf



Ports and
Logistics

APSEZL/EnvCell/2022-23/026

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 for Environment and CRZ clearance for 'Expansion of notified Multi-product SEZ by adding 1840 Ha notified SEZ with existing approved area of 6641.2784 ha to make it 8481.2784 ha at Mundra' by M/s Adani Ports and Special Economic Zone Ltd.

Ref : Environmental Clearance granted by Ministry of Environment, Forest and Climate Change, F. No. 10-138/2008-IA.III dated 12th February, 2020.

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

Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Monday, May 30, 2022 5:41 PM
To: ecompliance-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 -MSEZ 1840 Ha. part-2 for Period Oct'21 to Mar'22
Attachments: 11 EC Compliance Report_MSEZ 1840 Ha 2020-Oct 21 to Mar 22-part-2.pdf



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Logistics

APSEZL/EnvCell/2022-23/026

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Douglas Charles Smith
Chief Executive Officer
Mundra & Tuna Port

Encl: As Above

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.

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01/06/2022
Gujarat Pollution Control Board
Head Office
Sector No. 10-A,
Gandhinagar-382010



Ports and
Logistics

APSEZL/EnvCell/2022-23/026

Date: 27.05.2022

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Adani Ports and Special Economic Zone Ltd
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Environmental Clearance Compliance Report



Multi-Product SEZ
(Additional 1840 Ha)
Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited

For the period of
October-2021 to March-2022

Index

Sr. No.	Particulars	Page Nos.
1	Compliance Report of EC & CRZ Clearance	01
2	Annexures	
Annexure – 1	SLP (Civil) no. 1526/2014 SC Order	17
Annexure – 2	Updated status of SLP (Civil) no. 28788 of 2016	20
Annexure – 3	GCZMA recommendations for Mangrove Conservation Plan dated 22 nd Sep, 2020	23
Annexure – 4	Mangrove conservation monitoring and Tide level measurement report carried out by NCSCM, Chennai – March'2021	25
Annexure – 5	Report on Algal removal work in mangrove area	50
Annexure – 6	Adani Foundation – CSR Report for the FY 2021-22	52
Annexure – 7	Greenbelt Development & Mangrove Afforestation Details	153
Annexure – 8	Compliance report of CIA EMP	155
Annexure – 9	Updated DMP	222
Annexure – 10	Updated On Site Emergency Response Plan	388
Annexure – 11	Oil spill contingency response plan (OSCRP)	566
Annexure – 12	HTL/LTL & CRZ Maps of APSEZ, Mundra	664
Annexure – 13	Copies of CtOs / CC&As	670
Annexure – 14	Half Yearly Environment Monitoring Summary Report	677
Annexure – 15	Energy Audit Reports	740
Annexure – 16	Environment Policy	761
Annexure – 17	Environment Management Cell Organogram	762

**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 and CRZ Clearance		

M/s. Adani Ports and SEZ Limited has been granted Environmental / CRZ clearance vide letter no. 10-138/2008-IA.III, dated 12th February, 2020 for "Expansion of notified Multi-product SEZ by adding 1840 Ha notified SEZ with existing approved area of 6641.2784 ha to make it 8481.2784 ha at Mundra, Dist. Kutch (Gujarat)".

Activities / Facilities approved are as below:

Facilities / Components Approved	Total Approved Area (Ha)	Area (Ha) developed till 31.03.2022	Area (Ha) to be developed so far
Port Back-up and related industrial developments (Requiring Waterfront)	187.22	--	187.22
Industrial Zone (Chemical, Textile & Apparel, Heavy/Light Engineering, Plastic, Cement)	978.64	--	978.64
Warehousing & Container Freight Station (CFS) Zone	88.33	9.6	78.73
Green / Renewable Energy	24.15	6.68	17.47
Open/Green Spaces	607 ^s	3.0	604 ^s
Facilities / Amenities & Utilities / Transportation	256.2	143.95	112.25
TOTAL AREA	1840	163	1677

^sProposed greenbelt by APSEZ = 305 ha (16.6%) and by industrial units = 302 ha (16.4%)

Note:

Boundary wall is constructed along the project periphery. In some of areas level raising and area development of SEZ area, wherever required is also under progress.

*Inline to the APSEZ's request, Ministry of Commerce & Industry (MoCI) vide Gazette order dtd. 4th July 2019 has de-notified 46.6894 ha from total area of 8481.2784 Ha, thereby making resultant area of notified Multiproduct SEZ as 8434.5890 Ha.

Status of the Conditions Stipulated in Environment and CRZ Clearance

Half yearly Compliance report of Environment and CRZ Clearance for "Expansion of notified Multi-product SEZ by adding 1840 Ha notified SEZ with existing approved area of 6641.2784 ha to make it 8481.2784 ha at Mundra, Dist. Kutch (Gujarat)" by M/s Adani Ports and Special Economic Zone Ltd. issued vide letter no. 10-138/2008-IA.III, dated 12th February, 2020.

Sr. No.	Conditions	Compliance Status as on 31.03.2022
(i)	This Environmental and CRZ Clearance for the said expansion shall be subject to the outcome of ongoing court cases.	<p>Point noted and will be complied</p> <p>1. SLP (Civil) no. 1526 of 2014</p> <ul style="list-style-type: none"> Vide order dated 14.07.2014, the Hon'ble Supreme Court directed MoEF&CC to complete the process of environmental clearance to the MSEZ project of APSEZ within eight weeks. MoEF&CC issued EC and CRZ clearance to the proposed project vide letter dated 15.07.2014. Hence, the SLP (Civil) no. 1526/2014 is deemed closed. Details are attached as Annexure – 1. <p>2. SLP (Civil) no. 28788 of 2016</p> <ul style="list-style-type: none"> In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.02.2015. The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.02.2015 of Gujarat High Court and the same is pending. Sunita Narayan committee was appointed to study the area. Report was prepared by committee and submitted to Hon'ble Supreme Court. Matter pending at Supreme court. Details are attached in Annexure – 2.
(ii)	Total area of Multi-product SEZ run by APSEZ Limited will be 8481.2784 ha after this expansion. The geo-coordinates of the additional piece of land (1840 ha) are 22°47'35.41" - 22°47'57.67"N and 69°40'6.15" - 69°32'46.58"E.	Point noted and complied with
(iii)	The proponent shall obtain, wherever applicable, separate Environmental Clearance including Risk Assessment for	<p>Not Applicable</p> <p>As per MoEF&CC Notification dated 13th June, 2019, Item 6(b) and the entries relating thereto has</p>

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
	the Isolated Storage and Handling of Hazardous Chemicals under schedule 6(b) of the EIA Notification, 2006 and subsequent amendments thereto.	<p>been omitted from EIA Notification – 2006. Hence Project under Category – 6(b) Isolated Storage and Handling of Hazardous Chemicals not attracts EIA Notification – 2006 and subsequent amendments thereafter.</p> <p>However, individual unit will obtain requisite permissions from regulatory authorities in line to EIA Notification, 2006 and subsequent amendments thereto if applicable.</p>
(iv)	The proponent shall prepare and implement the Mangrove Conservation and Management Plan in consultation with the State Forest Department. This Plan shall be subject to monitoring by the third party. The implementation report and third-party audit report be submitted to the Regional Office, MoEF&CC and the State Forest Department.	<p>Complied.</p> <p>Conservation of Mangroves:</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 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 directives, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, presently, 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. • NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ, Mundra was 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).

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022						
		<ul style="list-style-type: none"> 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 attached as Annexure – 3. <p>As a part of mangrove conservation action plan and GCZMA recommendations, 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. </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.
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Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022		
				<ul style="list-style-type: none"> The cost of the said study was INR 23.56 Lacs incurred by APSEZ. The Report is attached as Annexure – 4.
		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. Details are attached as Annexure – 4.
		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 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).

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022	
			<ul style="list-style-type: none"> 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 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. 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 – 6. <p>As a part of GCZMA recommendations, APSEZ will carry out mangrove distribution in creeks in and around APSEZ, Mundra on every two years through recognized agencies.</p>

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
		<p>Inline to the compliance of MoEF&CC Order dated 18th September, 2015 including Mangrove conservation plan & its implementation, 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> <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> <p>Details on Mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as Annexure – 7.</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 M/s. GUIDE, Gujarat.</p>
(v)	All the recommendations and mitigation measures as proposed in the Cumulative Impact Assessment report of Waterfront, SEZ and ancillary Developments along Mundra, Kutch District, Gujarat shall be complied in letter and spirit. Proper record of monitoring should be placed along with six monthly	<p>Complied.</p> <p>APSEZ is already complying, as per Environment Management Plan and further recommendations, applicable to APSEZ as mentioned in the EMP of Cumulative Impact Assessment Study Report, w.r.t. Traffic Management Plan, Ground water quality management, Salinity ingress programme, Air and Noise quality Management, Surface and Marine water quality management, Ecology and</p>

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
	compliance report.	Biodiversity Management, Solid & Hazardous waste management, Socio-economic Management and Shoreline Management as per the progress of development within the boundary limits of APSEZ. The detailed compliance, applicable to APSEZ is attached as Annexure – 8 .
(vi)	This environmental clearance is only for the Multi-product SEZ. Any other activity within the Multi-product SEZ would require separate environmental clearance, as applicable under EIA Notification, 2006 and subsequent amendments. For all individual units, environmental clearances, as applicable, shall be obtained from the respective regulatory authorities.	Point Noted and Complied with Separate environment clearance will be obtained by APSEZ or individual unit from regulatory authorities in line to EIA Notification, 2006 and subsequent amendments thereto if applicable.
(vii)	An Emergency Response Centre to be established to take care for prevention of and management of accidents, chemical spills etc. including that during transportation of chemicals with the arrangement of antidotes and necessary equipment.	Complied. Disaster Management Plan for APSEZ, Mundra is in place and updated regularly. The updated DMP is attached as Annexure – 9 . On Site Emergency Response Plan and Crisis Management Plan for APSEZ, Mundra is in place and implemented. The updated Onsite emergency plan is attached as Annexure – 10 . Oil spill contingency response plan (OSCRP) is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan is being updated on regular basis and the same was last updated on 01.10.2021 is in place and implemented. The updated OSCRCP is attached as Annexure – 11 .
(viii)	All the provisions of the CRZ Notification, 2011 and subsequent amendments shall be	Point noted and will be complied with. CRZ Recommendations vide Letter No. ENV-10-

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
	strictly complied with, and in case of any change in scope of work, necessary recommendations from the concerned CZMA shall be obtained for further consideration by the concerned regulatory authority.	2010-1601-E dated 27 th March, 2012 obtained from GCZMA for Multi-Product SEZ for construction of Intake, Outfall pipeline and Desalination plant. Construction with respect to Desalination Plant, sea water intake and outfall system has not been started yet.
(ix)	The project proponent shall ensure that the project is in consonance with the new Coastal Zone Management Plan prepared by the State Government under the provisions of CRZ Notification, 2011 and subsequent amendments.	Point Noted and Complied with APSEZ ensures that the project is in consonance with the new Coastal Zone Management Plan prepared by the State Government under the provisions of CRZ Notification, 2011 and subsequent amendments.
(x)	On the project site physical HTL demarcation has to be compulsorily made with the help of Government of India organizations/Institutions.	Point noted and will be complied with NCSCM has prepared authorized CRZ maps with HTL and CRZ Boundary as per the approved CZMP of Gujarat state under the provisions of CRZ Notification, 2011 and subsequent amendments. Maps are attached as Annexure – 12 . Accordingly Physical HTL demarcation will be done.
(xi)	No construction works other than those permitted in CRZ Notification shall be carried out in CRZ area.	Point Noted and Will be complied with No construction works other than those permitted in CRZ Notification – 2011 will be carried out in CRZ area.
(xii)	Non-vegetated mudflats must be clearly demarcated on the map and no artificial plantation to be undertaken on non-vegetated mudflats.	Point Noted and Will be complied with CZMP of Gujarat state under the provisions of CRZ Notification, 2011 and subsequent amendments is finalized and published on website. No work other than those permitted in CRZ Notification – 2011 will be carried out in CRZ area.
(xiii)	The temperature at the discharge point has to be monitored regularly and also the physico-	Point Noted and Will be complied with

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
	chemical and biological parameters including benthic fauna and flora, primary and secondary productions as well as fishery populations has to be monitored regularly during the construction and operation phase by employing qualified persons.	Construction with respect to Desalination Plant, sea water intake and outfall system has not been started yet.
(xiv)	The project proponent shall report to the State Pollution Control Board about the compliance of the prescribed standards for all discharges from the Industrial Area into the sea	Point Noted and Will be complied with Construction with respect to Desalination Plant, sea water intake and outfall system has not been started yet.
(xv)	No New CETP shall be permitted in SEZ area.	Point noted. CETPs of 67 MLD capacities has been approved as part of EC & CRZ Clearance dated 15 th July, 2014. And same will serve the purpose of entire SEZ of 8481.2784 Ha area. No new CETP has been proposed as a part of said clearance.
(xvi)	Periodic monitoring of coastal water shall be carried out at outfall location by the project proponent by establishing minimum 3 monitoring stations. Proper record of monitoring should be placed along with six monthly compliance report.	Point noted and will be complied Construction with respect to Desalination Plant, sea water intake and outfall system has not been started yet.
(xvii)	Fund allocation of Rs. 12.50 Crore for Corporate Environment Responsibility (CER) shall be made as per Ministry's O.M. No. 22-65/2017-IA.III dated 1 st May, 2018 for various activities therein. The report having activity wise detail along with the time frame shall be submitted to this Ministry and its concerned regional office within 3 months.	Point noted and will be Complied with The report having activity wise detail along with the time frame was submitted to the MoEF&CC along with EIA / EMP Report. Fund will be allocated and spent on yearly basis in line with the actual cost spent for respective years on development of common infrastructure facilities within 1840 Ha MSEZ area.

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022												
(xviii)	No groundwater extraction is permitted. The project proponent shall obtain the necessary permission from the competent authority for use of surface water for the project.	<p>Complied.</p> <p>No ground water is used during construction & operation stage of the project. Current sources of water are through GWIL and desalination plant of APSEZ. Average, water consumption for entire APSEZ area is 3.45 MLD during the compliance period Oct'21 to Mar'22.</p>												
(xix)	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.	<p>Complied.</p> <p>Consolidated Consent & Authorization (CC&A) obtained from SPCB for development of 8481.27 Ha notified SEZ area @ Mundra. The present in-force CtOs are mentioned below.</p> <table><tr><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr><tr><td>CC&A – Fresh</td><td>Multi-Product SEZ</td><td>AWH – 88998</td><td>21.08.2022</td></tr><tr><td>CC&A – Amendment</td><td>Multi-Product SEZ</td><td>AWH – 97361</td><td>21.08.2022</td></tr></table> <p>Copy of CC&As are attached as Annexure – 13.</p> <p>All the hazardous wastes generated from project is being managed in line with Hazardous and other Waste Management Rules, 2016.</p>	Permission	Project	Ref. No. / Order No.	Valid till	CC&A – Fresh	Multi-Product SEZ	AWH – 88998	21.08.2022	CC&A – Amendment	Multi-Product SEZ	AWH – 97361	21.08.2022
Permission	Project	Ref. No. / Order No.	Valid till											
CC&A – Fresh	Multi-Product SEZ	AWH – 88998	21.08.2022											
CC&A – Amendment	Multi-Product SEZ	AWH – 97361	21.08.2022											
(xx)	The project proponent shall install system to carryout Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to SO2 and NOx emissions) within and outside the Industrial area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.	<p>Complied.</p> <p>Ambient Air Quality (considering one location within the project site and outside project site @ an angle of 120⁰) covering upwind and downwind directions are being carried out through NABL accredited and MoEF&CC authorized 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>Air sampling locations & frequency: 9 nos. (twice a week)</p> <table><tr><th>Parameter</th><th>Unit</th><th>Max.</th><th>Min.</th><th>Avg.</th><th>Perm. Limit^s</th></tr><tr><td>PM₁₀</td><td>µg/m³</td><td>89.18</td><td>40.36</td><td>72.22</td><td>100</td></tr></table>	Parameter	Unit	Max.	Min.	Avg.	Perm. Limit ^s	PM ₁₀	µg/m ³	89.18	40.36	72.22	100
Parameter	Unit	Max.	Min.	Avg.	Perm. Limit ^s									
PM ₁₀	µg/m ³	89.18	40.36	72.22	100									

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022					
		PM _{2.5}	µg/m ³	35.18	14.56	25.69	60
		SO ₂	µg/m ³	16.23	5.11	11.70	80
		NO ₂	µg/m ³	25.35	7.15	19.5	80
		⁵ as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards. Please refer Annexure – 14 for detailed analysis reports. Approx. INR 14.31 Lakh is spent for all environmental monitoring activities including ambient air quality monitoring during the FY 2021-22 for overall APSEZ, Mundra.					
(xxi)	The quantity of fresh water usage, water recycling and rainwater harvesting shall be measured/recorded to ensure the water balance as projected by the project proponent. The record shall be submitted to the concerned Regional Office of the Ministry along with six monthly monitoring reports.	Complied. The quantity of fresh water, water recycling and rainwater harvesting is being recorded and maintained. The data of water consumption, wastewater generation and treated water recycling is also being submitted to SPCB on monthly basis as part of the online submission – Monthly Patrak as well as yearly environmental statement (Form-V). Rain water within project area is managed through storm water drainage. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. 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. Including this a big recharge operation by bunding was taken up for Zarpara village as rainfall was very good during FY 2021-22. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani					

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
		<p>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>Adani Foundation water conservation work is as below.</p> <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. <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. Please refer Annexure – 6 for full details of CSR activities carried out by Adani Foundation in the Mundra region.</p> <p>It may be noted that the individual industrial units will also be encouraged for taking various</p>

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

Sr. No.	Conditions	Compliance Status as on 31.03.2022
		initiatives for rainwater harvesting within their premises / in the villages around the SEZ area.
(xxii)	Provide LED lights in their offices and residential areas.	<p>Complied.</p> <p>LED lighting are being used at various common areas of SEZ as well office buildings and residential townships.</p> <p>It may be noted that the individual industrial units will also be encouraged for provision of LED lights in their offices and other areas.</p>
(xxiii)	Used LEDs shall be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible. Energy conservation measures should be as per Bureau of Energy Efficiency (BEE) standards.	<p>Complied.</p> <p>Used LEDs are collected and sent for recycling through authorized e-waste collection agency.</p> <p>APSEZ has installed & commissioned 8.8 MW roof top solar plants within APSEZ and Township premises. APSEZ has also installed and commissioned 12 MW windmill and whatever electricity generated is being supplied to grid.</p> <p>Energy audit of port user buildings of MSEZ (including the details about building materials and technology etc.) is being carried out on regular basis. Last energy audit was done during Jan-2022. Report of the same is submitted to Chief Electrical officer, Gandhinagar. Report of the same are attached as Annexure – 15.</p> <p>Energy Conservation through Installation of Motion Sensor (Occu switch) & AC Temp. controls in few of the buildings are provided.</p> <p>Measures for energy conservation are incorporated at design stage. Few of the buildings in MSTPL are designed as green building. Some features of the same are as below.</p> <ul style="list-style-type: none"> • Used fly ash based cement and bricks • Special types of glasses were used which gives maximum sunlight and less heat • VOC free paint used certified by CII (Certificate of Indian Industries)

Status of the Conditions Stipulated in Environment and CRZ Clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2022
		<ul style="list-style-type: none"> Water flow reducer installed in the entire building <p>It may be noted that the individual industrial units will also be encouraged for taking various initiatives with respect to energy conservation (such as LED lightings, installation of renewable energy sources, utilization of energy efficient fixtures etc.).</p>
(xxiv)	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for Standard Operating Procedures (SOP) to have proper checks and balances and to bring into focus any infringements/ deviation/ violation of the environmental/ forest/ wildlife norms/conditions. The company shall have defined system of reporting infringements/ deviation/ violation of the environmental/ forest/ wildlife norms /conditions and/ or shareholders/stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	<p>Complied.</p> <p>Environment Policy duly approved by the Board of Directors is in place and attached as Annexure - 16.</p>
(xxv)	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly report to the head of the organization.	<p>Complied.</p> <p>M/s 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 is attached as Annexure - 17.</p>

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

Sr. No.	Conditions	Compliance Status as on 31.03.2022
(xxvi)	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	<p>Will be complied.</p> <p>Self-Environment audit will be carried out by internal audit team on annually basis. Third party environmental audit will be carried out by recognized agency on every three years and same will be submitted on regular basis to the ministry along with half yearly compliance report.</p>

Annexure – 1

ITEM NO.307

COURT NO.7

SECTION IX

S U P R E M E C O U R T O F I N D I A
RECORD OF PROCEEDINGS

Petition(s) for Special Leave to Appeal (C) No(s). 1526/2014

(Arising out of impugned final judgment and order dated
13/01/2014 in WP No. 21/2013 passed by the High Court Of Gujarat
At Ahmedabad)

SKAPS INDUSTRIES INDIA PVT LTD

Petitioner(s)

VERSUS

GAJUBA (GAJENDRASINH) BHIMJI JADEJA&ORS

Respondent(s)

(WITH PRAYER FOR INTERIM RELIEF AND OFFICE REPORT)

WITH

SLP(C) No. 1490/2014

(With prayer for exemption from filing c/c of the impugned
judgment and Prayer for Interim Relief and Office Report)

SLP(C) No. 1519/2014

(With prayer for exemption from filing c/c of the impugned
judgment and Prayer for Interim Relief and Office Report)

SLP(C) No. 1554/2014

(With prayer for exemption from filing c/c of the impugned
judgment and Prayer for Interim Relief and Office Report)

SLP(C) No. 1606/2014

(With prayer for Interim Relief and Office Report)

SLP(C) No. 1607/2014

(With prayer for interim directions and Prayer for Interim
Relief and Office Report)

SLP(C) No. 1799/2014

(With prayer for Interim Relief and Office Report)

SLP(C) No. 2198/2014

(With prayer for Interim Relief and Office Report)

SLP(C) No. 2204/2014

(With prayer for Interim Relief and Office Report)

SLP(C) No. 3327/2014

(With prayer for permission to file slp and Office Report)

SLP(C) No. 5851-5852/2014

(With prayer for Interim Relief and Office Report)

SLP(C) No. 7369/2014

(With prayer for Office Report)

Date : 14/07/2014 These petitions were called on for hearing

Signature Not Verified

Digitally signed by

today.

Parveen Kumar Chawla

Date: 2014.07.16

15:23:44 IST

CORAM :

Reason:

HON'BLE MR. JUSTICE JAGDISH SINGH KHEHAR

HON'BLE MR. JUSTICE J. CHELAMESWAR

HON'BLE MR. JUSTICE A.K. SIKRI

2

For Petitioner(s) Mr. K.K. Venugopal, Sr. Adv.
Mr. Sandeep Singh, Adv.
Ms. Radhika Gautam, Adv.

Mr. Mahesh Agarwal, Adv.
Mr. Shashank Manish, Adv.
Mr. Shamik Bhat, Adv.
for Mr. E. C. Agrawala, AOR

Mr. Harin P. Raval, Sr. Adv.
Mr. Praveen Kumar, AOR

Mr. M.L. Lahoty, Adv.
Ms. Gargi B. Bharoli, Adv.
For Mr. Himanshu Shekhar, AOR

Mr. Ajay Bhargava, Adv.
Ms. Vanita Bhargava, Adv.
Mr. Nitin Mishra, Adv.
For M/s Khaintan & Co., AOR

Mr. Ashok mathur, adv.
Mr. R. Sudhinder, Adv.
Mr. S.N. Mitra, Adv.

Mr. Abhinav Mukerji, AOR

Mr. Milind Kumar, AOR

For Respondent(s) Mr. J.S. Attri, Sr. Adv.
Mr. K. Radhakrishnan, Sr. Adv.
Ms. Kiran Bhardwaj, Adv.
Mrs. S.K. Bajwa, Adv.
Ms. Seema Rao, Adv.
For Mr. S.N. Terdal, AOR
for Mr. B.K. Prasad, AOR

Ms. Kamini Jaiswal, Adv.

Ms. Preeti Bhardwaj, Adv.
For Ms. Hemantika Wahi, AOR

Mr. Harin P. Raval, Sr. Adv.
Mr. Praveen Kumar, AOR

Mr. Anil Kumar Mishra-I, AOR

UPON hearing the counsel the Court made the following
O R D E R

The instant matter is taken up for consideration, in

3

the light of the motion Bench order dated 2.5. 2014.

By the

above order, the time granted to the Ministry of Environment and
Forests, to complete the process of environmental clearance, was

extended by a further period of eight weeks.

The period of

eight weeks expired about a fortnight ago.

We are informed that the Ministry of Environment and
Forests, has not yet completed the process of granting
environmental clearance, and no final decision has been taken by
the department. It is therefore, that the learned counsel for
the rival parties, seek a further extension, so as to enable the

Ministry of Environment and Forests, to complete the process of environmental clearance.

Keeping in mind the prayer made by the learned counsel for the rival parties, we consider it just and appropriate to grant one further and final opportunity to the Ministry of Environment and Forests to complete the process of environmental clearance. The same shall positively be completed within a further period of eight weeks. We also consider it just and appropriate to require the Secretary, Ministry of Environment and Forests to oversee the process of grant of environmental clearance. He would be duly assisted in the aforesaid objective by the Director, Department of Environment, Ministry of Environment and Forests, New Delhi. They shall be personally responsible, in case the entire process is not completed and finalised within a period of eight weeks from today. Registry is directed to send a copy of this order to the Secretary,

4

Ministry of Environment and Forests, New Delhi and Director, Department of Environment, Ministry of Environment and Forests, New Delhi.

List for further consideration after eight weeks.

In the meanwhile, communication dated 3.4.2014 of the Government of India, Ministry of Environment and Forests (in Annexure P1 annexed to I.A. Nos.1-2 of 2014) shall remain stayed.

(Parveen Kr. Chawla)
Court Master

(Phoolan Wati Arora)
Assistant Registrar

Annexure – 2

Status of Legal Cases - SLP 28788 of 2016:

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status	Current Status as on 31st Mar-22	Action Taken/Proposed
1	<p>SLP 28788 of 2016 Pravinsinh Bhurabhai Chauhan Vs State of Gujarat & Others</p> <p>Petitioner 1. PRAVINSINGH BHURABHA CHAUHAN</p> <p>Respondent 2. State of Gujarat 3. APSEZ 4. MoEF&CC, New Delhi 5. MOC&I, New Delhi 6. Collector, Bhuj 7. Principal Secretary, Gujarat</p>	<ul style="list-style-type: none"> Public Interest Litigation was filed before the Hon'ble Gujarat High Court by Mr. Pravinsingh Bhurubha Chauhan alleging, presence of Sand dunes in the APSEZ project area. APSEZ has submitted its representation that no Sand dunes are present in the project area and same was also verified during the site visit carried out by the Committee, constituted by Collector, Kutch on 25.07.2014 and by Regional Office of MoEF&CC, Bhopal on 25.09.2014. Hon'ble High Court of Gujarat had dismissed the PIL filed by the Petitioner, vide their order dtd. 18.02.2015 stating that, "There is no need of constituting 	Lastly it was heard on 14th Sept 2018	Matter pending Hon'ble at Supreme Court.	<ul style="list-style-type: none"> APSEZ has already submitted as part of their submission to the Committee that there are no presence of "Sand dunes", in APSEZ area, inline to the authenticated maps & report available for this area. The Committee visited Mundra on January 3 & 4, 2018 and the core issues to be examined by the Committee were (i) whether sand dunes are allotted in the forest land and whether APSEZL has destroyed/disturbed them and (ii) whether measurement of land was wrongly done? The Sunita Narain committee filed its report in the Hon'ble Supreme Court of India on 14.9.2018. The Committee heard representations from both the parties and concluded that the term "Dhuva" is not synonymous with shifting

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status	Current Status as on 31 st Mar-22	Action Taken/Proposed
		<p>a new committee to look into the alleged violations as there is already a committee constituted by the ministry and a report by the same committee has also been submitted"</p> <ul style="list-style-type: none"> • Later on Special Leave Petition was filed in Supreme Court by the Petitioner vide dated 26.10.2015 against the above said order of the Hon'ble High Court of Gujarat • In view of above, Hon'ble Supreme Court vide their order dated 23.08.2017, had requested the earlier formed Sunita Narayan Committee to relook in to this matter and submit their report. • Committee had visited the site on 3/4.01.2018 and has submitted their detailed report to Hon'ble Supreme Court. 			<p>sand dune. The Committee concluded that there is no incontrovertible evidence that Mor Dhuva was a sand dune and it cannot be said that M/s. APSEZL violated any conditions of the Environmental Clearance. With regards to the issue of measurement of land, the Committee stated that there was no credible evidence to show that Mor Dhuva was not part of the allotment to APSEZ and all measurements were done appropriately.</p>

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status	Current Status as on 31 st Mar-22	Action Taken/Proposed
		<ul style="list-style-type: none"> Further, based on the findings of the report, the subject land is not classified as Sand dune and therefore allegations are not correct. 			

Annexure – 3

Chiragsing Rajput

From: Azharuddin Kazi
Sent: Tuesday, September 22, 2020 1:11 PM
To: Chiragsing Rajput
Subject: FW: Mangrove conservation plan

From: Shalin Shah
Sent: Tuesday, September 22, 2020 1:00 PM
To: Azharuddin Kazi <Azharuddin.Kazi@adani.com>
Cc: Haresh Bhatt <Haresh.Bhatt@adani.com>
Subject: FW: Mangrove conservation plan

For necessary record and compliance.

Shalin

From: S. M.Saiyad, IFS (Director, Env.) [<mailto:direnv@gujarat.gov.in>]
Sent: 22 September 2020 12:51
To: Shalin Shah
Cc: ashokchauhan1971@gmail.com; gaurangbhatt22
Subject: Mangrove conservation plan

CAUTION: This mail has originated from outside Adani. Please exercise caution with links and attachments.

Respected Sir,

As decided in 45th meeting of the Gujarat Coastal Zone Management Authority (GCZMA) was held on 04-10-2019 under chairmanship of Dr. Rajiv Kumar Gupta, IAS, Additional Chief Secretary, Forests & Environment Department and Chairman, GCZMA in the Committee Room, Forests and Environment Department, Gandhinagar .

The Authority has approved Adani Port and SEZ Ltd. mangrove conservation plan with following conditions:

1. The APSEZL shall carry out annual compliance monitoring of the mangrove conservation area.
2. The APSEZL shall explore the possibility for taking necessary adequate measures to reduce the erosion near Bocha island.
3. The approval of mangrove conservation plan shall not be considered as any permission under CRZ Notification for dredging activity.
4. There should not be blockage of any drainage line and free flow of water is to be maintained, as flushing of mangrove areas is very essential.
5. The APSEZL shall carry out mangrove monitoring every two years and submit the data to Forest Department/GCZMA and MOEF&CC, GOI

You are directed to comply the above mentioned conditions.

Thanking You,

With regards,

S. M. Saiyad, IFS

Director (Environment) & Member Secretary

Gujarat Coastal Zone Management Authority

Forest & Environment Department

Sachivalaya, Gandhinagar

Tel: 079-23252660

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Annexure – 4

**Report on Comprehensive and Integrated plan for
preservation and conservation of mangroves and associated
creeks in and around the Adani Ports and Special Economic
Zone Ltd., Mundra, Gujarat**



Submitted to

**M/s Adani Ports and Special Economic Zone Ltd
Mundra**

Prepared by

**National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Chennai**

March, 2021

Progress report on Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island

1. Introduction

The northern Gulf of Kachchh in the western coast of India has extensive formation of mangrove. Ministry of Environment, Forest and Climate Change have accorded Environmental Clearance (EC) vide Letter No. F.No.10-138/2008-IA.III dt. 15th July, 2014 & 12th February, 2020 to M/s Adani Ports and Special Economic Zone Ltd (APSEZ), to set up a multi-product SEZ at Mundra, Kachchh, Gujarat. The project involves development of SEZ in a notified SEZ area of 8481.2784 ha.

While according Environmental Clearance (EC) to the project, the MoEF&CC have stipulated General and Special conditions in their Environment Clearance. Further inline to the MoEF&CC final order, vide F.No.10-47/2008-IA.III dtd 18th Sept. 2015 which also contained special conditions, two of which (sr. no iv and v of the order) are as follows:

(iv) A Comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks/mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area, e.g., the reported case of disappearance of mangroves near Navinal creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of Bocha Island up to Baradimata and others.

(v) NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA. In recognition of the fact that the existing legal provisions under the E(P) Act 1986 do not provide for any authority to impose ERF by the Government, the plan will be financed by the PP. The implementation will be carried out by GCZMA. The monitoring of the implementation will be carried by NCSCM.

2. Compliance to the EC conditions

Accordingly, Adani Ports and Special Economic Zone Limited (APSEZ) had requested the National Centre for Sustainable Coastal Management (NCSCM) for preparation of Comprehensive and Integrated plan for preservation and conservation of mangroves and associated creeks. The components of plan are analysis of mangrove health by comparing the coverage between 2011 and 2016, bathymetry of creeks, socio-economics of villages adjoining creeks of APSEZ. One of the key recommendations is monitoring of coverage of mangrove in the late 2019 and comparing its extent of distribution with the data reported

in 2016-17. As per reported in the Conservation plan there has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. It was recommended that the trend of mangrove cover needs to be studied in Jan/March 2020 using satellite images of late 2019 and if the trend continues, only monitoring is needed. The Conservation plan was submitted to the Gujarat Coastal Zone Management Authority and in its meeting held in October, 2019, then plan was approved as per their email dt 22nd Sept 2020. The major recommendation relating to mangroves that were specified in the conservation plan are as follows:

2.1. There has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. No action is needed at present except at Navinal creek, Bocha island and off Bocha creek. The trend of mangrove cover needs to be studied in Jan/March 2020 using satellite images of late 2019 and if the trend continues, only monitoring needed. The tidal range in the mangroves is also to be observed annually using tide poles to ensure that the flow of tidal water remains same as observed in April 2017 during the field study.

If degradation of mangroves to the extent of 10% due to inadequate seawater is observed in Kotdi and Baradimata creeks, initially the mouth areas need to be made free from silt. If tidal flow does not improve after one year and if the extended banks are noticed which might be due to siltation, silt need to be removed on the banks where there are no mangrove roots. If the tidal conditions still do not improve after one year, the interior parts of the creeks need to be dredged in a phased manner from 0.5 m to 1 m. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs to be implemented.

2.2. In the Navinal creek, if degradation of mangroves or reduction of mangrove cover by even 10% is noticed in 2020 due to decrease in tide water flow, dredging of Navinal creek from beyond port operation areas up to 4.5 km to increase the depth by 1 m in a phased manner must be taken up to facilitate increased tidal water flow into the mangrove areas of Bocha island. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs to be implemented.

The authority suggested to undertake compliance monitoring of the mangrove conservation area to comply the above recommendations and study the health of mangroves in creeks. Accordingly, APSEZ has requested NCSCM to monitor the mangrove coverage using the satellite images of 2019 and also to check the extent of shoreline changes in the eroding areas of Bocha Island which led to loss of about 5.33 ha of dense mangroves between 2011 and 2016-17.

3. Scope of work

In order to comply with above recommendations relating to assessment of health of mangroves and also to assess the coastal erosion following activities are proposed:

- i. Procurement of high-resolution satellite images of late 2019/Jan 2020 and prepare GIS based maps on distribution of mangroves in creeks of APSEZ. Field validation of mangrove data collected (subject to COVID-19 conditions prevailing in the country)
- ii. Comparative analysis on variation of mangrove coverage between 2016/17 and late 2019 using GIS techniques and drawl of inference on health of mangroves.
- iii. Determination of shoreline changes at the reported eroding shoreline of Bocha island by comparing shoreline of 2016/17 with 2019.

4. Proposed Tasks

- i. In the Conservation plan prepared for creeks and mangroves of APSEZ, it was observed that there has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. The extent of mangrove cover will be mapped in the creeks Kotdi (I & II), Baradimatha (I & II), Navinal, Bocha and Khari creeks using High resolution satellite images of late 2019. These creeks have been indicated in Fig.1.

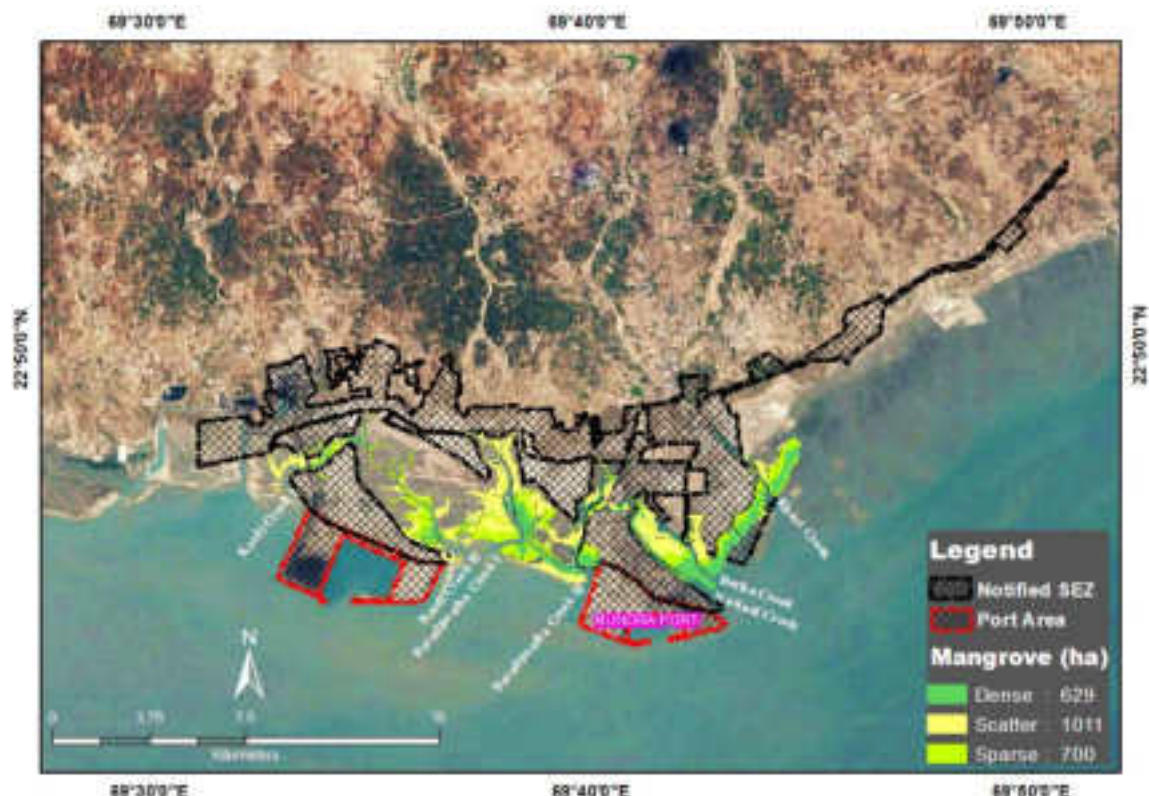


Fig.1. APSEZ area, creeks and mangrove formation along the creeks

- ii. Change detection analysis using GIS tool will be carried out for Bocha Island to determine and mangroves will be categorized as scattered, sparse and dense. *{While categorizing mangroves in terms of their density, they have been classified as dense (mangrove plants both tall and stunted with gap between one tree and another being 2 m and less), sparse (shrubs with distance between patches being more than 2 m but less than 5 m) and scattered (shrubs with distance between patches being more than 5 m)}*. The changes from one category to other will be indicated as quantitative data along with locations in the GIS map.
- iii. Determination of shoreline changes in eroding areas of Bocha Island by comparing the shoreline of March, 2017 with shoreline as found in the satellite images of Sept. 2019 to understand the extent of increase/decrease of erosion and corroborating with underlying oceanographic parameters that cause erosion.

5. Tasks Completed

5.1. Tidal observations in the creeks in and around APSEZ

The technical personnel of APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. A Google earth image showing the locations where tidal observations made in December 2020 is placed in Fig.2. These observations made in a 24 hrs tide cycle using tide poles in December, 2020.

The observed tide levels are given in Annex 1. A comparison of tide levels recorded between April, 2017 and December, 2020 is given in Table 1.

Table 1. Comparison of tide levels between April, 2017 and December, 2020 in creeks in and around APSEZ

Creek	2017 (values in meters)			2020 (values in meters)		
	Max	Min	Range	Max	Min	Range
Kotdi I L 1	5.63	3.16	2.47	5.84	2.94	2.90
Kotdi I L 2	5.45	2.17	3.28	5.81	2.81	3.00
Kotdi II	5.60	2.98	2.62	6.08	1.38	4.70
Baradimata I L 1	4.83	3.59	1.24	6.08	2.88	3.20
Baradimata II L 1	5.55	4.01	1.54	5.90	0.50	5.40
Baradimata II L 2	4.89	0.53	4.36	6.11	3.41	2.70
Navinal L 1	5.21	3.42	1.79	6.01	3.41	2.60
Navinal L 2	5.20	3.76	1.44	6.18	1.98	4.20
Navinal L 3	5.18	3.54	1.64	6.10	1.14	4.96
Bocha L 1	5.81	2.99	2.82	6.16	1.06	5.10
Bocha L 2	5.75	3.87	1.88	6.03	2.53	3.50
Bocha L 3	5.75	3.44	2.31	5.88	1.48	4.40
Khari L 1	6.15	4.07	2.08	6.01	1.71	4.30



Figure 2: Google image showing locations of tide observations

As the tides primarily follow lunar cycle of the year, there are natural variations in tidal ranges among months in a year. An analysis tide values at selected locations (indicated as L in table 1) reveals existence of higher tidal ranges at most of the locations in 2020 compared to the year 2017. Though such variations are attributed year to year variation in high tide levels in a 19 year lunch cycle, it also indicates prevalence of good tidal ranges in the observed locations revealing normal flow of tides around the observed locations. A comparison of mangrove health with tidal observations through a general inference of availability of tidal water all along the creeks leading to presence of mangroves in categories mostly to the level of 2017, a few locational changes in mangrove categories were observed viz., from dense to sparse and scatter and vice versa. These changes have been described in the respective sections below.

5.2. Procurement of High Resolution satellite imagery

Enquiries were made with National Remote Sensing Centre (NRSC) who are the only authorized distributor of satellite images in India, for availability of high resolution satellite imagery especially multi-spectral images similar to the images used to study the mangrove distribution i.e., 0.6m PAN and 2.0 m multispectral data from World view 2 foreign satellite. NRSC has intimated that a procurement procedure for e-purchase of images acquired by foreign satellite is being evolved and it would take considerable time to finalise the procedure. Further, NRSC also informed that no Indian satellite has facility for capturing 2.5m multi-spectral image data. As there are uncertainties in the acquisition of the images from World view 2 satellites during the period of progress report preparation, an effort has been made to use freely available open source Google earth images which is a merged product of 0.65 PAN and 2.5m Multi-spectral data. It has limitations as it is not a digital data and the mangroves details are obtained from Google earth images by directly digitizing from the computer screen. There could be possible error of less than 10 % in mangrove categorization (as dense, sparse and scatter) and also extent of total coverage in terms of hectare. The methodology adopted to map the distribution of mangroves is similar to the method mentioned in the Conservation plan report except the source of satellite image. The present report on mangrove distribution is based on Google images of March, 2017 and Sep 2019, as cloud free images are available only for these dates.

5.3. Monitoring on distribution of mangroves in creeks in and around APSEZ to assess their health conditions

5.3.1. Overall assessment

The Kotdi, Baradimata, Navinal, Bocha and Khari creeks experience high tidal ranges up to 6m and with average tidal range of 2 to 4.5m which varies annually. The creeks have mangrove formation due to muddy substratum and the mangroves are tide fed and tidal flow in to the mangroves occurs only during high tide. This makes the mangroves as inter-tidal one and any change of tidal conditions in the creeks affect the growth and distribution of mangroves.

Distribution of mangroves in Kotdi, Baradimata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant.

Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period (Table 1 and Figs.1 to 3). 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 (Table 2 and Figs 3 to 5).

Table 2: Data on distribution of various categories of mangroves in the creeks in and around APSEZ in 2017 and 2019

Category	Area in Hectares	
	2017	2019
Dense	623	701
Sparse	741	925
Scatter	1034	1028
Total	2398	2654

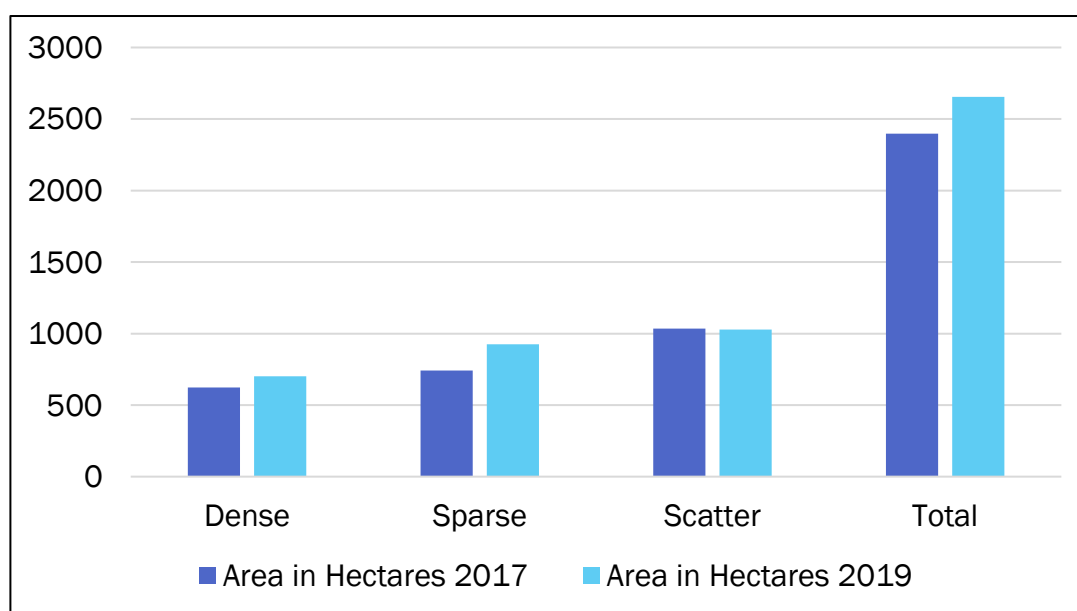


Figure 3: Comparison of various categories of mangroves in creeks of APSEZ between 2017 and 2019



Figure.4. Google earth image showing GIS output on distribution of various categories of mangroves in March 2017



Figure 5: Google earth image showing GIS output on distribution of various categories of mangroves in March 2019

5.3.2. Creek wise assessment

a. Kotdi creek

The Kotdi creek with two mouths, named as Kotdi I on the western end of South Port of Adani and Kotdi II east of Kotdi I experience tidal flow up to 4.5 km in Kotdi I and up to 7.4 km in Kotdi II during high tide periods. The tidal range observed in 2020 is 2.9 to 4.7m. During the period of study, the creek showed significant growth of all categories of mangroves and the overall increase in Sep 2019 compared to March, 2017 was to the extent of 106.86 ha which is about 25.9%. It is also worth noting that dense mangroves have increased by 106.5% (Table 3 and Fig.6 to 8). While the sparse category marginally decreased to the extent of 20.8 ha, the scatter ones increased by 77.3 ha. (Table 3 Figs 6 to 8). The results reveal good tidal flow in the creeks of Kotdi during the period of investigation and the mangroves are generally in good health condition. Marginal decrease of sparse category and increase of area of scatter are mainly due to transitional changes which are natural in mangrove distribution.

Table 3. Distribution of mangroves in Kotdi creek system in 2017 and 2019

Category	Area in Hectares	
	2017	2019
Dense	47.25	97.59
Sparse	188.50	167.70
Scatter	177.20	254.52
Total	412.95	519.81

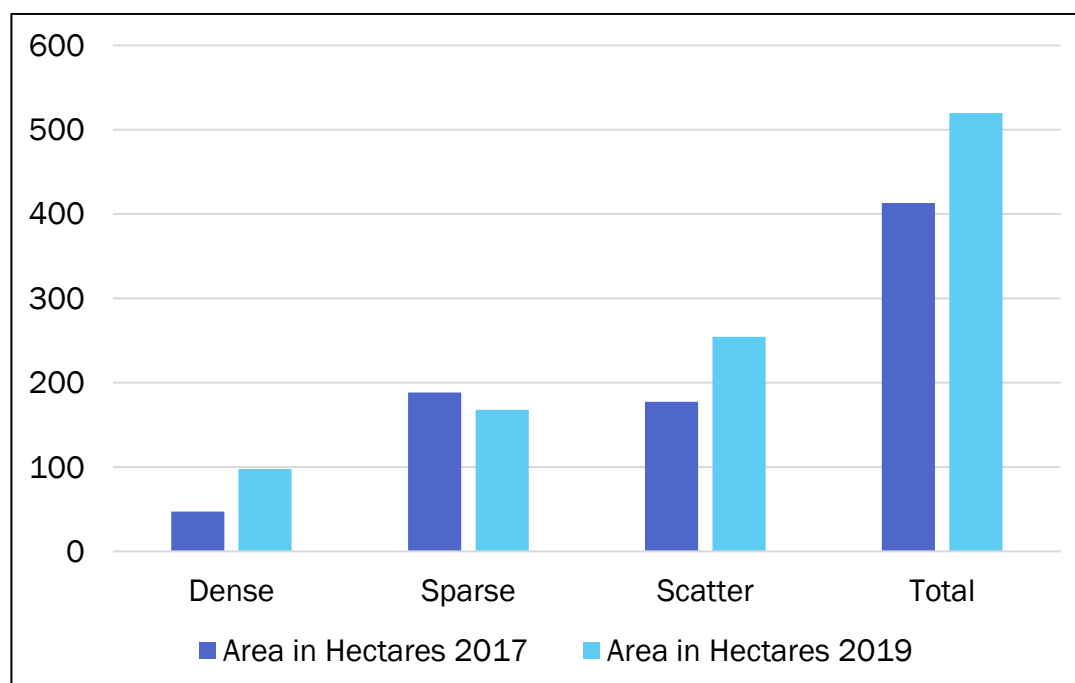


Figure 6: Comparison of mangrove distribution between 2017 and 2019 in Kotdi creek system.



Figure 7: Distribution of mangroves in 2017 in Kotdi creek system.



Figure 8. Distribution of mangroves in 2019 in Kotdi creek system.

b. Baradimata Creek

The creek has been one of the well tide influenced creeks and as of 2020, the creek experienced a tidal range of 2.7 to 5m and the high tide penetrates approximately up to 6.15 km from its mouth. The creek too remains uninfluenced by human interventions except navigation by fishing community from the nearby villages. The health of the mangroves was assessed between 2017 and 2019 and the results are shown in Table 4 and Figs.9 to 11. It has showed overall improvement in mangrove coverage to the extent of 129.47 ha (11.3% increase) mostly with formation of new mangroves in the form of sparse mangroves with minor inter-conversion in categories of sparse to dense (Table 4 and Figs.9 to 11).

Table 4: Data on various categories of mangroves in the years 2017 and 2019 in Baradimatha creek system

Category	Area in Hectares	
	2017	2019
Dense	218.90	241.41
Sparse	328.83	337
Scatter	590.60	689.01
Total	1138.33	1267.80

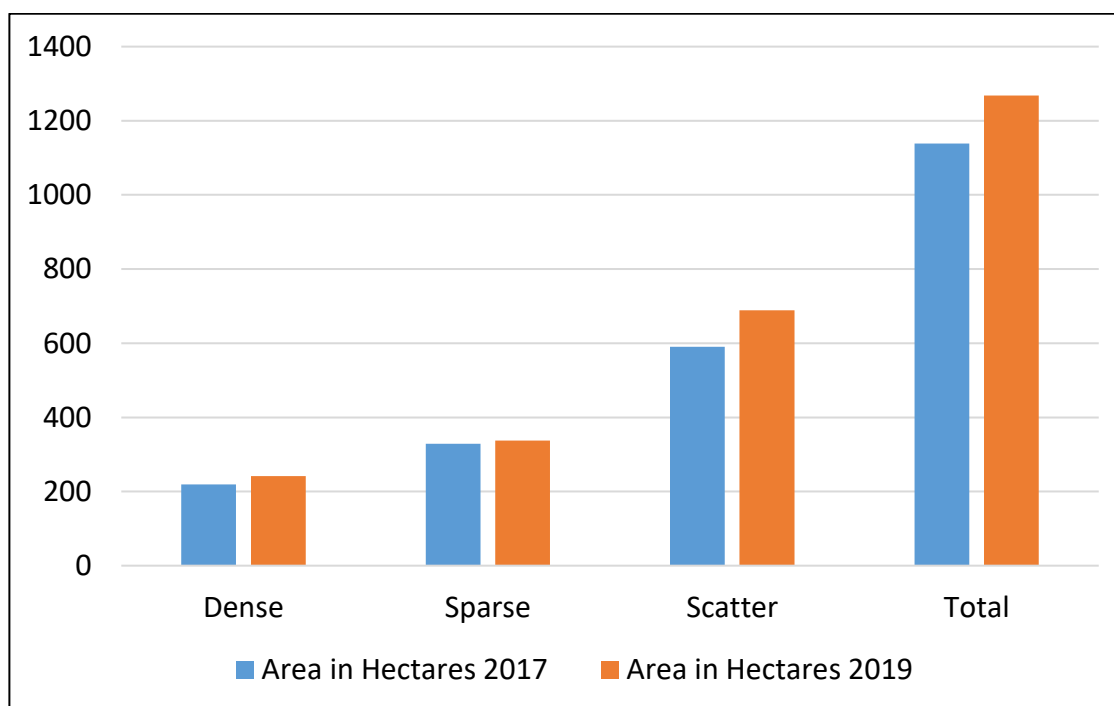


Figure 9: Comparative data on various categories of mangroves in 2017 and 2019 at Baradimata creek.



Figure 10: Distribution of mangroves at Baradimata creek in 2017 shown in Google earth image



Figure 11: Distribution of mangroves at Baradimata creek in 2019 shown in Google earth image

As the data on mangrove distribution has shown an increased trend between the years especially improvement to higher categories (i.e., from scattered to sparse and further to dense) and also formation of new mangroves, it could be inferred that the mangroves in the creek are in healthy conditions with normal tidal flow.

c. Navinal and Bocha creeks including Bocha island

The creek system is complex with Navinal creek situated abutting to Adani Port and the eastern Bocha creek connecting to Navinal creek in the north leading to formation of Bocha island which has substantial dense mangroves. The mouth of creeks has good tidal inflow especially in Navinal creek as its mouth forms entry to the Port. The Navinal creek becomes narrow towards north and flows eastward to connect with Bocha creek (Fig.1). The creeks have fair to good growth of mangroves on their bank with dense mangroves in the Bocha island and the Figs.12 to 14 show the distribution of mangroves in 2017 and 2019 respectively.

The data on distribution of various categories of mangroves have been shown in Table 5 and Fig.12. The mangroves of the creek system have almost remained at 2017 level with marginal increase of 11.43 ha which is an increase of 2.1%. At pre-pages the recommendation made in the conservation plan has been mentioned. Accordingly, if there has been a decrease in mangroves less than 10% to the 2017 level, then the tidal flow in the creeks needs to be studied to check reduction in tidal flow, as the tidal flow is the key parameters for survival and growth of mangroves. As the present data has shown an increase of 2.1% cover of mangroves in the Navinal-Bocha island and Bocha creek system, in general, overall mangrove health is normal with usual tidal flow.

Table 5: Data on distribution of mangroves in 2017 and 2019 in Navinal Bocha creek system

	Area in Hectares	
	2017	2019
Dense	212.90	212.6
Sparse	102.75	278.4
Scatter	230.44	66.2
Total	546.09	557.52

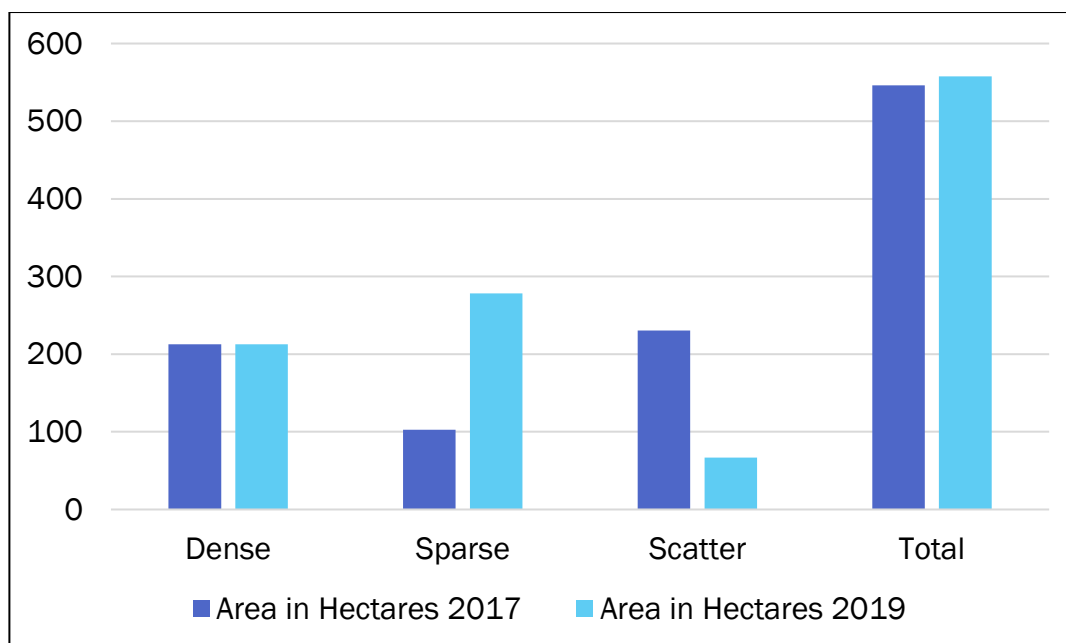


Figure 12: Comparison on distribution of mangroves between 2017 and 2019 in Navinal Bocha creek system

Though, the overall increase in mangrove in the Navinal-Bocha creek system shows prevalence of normal conditions, specific attention was drawn in the case of Navinal creek in the Conservation due to formation of sand spits. It was postulated that continued growth of sand spit across the creek might reduce tidal flow in future which may affect the growth of the mangroves. In this regard, it is pertinent to draw the following recommendations for mangroves in Navinal creek in the Conservation plan:

Sand/silt spits were observed on the banks of Navinal creek and some of them were extending close to Bocha island. If such spits continue to grow, they may obstruct tidal flow leading to reduced tidal water supply to the northern banks of Navinal creek and the Bocha island. Therefore, assessment of the health of mangroves should also be carried out along the Navinal creek in Jan/Mar 2020. If the health of the mangroves either remains at the current condition or improves, the situation should be monitored once in every two years using high resolution satellite images. If there are signs of degradation of mangroves due to decrease of flow of tidal waters in the interior parts of the Navinal creek, Bocha island that are fed by tidal waters of Navinal creek, then it would be necessary to deepen the Navinal creek to facilitate movement of tidal water"

As there was a specific recommendation on Navinal creek, comparison of mangrove categories between 2017 and 2019 was made using mangrove distribution depicted in Figs 13 and 14. It was observed that while the southern side of Navinal bank adjoining Adani port where tidal range is high (~5 m) the scattered mangroves of 2017 grew well to become dense. However, in the northern side, the dense mangroves at the landward side of creek bank, few patches of dense mangroves have turned to sparse and scatter. On analysis of tidal values in the deeper northern part of the creek, it was found that the location which is a junction of a branch of Bocha creek showed in a tidal range of 2.6m

(6.01 m during peak high tide and 3.4 m during peak low tide) in 2020 compared to 1.8m in 2017 at same location (measured in 2017 while preparing the Conservation plan) which indicates a good tidal flow in the creek. Conversion of mangrove from dense to sparse in Navinal from 2017 to 2019 despite such good tidal flow is not clear.

In order to understand the causes, it is necessary to measure tide at closer intervals (every 300m) in this mangrove change section of Navinal creek till the meeting point of Bocha creek during the next monitoring cycle. This may indicate locational change of tidal range and also influence of tide from Bocha creek at the meeting point.

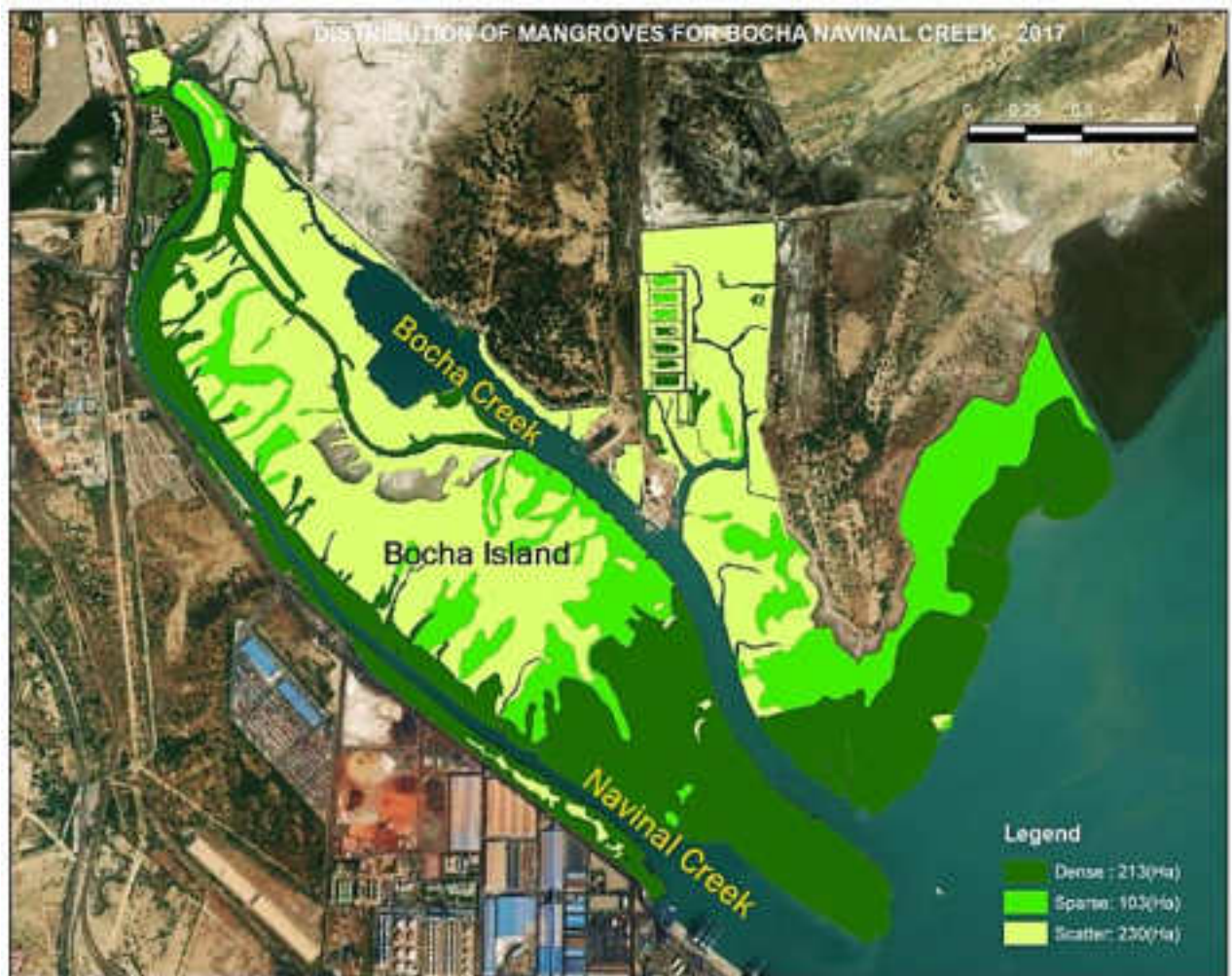


Figure 13: Distribution of various categories of mangroves overlayed in Google earth image of Navinal and Bocha creek system for the year 2017

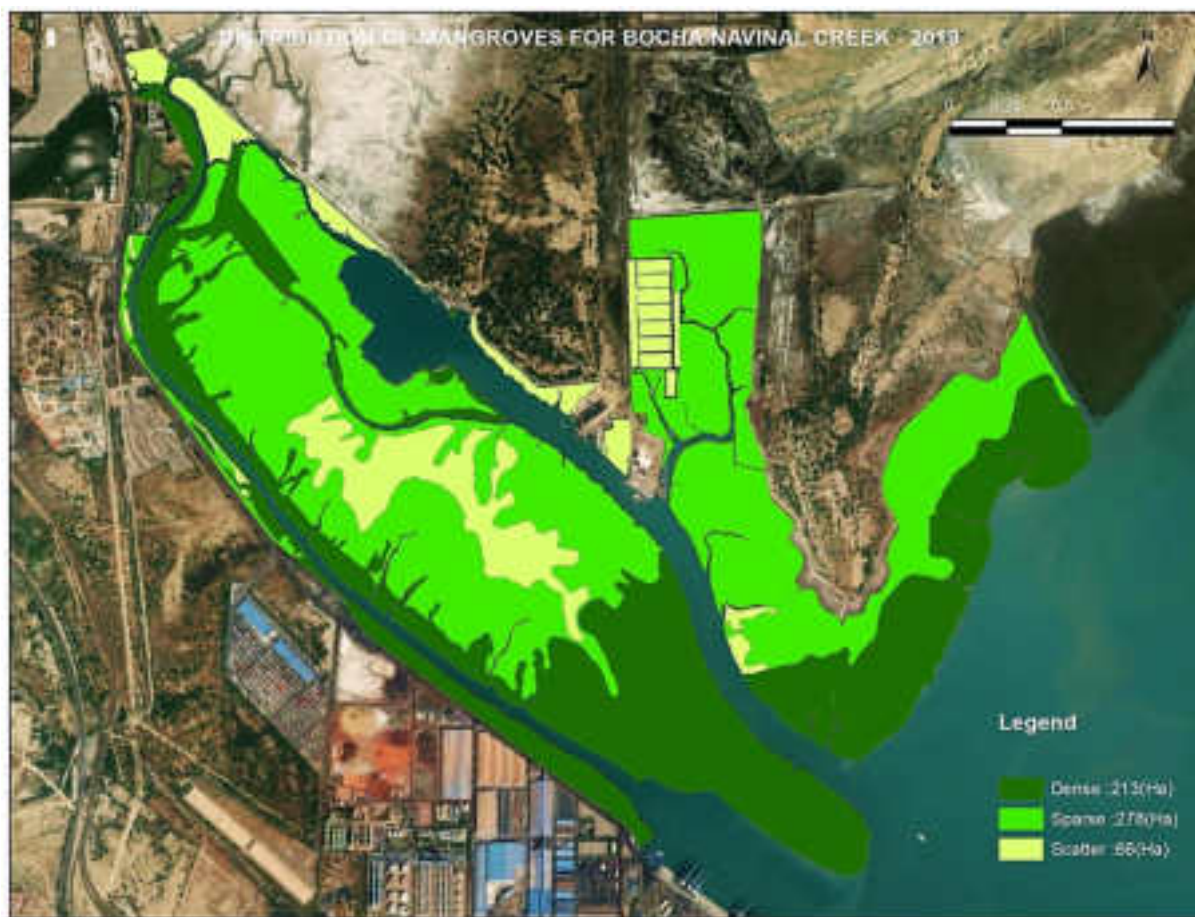


Figure 14: Distribution of various categories of mangroves overlaid in Google earth image of Navinal and Bocha creek system for the year 2019

The change analysis performed using GIS overlay techniques to understand inter-conversion among Dense, Sparse and Scattered indicates there is a net loss of dense mangroves to the extent of 2.83 ha which has mostly occurred at the tip of the Bocha island and also along the coast east of Bocha creek (Table 6 and Figs 15 and 16). Loss of dense mangroves around the tip of Bocha island to the extent of 5.33 ha between 2011 and 2016-17 was reported in the Conservation plan. From the present results, it is evident that the erosion has been continuing around the tip of the Bocha island resulting in the loss of dense mangroves.

Table 6: Data on inter-conversion of mangrove categories from 2017 to 2019

Category	Area in Hectares				
	Dense in 2019	Sparse in 2019	Scatter in 2019	Gain/Loss	Total 2017
Dense in 2017	206.06	1.94	2.06	2.83	212.90
Sparse in 2017	0.74	52.42	49.69	-0.10	102.75
Scatter in 2017	5.56	89.31	135.59	-0.01	230.44
Gain/Loss	0.19	134.73	-120.72		
Total 2019	212.55	278.40	66.62		

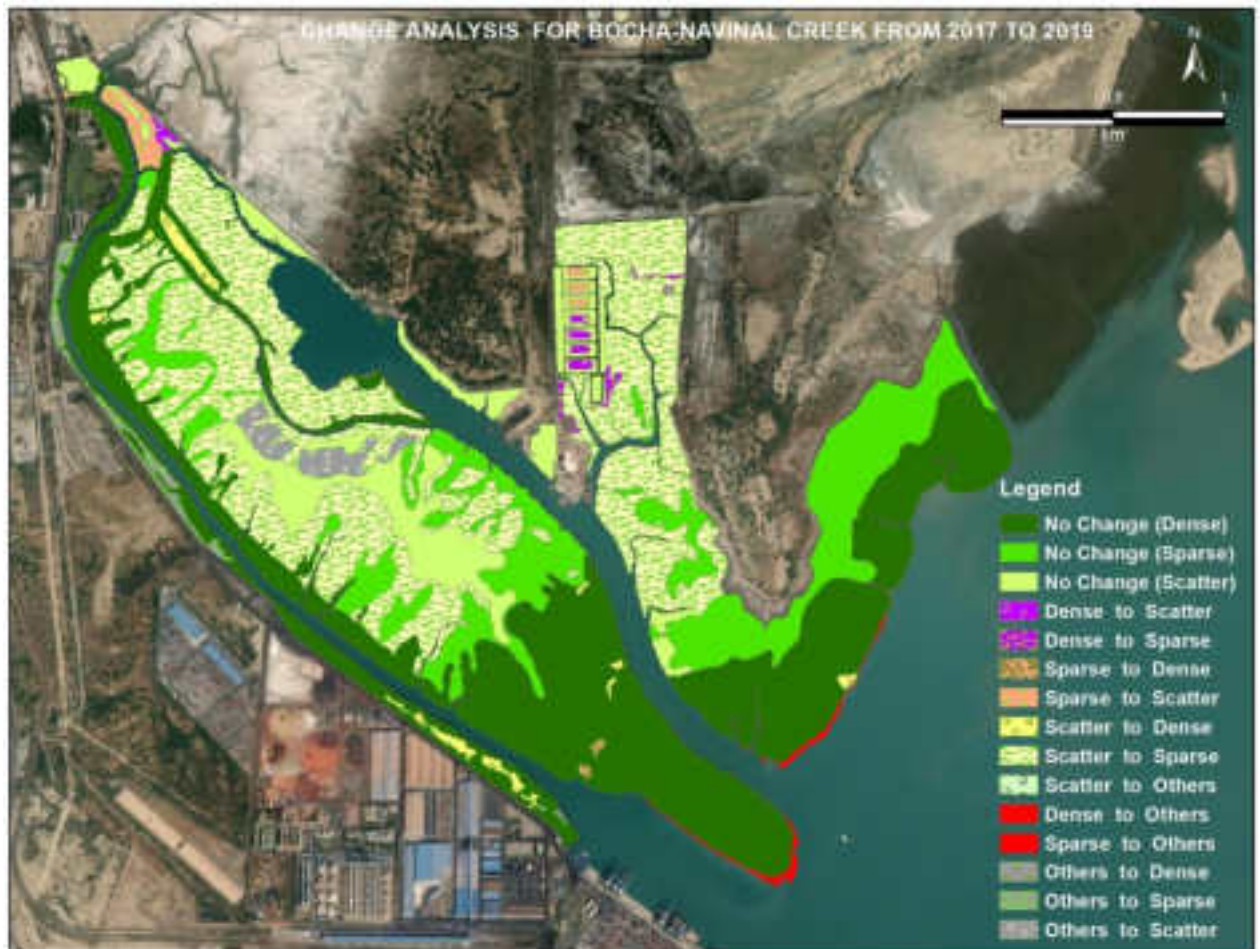


Figure 15: Result of change analysis from 2017 to 2019 on categories of mangroves in Navinal-Bocha creek system overlaid on Google earth image

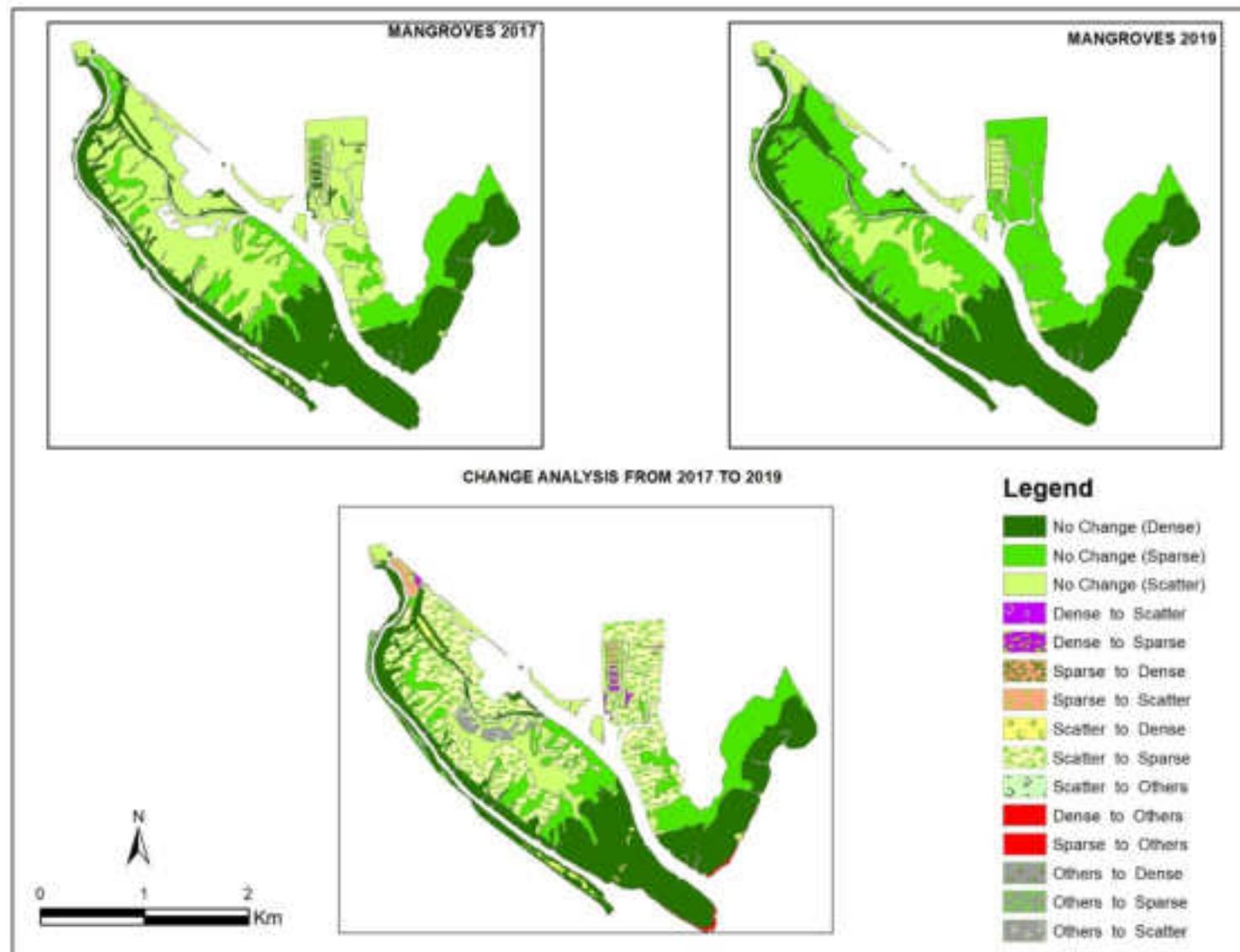


Figure 16: Mangrove layers of 2017 and 2019 and the overlaid results

Khari creek

The creek experiences normal tidal flow with settlements located in the northern part of the creek (Junabunder village). Distribution of mangroves between March, 2017 and Sep 2019 has been studied and the data is given in Table.7 and Fig.17. and categories of mangroves are indicated in Figs18 & 19. The data indicates there is a marginal increase of mangroves to the extent of 7.87 ha which 2.62% compared to 2017 level. The minor decrease in scatter category is due to its conversion to both dense and sparse. This is a normal process of changes in mangroves due to annual variation in tidal regimes. Since there has been an increase of 2.62% of mangroves compared to 2017 level, the mangroves are in normal conditions and the decrease in scatter may be due to conversion to higher category namely sparse.

Table 7: Distribution of various categories of mangroves in 2017 and 2019 in Khari creek

Category	Area in Hectares	
	2017	2019
Dense	143.71	149.46
Sparse	120.83	141.28
Scatter	36.14	17.80
Total	300.68	308.55

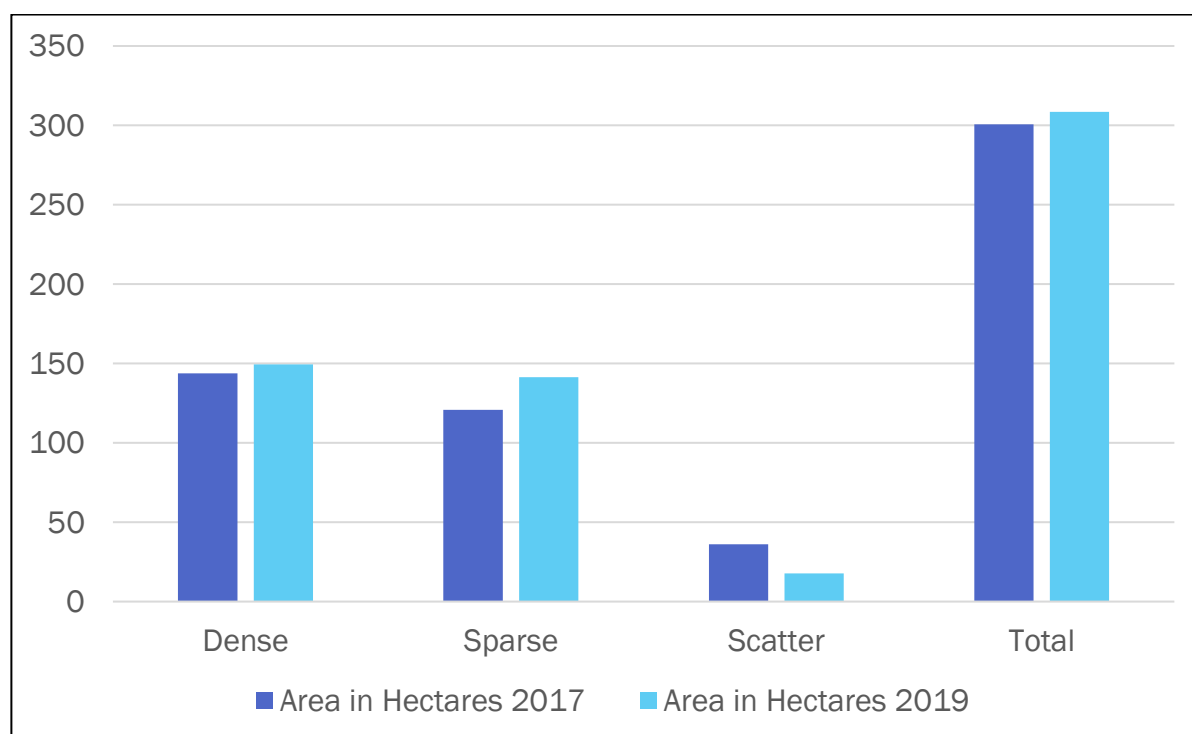


Figure 17: Comparison of mangroves in 2017 and 2019 in Khari creek



Figure 18: GIS based map showing distribution of mangroves in March,2017in Khari creek.



Figure 19: GIS based map showing distribution of mangroves in Sep.2019 in Khari creek

6. Erosion at Bocha Island

In the Conservation plan prepared in 2017, it was indicated that erosion is prevalent around the Bocha island leading loss of about 30m of coastline along with 5.33 ha of dense mangroves between 2011 and 2017 (Feb). A solution with alternative was also suggested in the Conservation plan to control the erosion. One of the main reasons attributed for the cause of erosion occurrence of strong tidal currents along the Bocha creek side of the island. Prevalence of high current was due to shallowness of the mouth of Bocha creek, which acts as barrier and deflects the tidal current to the island shore.

However, in order to check whether any natural process has nullified erosion around the Bocha island, attempt has been made to study the erosion rate from 2017 March and 2020 March using the Google image. The results have been shown in Fig.19 which indicates continued erosion at the site rate of 10 to 16 m/yr with loss of about 2 ha of dense mangroves. This re-emphasizes the need to implement the solution of deepening the submerged portion of the mouth of Bocha island to dampen the current.

The Conservation plan had already suggested two solutions to mitigate the erosion, which will be carried out after taking approvals from the concerned authorities. APSEZ has already initiated the process of obtaining required approvals to execute the first solution of deepening the mouth of Bocha creek and same will be implemented and monitored for erosion to decide the future course of actions required, if any.

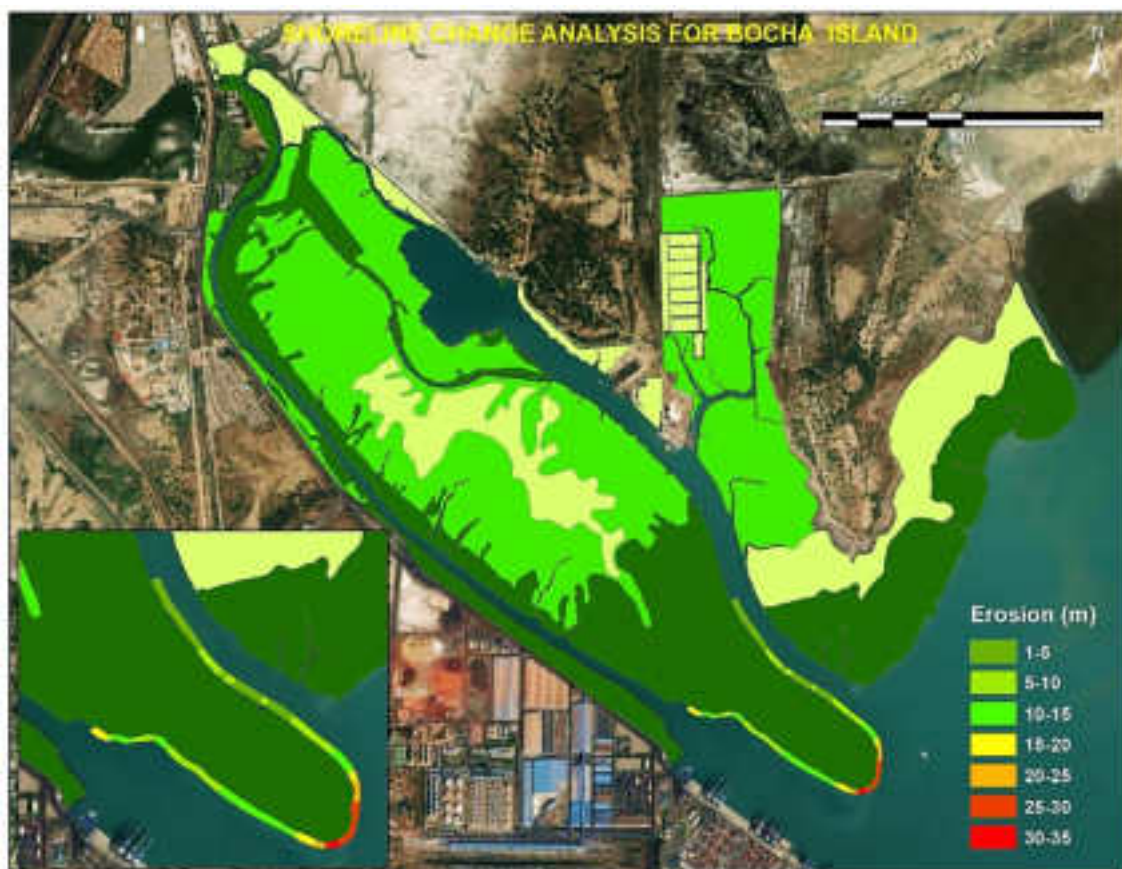


Figure 19: Rate of erosion around the mouth of Bocha island between 2017 and 2019

7. Summary

Based on the results obtained by comparing distribution of mangroves between 2017 (March) and Sep 2019 using Google earth images, following inferences could be drawn:

- (a) Overall health of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 with 2019 and it is observed that there was an 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 mangrove and the tidal system in the creeks remain undisturbed over this period.
- (b) The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.
- (c) While Kotdi creeks have shown significant increase in dense mangrove cover, it remained unchanged/ marginal increase in Baradimata creek, Navinal-Bocha island - Bocha creek system and Khari creek.
- (d) At Navinal creek, which had shown formation of sand spits from western bank to east, has shown good growth of mangroves in the southern sector. However, in the northern sector, the dense mangroves on the landward edge of western part of the creek was observed to be converted to sparse mangroves, occurring in patches. However, good tidal flow at the far end of the creek is noticed, it is recommended to measure tide at closer intervals (every 300m) in the sections of Navinal Creek upto the meeting point at Bocha creek during the next monitoring period. This may indicate locational change of tidal range and also impact of sand spits on the tidal regime from the middle to the northern end of the creek. Alternatively Drone survey with appropriate speed and elevation may also be considered in the subsequent survey(s) at both high and low tides to determine the extent of tidal water reaching along this part of bank of the creek along with the residence time.
- (e) Erosion around the Bocha island has been continuing at the rate of 10 – 16m/yr requiring urgent action. The Conservation plan had already suggested two solutions to mitigate erosion, which will be undertaken after taking approvals from the concerned authorities. APSEZ has already initiated the process of obtaining required approvals to execute the deepening the mouth of Bocha creek, as a first step and same will be implemented and monitored for erosion to decide the future course of actions required, if any.

Table 8. Observations of tide levels in the creeks in and around APSEZ

Location - 1 KOTADI CREEK 1-L2	2020	2017
LATITUDE / LONGITUDE	22° 47' 29.66"N 69° 33' 44.84"E	22° 47' 28.99" 69° 33' 42.20"
Max.	5.81	5.45
Min.	2.81	2.17
Mean	4.51	4.18

Location - 2 KOTADI CREEK 1-L1	2020	2017
LATITUDE / LONGITUDE	22° 48' 0.57"N 69° 34' 25.23"E	22° 48' 04.43" 69° 34' 28.97"
Max.	5.84	5.63
Min.	2.94	3.16
Mean	4.33	4.59

Location - 3 KOTADI CREEK-2	2020	2017
LATITUDE / LONGITUDE	22° 46' 36.45"N 69° 36' 26.25"E	22° 46' 36.77" 69° 36' 27.59"
Max.	6.08	5.60
Min.	1.38	2.98
Mean	3.24	4.78

Location - 4 BARADIMATA CREEK 1	2020	2017
LATITUDE / LONGITUDE	22° 48' 3.76"N 69° 38' 8.78"E	22° 48' 14.54" 69° 38' 22.09"
Max.	6.08	4.83
Min.	2.88	3.59
Mean	4.42	4.24

Location - 5 BARADIMATA CREEK2-L1	2020	2017
LATITUDE / LONGITUDE	22° 46' 2.65"N 69° 39' 56.80"E	22° 46' 01.30" 69° 39' 57.24"
Max.	5.90	5.50
Min.	0.50	4.01
Mean	3.46	5.01

Location - 6 BARADIMATA CREEK2-L2	2020	2017
LATITUDE / LONGITUDE	22° 47' 29.85"N 69° 40' 21.45"E	22° 47' 30.01" 69° 40' 21.83"
Max.	6.11	4.89
Min.	3.41	0.53
Mean	4.86	3.05

Location – 7 NAVINAL CREEK-L1	2020	2017
LATITUDE / LONGITUDE	22° 46' 47.51"N 69° 40' 59.09"E	22° 46' 47.49'' 69° 40' 57.78''
Max.	6.01	5.21
Min.	3.41	3.42
Mean	4.58	4.52

Location – 8 NAVINAL CREEK-L2	2020	2017
LATITUDE / LONGITUDE	22° 45' 44.89"N 69° 41' 19.88"E	22° 45' 43.39'' 69° 41' 20.61''
Max.	6.18	5.20
Min.	1.98	3.76
Mean	3.80	4.74

Location – 9 BOCHA CREEK-L2	2020	2017
LATITUDE / LONGITUDE	22° 45' 58.52"N 69° 41' 36.13"E	22° 46' 47.49'' 69° 40' 57.78''
Max.	6.03	5.75
Min.	2.53	3.87
Mean	4.33	4.97

Location – 10 BOCHA CREEK-L1	2020	2017
LATITUDE / LONGITUDE	22° 45' 43.20"N 69° 42' 22.22"E	22° 45' 47.21'' 69° 42' 16.87''
Max.	6.16	5.81
Min.	1.06	2.99
Mean	3.58	4.91

Location – 11 BOCHA CREEK-L3	2020	2017
LATITUDE / LONGITUDE	22° 45' 12.33"N 69° 42' 41.88"E	22° 44' 09.38'' 69° 43' 02.58''
Max.	5.88	5.75
Min.	1.48	3.44
Mean	3.62	4.89

Location – 12 KHARI CREEK	2020	2017
LATITUDE / LONGITUDE	22° 47' 39.13"N 69° 43' 27.00"E	22° 47' 46.53'' 69° 43' 26.82''
Max.	6.01	6.15
Min.	1.71	4.07
Mean	3.77	5.43

Location – 13: NAVINAL CREEK-L3	2020	2017
LATITUDE / LONGITUDE	22° 43' 57.58"N 69° 42' 30.60"E	22° 44' 09.38'' 69° 43' 02.58''
Max.	6.10	5.18
Min.	1.14	3.54
Mean	3.66	4.63

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

2021-22

Annual Report

CSR Kutch

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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.

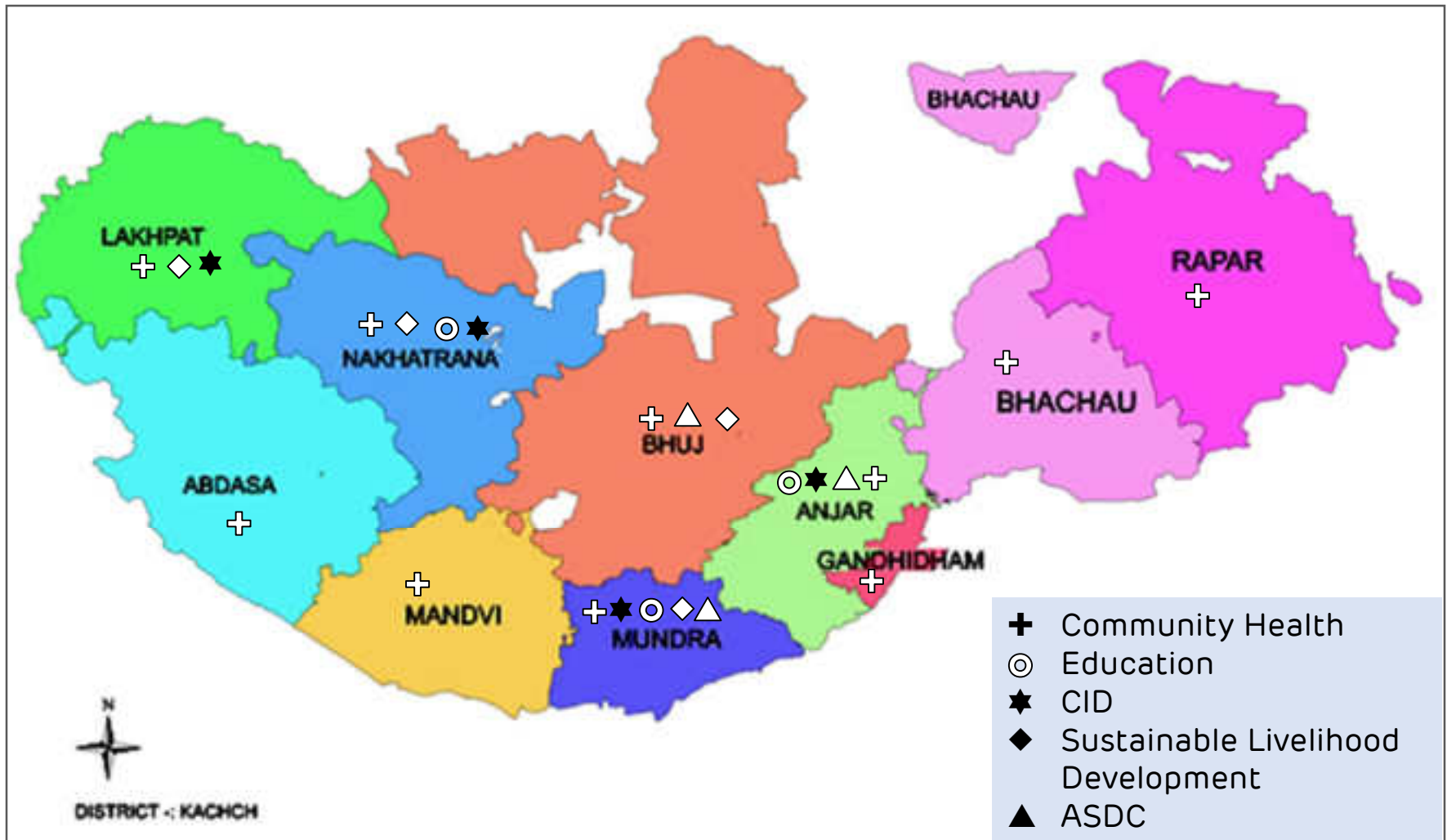
'Technical Training Program' by Adani Skill Development Centre for Fisher Folk community youth is a flagship program to provide them with a platform to get skilled and carve their future into new career options. The ASDC is committed to the cause of the deprived and underprivileged to generate employment 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



INDEX

6	Education	61	Adani Skill development
13	Adani Vidya Mandir Bhadreswar	66	Adani Green Energy Ltd. - Nakhtrana
17	Community health	67	Addani Cementtaion Limited -Lakhpur
25	Community Health Bhuj	68	AKBPTL - Tuna
26	Environment Sustainability	69	CSR-Bita
36	SLD Fishermen	70	Dignity Work shop -EVP
45	SLD-Live stock	73	Events
48	SLD-Agriculture	80	Our change maker
53	SLD-Women Empowerment	96	Our change maker
57	Community Resource Cneter	97	Beneficieires details
59	Community Infrastructure	98	Finacial Over view



Education (SDG - 4/4.a)



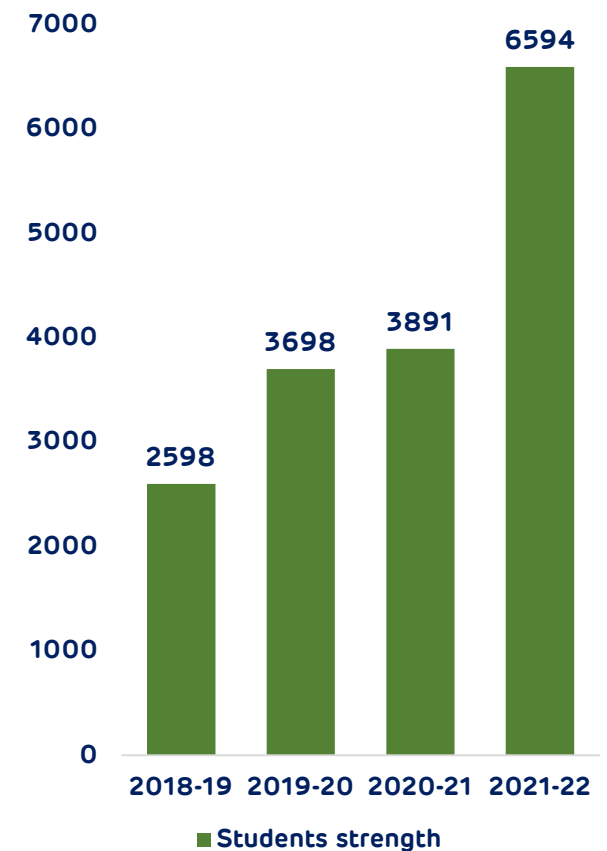
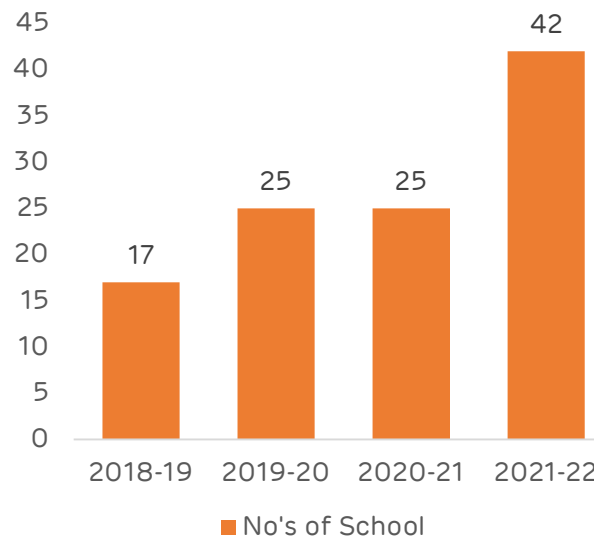
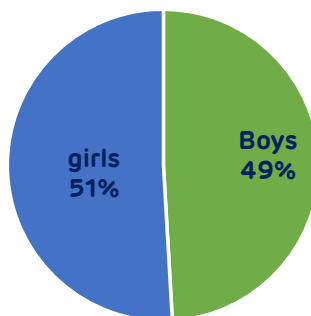
Education Projects

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.

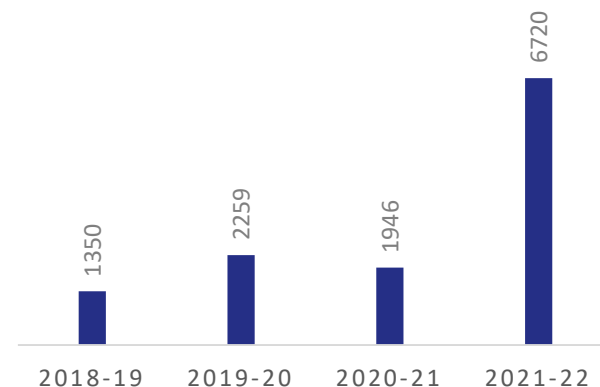
IT on wheel program is run to teach them Basic emphasizes elementary school digital literacy.

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

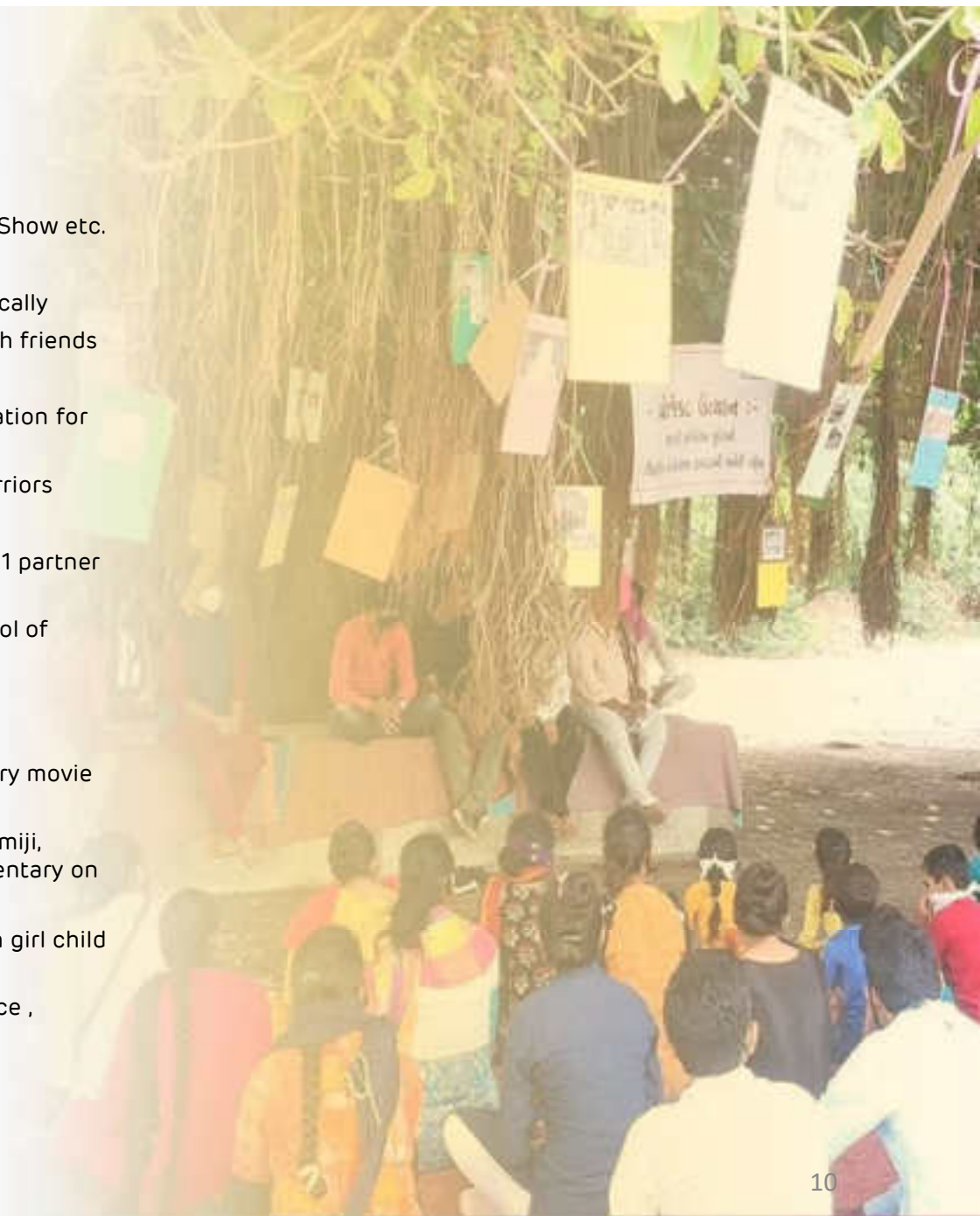
A child's maximum growth occurs in initial years of education where involvement of teacher as well as mother plays a key role in nurturing their character and personality. Many of the students are first generation learners with uneducated parents, in such case, Mother's meet helps mother and teacher 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

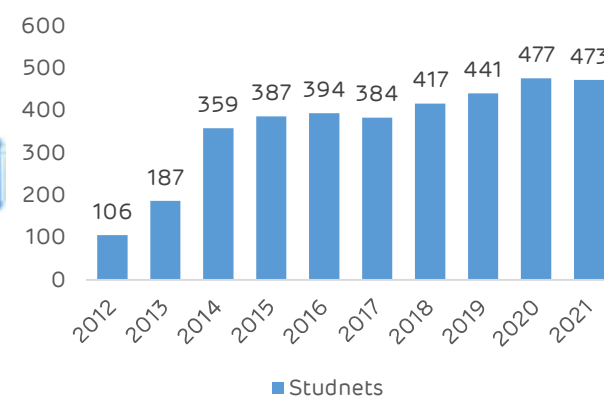
Project Activity

- 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.

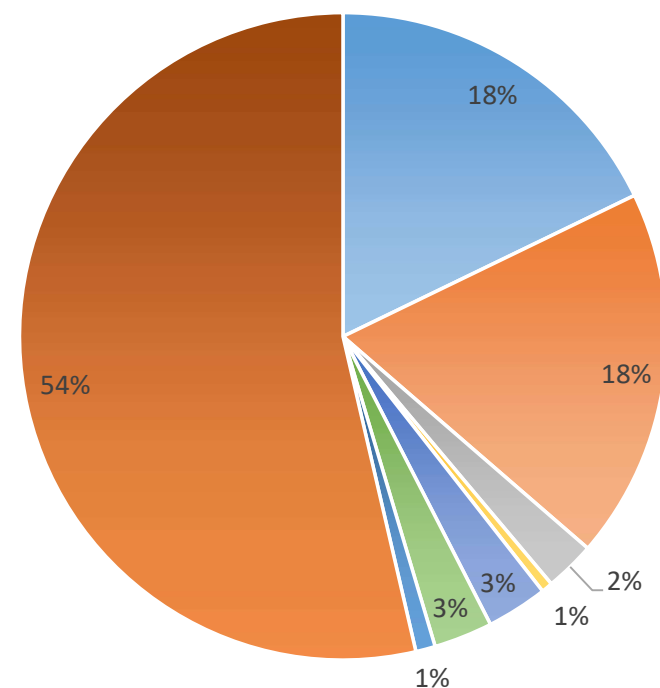


It is health that is real Wealth , not a piece of Gold and silver.

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

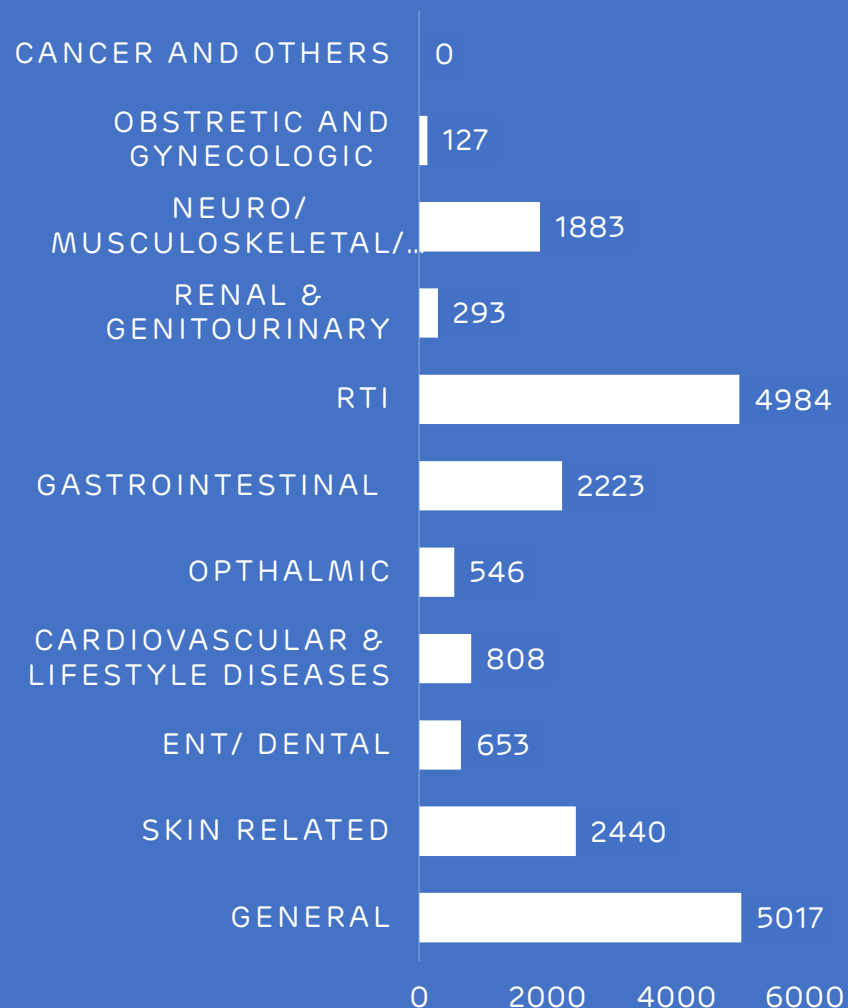
The mobile health care unit is operated by Medical officer and health care assistant and equipped with various integrated medical devices that allows Medical staff to conduct preliminary check up. more than 90 types of general life saving medicines are available in MHCU and covered 29 villages and 07 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 stork*

- ✓ reduce carbon sequestration by 3 T per hecter 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 Mammals-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.





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

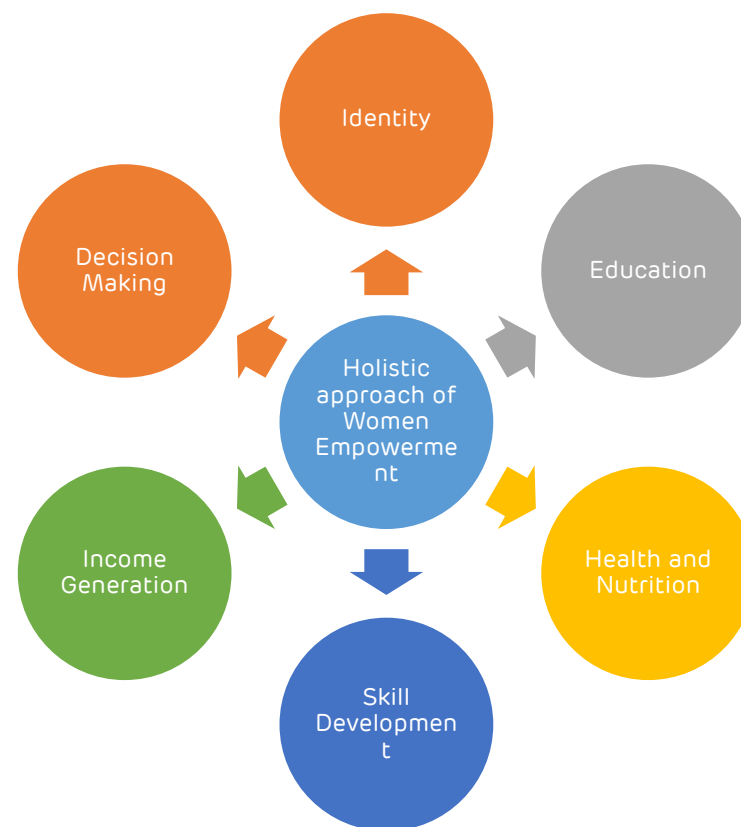
Women are central to the entire development process, be it in an individual family, village, state or to a nation. Adani Foundation provides platform to community women to break the ceiling and move out as a change makers in their communities and among societies keeping their traditions intact. A considerable 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.



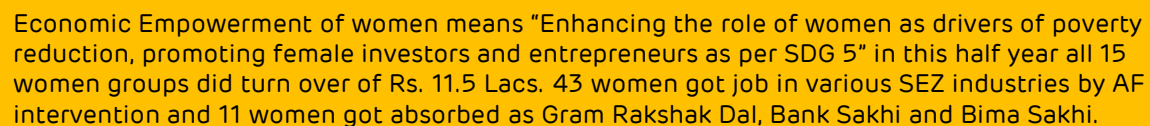


Total 15 Active SHG Groups are engaged as mentioned in table Income generation activity. We facilitate them capacity building training for quality ,Marketing Finance and team work to made them self sustain.

Major Achievements:

- Saheli Swa Sahay Juth have **completed order of 15000 Sanitary pad** from District Health Department.
- **"Shradha Saheli Swa 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.
- Shradha Saheli & Jay Adhar Saheli have been registered in FSSAI (Food safety and standards Authority of India.
- Turn over of Tejaswi Saheli, Shradha 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

56

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.

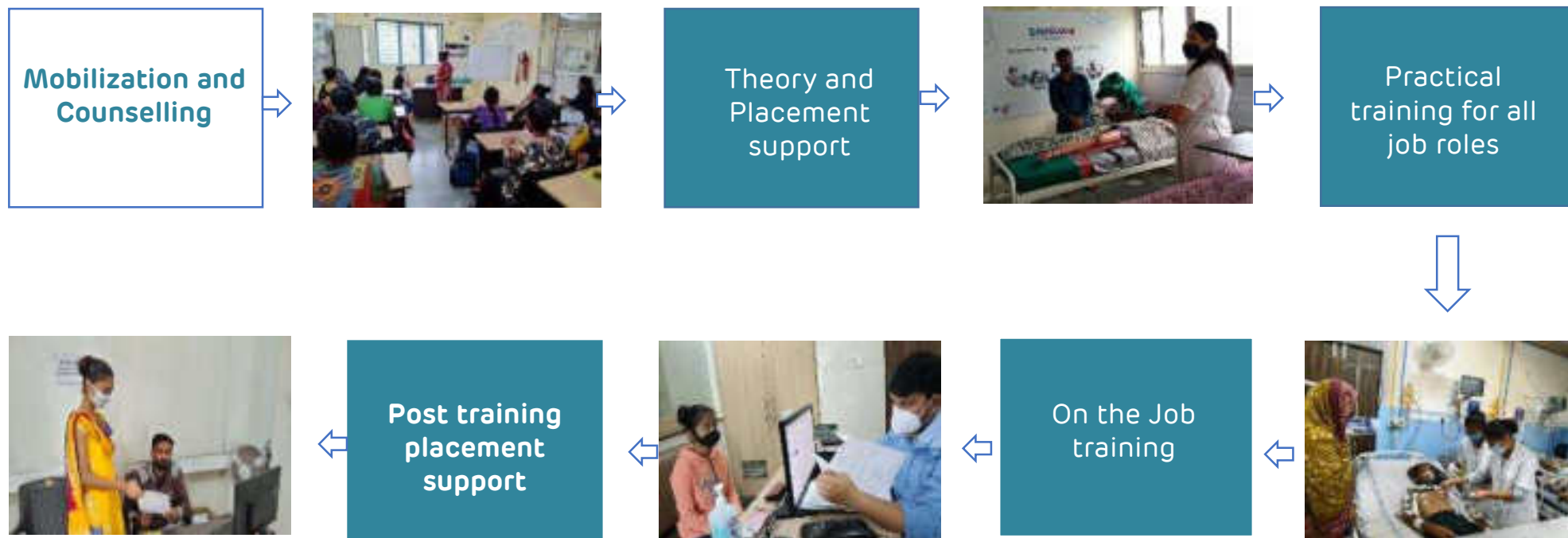


Adani Skill Development Centre

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 implement 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 Vandri 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 Drinking 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.

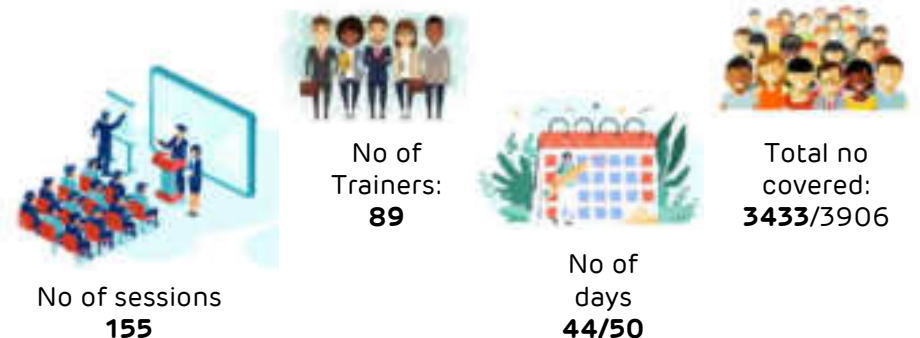
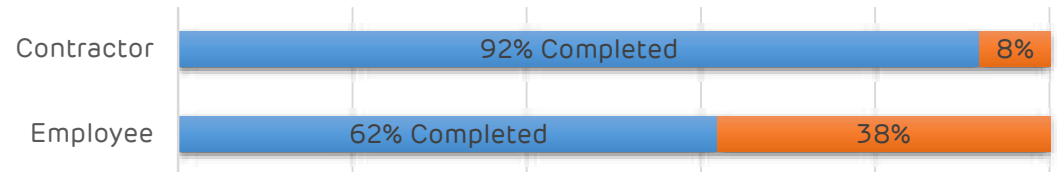


Dignity of Work Force Programme - EVP



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, KKGH 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 decalared 1st winner for Paper presentation and 1st to 5th winner for Drawining 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 saving 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 Bishweswar 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	Lakhpat	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



Media coverage



Thank You

Annexure – 7

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 – 8

Compliance Report of CIA Study Environment Management Plan

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
1	Land Use Change						
1.1	<p>It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015.</p> <p>New settlements near the SEZ area might create slums.</p> <p>Unorganized urban development leading to poor sanitation and proliferation of vectors and disease.</p>	Level - 1	<p>APSEZ has developed two townships (Shantivan and Samudra) presently accommodating 1668 households. Necessary permissions from concerned authorities were already obtained for the development of townships and Associated infrastructure facilities.</p>	<p>The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.</p>	APSEZ	As and when Required	<p>APSEZ has developed two townships (Shantivan and Samudra) accommodating 2057 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 97.4% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 65 nos. of industries (processing & non-processing) are present within the SEZ (51 nos. are in operation). Township facilities are also made by some of SEZ industries within Mundra town for their employees with basic infrastructure facilities and requirements.</p> <p>Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be expanded as per requirement.</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							APSEZ has also been granted permission for receiving domestic sewage @ 2.5 MLD from Mundra village (which was earlier discharged into open area within Mundra region) in to wastewater treatment plant for treatment and disposal. APSEZ has already started receiving of domestic sewage from Mundra, which abates the poor sanitation and unhygienic condition within Mundra region. Total project cost for laying domestic sewage underground pipeline with other associated facilities from Mundra to APSEZ is 362 Lacs.
1.2	Once the project is fully developed, due to increase in built up land in the APSEZ area, there will be an increase in the storm water runoff from the facility.	Level-1	The study area experiences scanty rainfall less than 400 mm/year. Considering the natural gradient, ASPEZ have designed and implemented storm water drains in the existing facility to meet the	Technical feasibility study can be carried out to explore the possibility of developing storm water collection ponds to utilize maximum possible storm water runoff for dust suppression in the coal yard areas during non-rainy days.	APSEZ	Technical Study - one time, Implementation - Continual process	<p>Presently, ~51% of the total SEZ is developed. Based on technical studies,</p> <p>At present all existing coal yards are designed with drain, for collection of water during water sprinkling and rainfall, which is carried away to dump pond. Supernatant water from dump pond is being collected and used for dust suppression activities or after sedimentation, discharged to sea. Details of drain and dump pond has been submitted in along with EC compliance report (Oct 19 to March 20). Analysis of said water discharging into sea during monsoon season is being carried out (twice in a year during monsoon) through NABL / MoEF&CC accredited laboratory. Analysis report of the same shows there is no any contamination. The report is attached herewith as Annexure – i.</p> <p>During compliance period FY 2021-22, the maximum</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
			peak daily rainfall of 440 mm/hr. Hence flooding of water in the neighboring areas is not envisaged.				recorded rain fall was 5.6 mm/hr observed, which was much less than the design capacity of existing storm water drainage system. So our existing storm water management facility is adequate to handle the storm water runoff from the area. Hence flooding of water in the neighboring areas is not envisaged.
			As per the directions given in the environmental clearance issued for the proposed Multi-Product SEZ and CRZ clearance for Desalination, sea water intake, outfall facility and pipeline project, the master plan of the project was	The channel depth in all the natural streams shall be maintained to accommodate peak flood flow during the monsoon and periodical desilting activities in the natural streams passing through the APSEZ area	APSEZ, District Administration* and Irrigation department	As and When Required	Presently there is no Desalination plant, sea water intake and outfall facility developed as part of EC & CRZ clearance of Multiproduct SEZ. The project will be designed and implemented as per requirement without disturbing the natural flow of rainwater in all the seasonal streams.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
			designed and being implemented without disturbing the natural flow of rainwater in all the seasonal streams.				
1.3	Due to conservation and protection of mangroves in the designated conservation area, it has been predicted that the current mangrove footprint area would marginally increase in next 15	Positive Impact with ecological benefits	In addition to conservation of the identified 1254 ha mangrove areas around Mundra port and SEZ, APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations	APSEZ will continue mangrove afforestation as per the commitment made with concerned regulatory authority	APSEZ	Short Term	<p>APSEZ has carried out mangrove afforestation in 3140 ha. area across the coast of Gujarat till date. Total expenditure for the same till date is INR 847.8 lakh.</p> <p>No further mangrove afforestation is pending w.r.t. commitment made with concerned regulatory authority for APSEZ, Mundra project.</p> <p>As per study conducted by NCSCM, Chennai in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr.</p> <p>Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between March 2017 (Total 2340) and September 2019 with an extent of 256 Ha (Total 2596 Ha Area) which is about 10.94% rise in growth rate, also It</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance						
	years due to natural growth. This will enhance the overall biodiversity in the local coastal eco-system.		across the coast of Gujarat state in consultation with various organizations				<p>reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an increase in dense mangroves along with the conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table><tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr><tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td><ul style="list-style-type: none">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</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
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											

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									<p>that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</p> <ul style="list-style-type: none"> 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 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance		
									<ul style="list-style-type: none"> 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 – 1 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 Cattles / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance		
									<ul style="list-style-type: none"> 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. Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in 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. 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.
								Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species	

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							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 mangrove species. Total 16 Ha. multi-species mangrove plantation has been carried out till March-22 association with M/s. GUIDE, Gujarat.
1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		Detailed hydro-dynamic modelling and shoreline change prediction for a fully developed APSEZ facility has been studied. The study reveals that the erosion and accretion in the study area at the end of 15th year will be	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	<p>Shore line change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study is as below.</p> <p>To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis</p> <p>10km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side</p>

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			within the designated criteria of ± 0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra shoreline.				<p>Shoreline and that of the right side as East Side Shoreline for ease of recognition.</p> <p>The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively.</p> <p>The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.</p> <p>APSEZ has already awarded work to the agency namely M/s. Gujarat Institute of Desert Ecology, Bhuj for carrying out Shoreline Change Assessment Study for Mundra region vide P.O. No. 4802013270 dated 30.03.2022. The cost of said study is INR 1,739,320 Lacs. The said study is under progress.</p>
2	Regional Traffic Management Plan						
2.1	The projected traffic data as per the EIA Report of Multi-Product Special Economic Zone, the peak	Level-1	As per the master plan of APSEZ, eight artillery roads will be connected to either state highway or national highway for evacuating	Additional road as per master plan will be built in future based on the overall progress of the project. Currently about 25% of cargo from APSEZ is transported by	APSEZ	As and When Required	<p>Presently, ~51% of the total SEZ is developed. Based on technical studies,</p> <p>Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has increased to ~38.36 %, thereby reducing the usage of road.</p> <p>Additional road facilities will be built as per master plan considering future development.</p>

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	<p>vehicular traffic from the port and SEZ operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively.</p> <p>There could be a possible increase in traffic congestions on village-highway intersections and road accidents.</p>		<p>the goods from APSEZ. None of these roads are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500</p>	<p>Rail and the same will be enhanced to 40% when the facility is fully developed in future. This will further reduce the traffic volumes on the regional road network.</p>			<p>The facilities for transportation of cargo other than road will be enhanced considering future development, which will reduce the traffic volumes on the regional road Network.</p>

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			PCU/hr. Out of eight artillery roads considered in APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training Programs to all their contractors to enhance awareness on road safety.	APSEZ can undertake technical feasibility of implementing Intelligent Transport System (ITS) for the freight carriers associated with their development activities.	APSEZ & GSRDC*	Long Term	APSEZ is being imparting the regular in-house classroom and on-job training to all drivers and employees on below topics: ✓ ✓ Basic induction Training for drivers ✓ ITV Driver Training ✓ ITV Driver Induction for Supervisor ✓ Defensive Driving for LMV & HMV ✓ Defensive Driving & BBS ✓ Driver Assessment ✓ Road accident & rescue ✓ Traffic Management & Road Signage ✓ Driving safety training ✓ RORO Driver training ✓ Road Safety ✓ Defensive Driving & Emergency Action Plan ✓ Drivers Responsibilities & Safe driving

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							<p>✓ Emergency Rescue (Vehicle) Training</p> <p>Approx. 1448 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period Oct 21 to Mar 22. The same will be continued in future also.</p> <p>APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system.</p> <p>Following steps were taken by APSEZ to reduce the accidents.</p> <ul style="list-style-type: none"> ✓ Handling and escorting of the ODC for ensuring the smooth movement on the roads. ✓ Traffic Awareness programs for the drivers and regular briefing of the drivers in the parking areas. ✓ Incident handling and root cause analysis for taking necessary action in order to avoid such incidents. ✓ BAC checks for the drivers in order to identify the intoxicated drivers and necessary action is being taken against them. ✓ Water spray drive at gates are being conducted on regular basis during night hours to avoid dozing by the driver while driving. ✓ RTMS devices are being installed at 08 critical locations in order to capture speed violations and enforcing road safety regulations.

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							<ul style="list-style-type: none"> ✓ Display of traffic signages and lane markings on road in coordination with the Civil team for ensuring road safety rules are being followed by the road users. ✓ We have approx. 100+ cameras which are being utilized for monitoring of traffic movement through CCTV and timely response in order to avoid any congestion and during traffic incidents. ✓ Regular traffic checks by Traffic Marshalls in order to ensure road safety rules (Wearing seat belt/Wearing helmet/Carrying driving license/Speed checks/Documents) is being followed by the drivers. ✓ Installation of Road furniture's (Cones/Water filled barriers/Cats eye/Spring Posts/Jersey Barriers) for lane segregation, Channelizing the traffic, at Junctions and indicating Caution for the road users.
3	Water resources Management and sewage treatment & disposal Plan						
3.1	For a fully developed APSEZ facility, water demand will be in the order of 4,30,000 m ³ /day (430 MLD). APSEZ will	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination	As per the master plan and permissions granted under EC, APSEZ will be developing progressively 4,50,000 m ³ /day (450 MLD) of desalination plants to meet the future	APSEZ	As and When Required	<p>Currently there are two fresh water sources available with APSEZ.</p> <p>Desalination Plant – 47 MLD</p> <p>Narmada water through GWIL – 9 MLD (sanctioned capacity).</p> <p>Current water demand for APSEZ along with SEZ industries including Adani Power Plant is an avg. of 28 MLD.</p> <p>So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ</p>

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	be sourcing majority of the water from the captive desalination plants, which will be developed in progressive manner.		plant at site. Necessary water allocation from concerned authorities was obtained and the same will be renewed from time to time as per the directions of state government.	demand. Hence stress on regional water resources due to these developmental projects will be less significant.			including member units. The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.
3.2	Existing water demand in the Mundra taluk is estimated as 8500 m ³ /day (@55 lpcd) and the potable and sanitation water needs	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to enhance ground water	Adani Foundation is planning to implement the various water resource conservation programs in next ten years under various schemes.	APSEZ and CGWB*	Long Term	Water needs of APSEZ is being met through existing Desalination Plant of APSEZ and GWIL which may be further enhanced on modular basis, At present Ground water is not utilized for any activities within APSEZ. However various works are being carried out by Adani Foundation continuously under Water Conservation Work to achieve water security in Mundra region by Adani Foundation. Following works are carried out as a part of water conservation work since April – 2018. 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

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	would increase to 37,000 m ³ /day (@125 lpcd) in future when the area is fully grown into larger municipality due to induced economic growth. Water demand of the local communities is met through Narmada water supply system to some extent, but largely depending on the		resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.				<p>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 (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 were built leading to a significant increase in water table and higher returns to the farmers. 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.

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	ground water in the study area. Mundra block is reported to be a safe ground block as on date. Due to influx of people and rapid urbanization due to the economic development, there could be some stress on the ground water resources in future.						<ul style="list-style-type: none"> Recharge Borewell 189 Nos (83 Nos current FY 2021-22) which is best ever option to. Drip Irrigation 1158 Farmers (180 farmers 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 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>Adani foundation has spent approx. INR 6047.05 lakhs from April – 2018 to Mar – 2022 for CSR activities which also includes water conservation projects as mentioned above.</p>
3.3	It is estimated that about 60,000 m ³ /day (60	No Impact	Seven sewage treatment plants with an aggregate	APSEZ is permitted to develop decentralized sewage	APSEZ	As and When Required	Current installed capacity of wastewater treatment plants is 6.05 MLD (ETP, STPs & CETP) for treatment of effluent & sewage generated at various locations of APSEZ excluding wastewater treatment plants installed within individual member units.

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	MLD) of sewage will be generated from the APSEZ facility when the project is fully developed.		capacity of 3.1 MLD have already built at APSEZ. Treated sewage is utilized for greenbelt development and sewage is not discharged into either seasonal natural streams or marine environment.	treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized for greenbelt development.			<p>Out of 51, only 4 operational industries within the SEZ are sending their partially treated industrial as well as domestic effluent to the CETP conforming to CETP inlet norms for further treatment and final disposal. Other SEZ industries have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per specific permission granted by SPCB.</p> <p>APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP.</p> <p>Presently avg. 2.03 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during October'21 to March'22. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development.</p> <p>Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.</p>
4	Air quality management Plan						
4.1	Although all the regulated activities in		APSEZ and other thermal power plants	All existing and new industrial establishments will obtain	APSEZ And Other Industries	Continual Process	APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air).

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	the study area will be adopting promulgated emission norms, total air emission mass discharge from the study area would increase.	Level-2	have obtained valid consent to operate and have been operating the facilities as per the emission norms stipulated in respective consent orders. APSEZ and other two power plants are monitoring the ambient air quality on regular intervals as per GPCB/CPCB guidelines and the data is analyzed and	requisite consents from GPCB and adhere to the stipulated emission norms regulations and guidelines issued by authorities from time to time.			<p>Ambient Air Quality monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi for APL as per NAAQ standards, 2009. Stack emission monitoring is also being carried out on regular basis. Reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>Adani power plant has installed continuous emission and air quality monitoring instruments as per CPCB Directive and submitting the reports also. Another power plant of CGPL is outside APSEZ area.</p> <p>The AAQM summary for last six months (Oct'21 to Mar'22) are as below.</p> <p>Locations: 18 Nos. (APSEZ – 13 + APL – 5 including 4 villages) Frequency: Twice in a week</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>PM10</td><td>µg/m3</td><td>95.43</td><td>40.36</td><td>69.15</td><td>100</td></tr><tr><td>PM2.5</td><td>µg/m3</td><td>55.39</td><td>14.56</td><td>30.77</td><td>60</td></tr><tr><td>SO2</td><td>µg/m3</td><td>44.16</td><td>5.11</td><td>17.29</td><td>80</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Parameter	Unit	Max	Min	Average	Perm. Limit\$	PM10	µg/m3	95.43	40.36	69.15	100	PM2.5	µg/m3	55.39	14.56	30.77	60	SO2	µg/m3	44.16	5.11	17.29	80						
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			presented to GPCB on monthly basis. Both the thermal power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				<table><tr><td>NO₂</td><td>µg/m³</td><td>47.15</td><td>7.15</td><td>24.70</td><td>80</td></tr></table> <p>[§] as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards.</p> <p>Approx. INR 14.31 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p> <p>Other industries located within the SEZ have obtained requisite permissions from the competent authorities for their respective plant and they also carried out environmental monitoring within their premises to comply with the permission granted. The same has been ensured by APSEZ as well as SPCB during their regular visits. APSEZ carries out regular visits/inspections of member industries within SEZ and last visit was conducted during Jan to March' 2022 for EMS & compliance verification. During compliance verification, it was verified that monitoring of air emission was well within the permissible standards based on analysis reports. Same will be continued in future also.</p> <p>The monitoring reports of industries within SEZ are also being submitted to the regulatory authorities as a part of half yearly Compliance report of EC for Multi-Product SEZ.</p>	NO ₂	µg/m ³	47.15	7.15	24.70	80
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				A common air quality management committee may be framed under the guidance of the State Pollution Control Board and district administration to manage regional level emission inventory data that can help to manage regional level air quality management goals.	APSEZ and Other Industries, Stakeholders, District Administration and GPCB*	Long Term And Continual	<p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities for air quality management within APSEZ area. However, at present, APSEZ has formed Internal Environment Monitoring Committee, involving officials from APSEZ, Adani Power Limited and other SEZ member units with following role and responsibilities:</p> <ul style="list-style-type: none"> • Identification of sources of air & noise emission and its dispersion in surrounding villages • Remedial measures to eliminate, control, reduce or capture air & noise emission • Identify available resource to abate the air and noise emission • Required additional resources for control of air and noise emission • Drinking water and its testing of all the available fresh water sources in surrounding villages • Identify any surrounding villages affected by organization's improper waste disposal mechanism. <p>Last committee meeting was conducted on dated 23rd March 2022, and below was the point of discussion for way forward.</p> <ul style="list-style-type: none"> • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions

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							<ul style="list-style-type: none"> Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. Discussed about the proper management of the canteen waste. Discussed about the cleaning of outside of the SEZ units. Discussed about the management of rain water & proper cleaning of the common storm water drainage system. Discussed about proper segregation & disposal of solid waste material. Discussed about to increase more green belt area inside plant premises of SEZ units <p>APSEZ and all the industries within SEZ are in compliance to NAAQS and same is being ensured by APSEZ. The monitoring reports of industries within SEZ are being submitted to the regulatory authorities as part of half yearly Compliance report of EC for Multi-Product SEZ.</p>
4.2	Release of particulate emissions from handling and storage of coal at the port and power plants	Health Impact	APSEZ has been implementing the following management plan to control emissions as per the	All industries located in the APSEZ shall adhere to the emissions norms and minimum stack height guidelines issued by CPCB and	APSEZ and Other Industries	Continual Process	<p>Following safeguard measures are taken by APSEZ for abatement of dust emissions.</p> <ul style="list-style-type: none"> Adequate stack heights to the Boilers, D.G. Sets, TFHs & HWGs for proper dispersion of pollutants within APSEZ Using of liquid & Gaseous fuels instead of solid fuels in Boilers, Thermic fluid heaters and hot water generators. Regular sprinkling on road and other open area

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	would influence PM10 and PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.		applicable regulations and similar practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water sprinkling on road and other open areas, regular cleaning of roads, dry fog dust suppression systems (DSS) in hoppers, transfer towers and conveyor belts, use of water mist	consent to operate issued by Gujarat Pollution Control Board from time to time.			<ul style="list-style-type: none">Regular cleaning of roadsDry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor beltsUse of water mist canonClosed type conveyor beltsRegular sprinkling on coal heapsCovering other types of dry bulk cargo heapsInstallation of wind breaking wallDevelopment of greenbelt along the periphery of the storage yards/back up areaMechanized handling system for coal and other dry bulk cargoWagon loading and truck loading through closed silo <p>Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant.</p> <p>The stack monitoring summary for last six months (Oct'21 to Mar'22) are as below.</p> <p>Total Nos. of Stacks: 23 Nos. Frequency: Monthly / Half Yearly</p> <table><tr><th>Parameter</th><th>Unit</th><th>GPCB Limit</th><th>Min</th><th>Max</th><th>Average</th></tr><tr><td>PM</td><td>mg/ Nm³</td><td>150</td><td>16.30</td><td>22.40</td><td>18.95</td></tr><tr><td>SO₂</td><td>Ppm</td><td>100</td><td>4.25</td><td>6.50</td><td>5.86</td></tr></table>	Parameter	Unit	GPCB Limit	Min	Max	Average	PM	mg/ Nm ³	150	16.30	22.40	18.95	SO ₂	Ppm	100	4.25	6.50	5.86
Parameter	Unit	GPCB Limit	Min	Max	Average																				
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			canon, covered conveyor belts, regular sprinkling on coal heaps,				<table><tr><td>NO_x</td><td>ppm</td><td>50</td><td>18.76</td><td>30.80</td><td>28.23</td></tr></table> <p>Values recorded confirms to the stipulated standards.</p> <p>Approx. INR 14.31 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22, which also includes stack monitoring for overall APSEZ, Mundra.</p> <p>All other industries located within SEZ are adhere to provide adequate stack height and pollution control measures for proper dispersion of pollutants as per respective permissions granted by the board. The same is being inspected and ensured by APSEZ as well as SPCB officials on regular basis.</p>	NO _x	ppm	50	18.76	30.80	28.23
NO _x		ppm	50	18.76	30.80	28.23							
		covering of other types of dry bulk cargo heaps by protective materials, installation of wind breaking wall, development of greenbelt along the periphery of the storage	An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively co-ordinate the approach to coal dust management and monitoring	APSEZ and Other Industries, Concerned Stake holders, District Administration*	Long Term	<p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, with specific role and responsibilities as defined above.</p> <p>The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons. Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant.</p> <p>Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions within the thermal power plant for proper dispersion of pollutants.</p>							

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			yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and truck loading through closed silo. Both thermal power plants in the study area have installed electrostatic precipitators on the boilers and are meeting the emission norms as per the respective ECs granted. Due to installation				<p>Green belt / plantation is provided around the periphery of dry cargo storage area and regular water sprinkling is also being done to abate the dust emission from coal hips.</p> <p>Last committee meeting was conducted on dated 23rd March 2022, and below were the point of discussion for way forward.</p> <ul style="list-style-type: none"> • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & proper cleaning of the common storm water drainage system. • Discussed about proper segregation & disposal of solid waste material. • Discussed about to increase more green belt area inside plant premises of SEZ units

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			of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due to release of emissions from two power plants is insignificant.				
4.3	Ships are one of the significant sources of SO ₂ and NO _x emissions in the study area. Marine diesel engines on the ships often utilize fuel oils that might contain	Level-2	A Standard Operating Procedure (SOP) has been developed to be included as a part of APSEZ environment management plan to verify that all ships	The current global limit for Sulphur content of ships fuel oil is 3.5 % m/m (mass by mass). According to MARPOL, the new global cap on sulphur in the marine vessel fuels will be 0.50% m/m by the 1st January 2025.	APSEZ and Ship Owners	Long Term	The ships coming to the APSEZ are complying with MARPOL and other shipping rules and regulations. APSEZ has already started providing shore power supply to the tugs (11 Nos.), dredgers (2 Nos.) and barges (1 No.). The feasibility of shore power will be explored and implemented on large scale for the visiting vessels to reduce idling stage ship emissions.

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	higher sulphur content. As per the international best practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due to lower stack heights of the marine diesel engine, ship emissions often gets dispersed in		anchored at the port are adopting the MARPOL4 regulations.	APSEZ should explore the possibility of providing shore power to the ships at the port to reduce idling stage ship emissions.			

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	the local environment and might pose risk of fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
4.4	Road vehicle emissions will be other major contributors to the air pollution in the region when the facility is fully	Level-2	Not Applicable	Due to implementation of Bharat VI fuels (MoEF&CC)6 in near future the vehicular and diesel engine emissions will be reduced by about 50% from the current national levels. APSEZ should develop a robust contractor environmental	APSEZ and All Industries	Short Term	<p>Presently, cargo evacuation through rail / conveyer / pipeline has increased to ~38.36 %, thereby reducing the usage of road.</p> <p>Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area.</p> <p>In future, APSEZ will also explore the feasibility of using Electric Vehicles for internal cargo movement.</p>

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	developed.			policy to ensure that Bharat Stage VI emission norms are adopted by all their contractors and sub-contractors.			
5	Noise emissions						
5.1	Noise emissions are envisaged from port operations, industrial operations and power plants in the study area. Any increase in noise levels beyond three decibels from the	Level-1	Due to adoption of various mechanized operations at the waterfront development, the noise emissions from the port cargo handling will be minimal. An adequate greenbelt is being developed by APSEZ to further	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to demonstrate the compliance with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the community grievances, when	APSEZ	Continual Process	<p>Below Safeguard measures are already taken for abatement of noise emissions.</p> <ul style="list-style-type: none"> • Development of greenbelt along the periphery of the operational area. • D.G. Sets having Acoustic enclosures. • Maintenance of plant machineries and equipment's on regular frequency. <p>Noise monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi as per permission granted and reports are being submitted to the concerned authorities on regular basis.</p> <p>The noise monitoring summary for last six months (Oct'21 to Mar'22) are as below.</p> <p>Locations: 13 Nos. Frequency: Once in a month (24 hourly)</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance																		
	background levels would be perceived as noise nuisance (USEPA)7.		reduce any residual impacts due to noise emissions from the facility. Periodic noise level monitoring programs were adopted by APSEZ. Predicted noise levels were found to be well within the designated noise standards for Industrial facilities.	ever required. To assess the overall site wide compliance and also to address any community grievances related to noise issues due to operation of APSEZ facilities.			<table><tr><th>Noise</th><th>Unit</th><th>Leq Max</th><th>Leq Min</th><th>Leq Avr.</th><th>Leq Perm. Limit^{\$}</th></tr><tr><td>Day Time</td><td>dB(A)</td><td>72.90</td><td>53.25</td><td>64.35</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>67.80</td><td>48.28</td><td>59.26</td><td>70</td></tr></table> <p>^{\$} as per GPCB standards</p> <p>Approx. INR 14.31 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22, which also includes noise monitoring for overall APSEZ, Mundra.</p> <p>All the results are well within the standards. From this it can be inferred that there no impacts on the surrounding community.</p> <p>All other industries located in the APSEZ are adhere to monitor and control the ambient noise level as per permission granted by SPCB and same is being confirmed by APSEZ as well as SPCB on regular basis.</p> <p>Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.</p>	Noise	Unit	Leq Max	Leq Min	Leq Avr.	Leq Perm. Limit ^{\$}	Day Time	dB(A)	72.90	53.25	64.35	75	Night Time	dB(A)	67.80	48.28	59.26	70
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				In order to address the public grievances	APSEZ	Continual	As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other																		

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				related to noise from the facility, an internal Noise Management Committee can be formed by APSEZ to investigate the root cause and to develop and implement noise mitigation plans in the specific zones.		Process	<p>member units, having role and responsibilities as defined above.</p> <p>Last committee meeting was conducted on dated 23rd March 2022, and below were the point of discussion for way forward.</p> <ul style="list-style-type: none"> Brief introduction about the Environment Management Plan (EMP) All members conveyed his environment management practices, issue & suggestions Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. Discussed about the proper management of the canteen waste. Discussed about the cleaning of outside of the SEZ units. Discussed about the management of rain water & proper cleaning of the common storm water drainage system. Discussed about proper segregation & disposal of solid waste material. Discussed about to increase more green belt area inside plant premises of SEZ units <p>No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.</p>
6	Surface water quality (Terrestrial and Marine)						
6.	In general,		As per the master plan	As per the master plan of APSEZ,	APSEZ	As and When	APSEZ has installed Common Effluent Treatment Plant (CETP) having 2.5 MLD capacities for treatment of

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1	release of untreated wastewater from industrial facilities would pose threat to water quality of streams, estuaries and marine water bodies.	Level -1	of APSEZ, 67 MLD of wastewater is expected to be generated from the fully developed project scenario, for which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP capacity of 2.5 MLD is in place. Presently member units treat their effluents to	the existing CETP shall be augmented to 67 MLD in progressive manner based on the future demand. The facility should limit the marine discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.		Required	<p>partially treated effluent and sewage generated from industries within SEZ.</p> <p>Currently, CETP receives 669 KLD (Avg.) hydraulic load and considering the current development scenario, existing CETP is adequate to treat and handle the total effluent load coming from industries within SEZ.</p> <p>Out of 51 only 4 industries within SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming CETP inlet norms for further treatment and final disposal. Other industries within SEZ have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per permission granted by SPCB.</p> <p>The capacities of CETP will be enhanced on modular basis as per future requirement.</p> <p>Presently avg. 2.03 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period Oct'21 to Mar'22 and no discharge is made to any other source.</p>

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			meet the CETP inlet norms and then send it to CETP. Treated wastewater from CETP meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				
			Online wastewater quality monitoring systems are installed at CETP to ensure quality of treated effluent meets the requisite	Efforts shall be made to recycle complete treated wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility study.	APSEZ	Based on outcome Techno-feasibility Study	Online continuous effluent monitoring system installed at the discharge point of CETP to track any deviation from discharge norms. Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.

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			discharge norms. No wastewater from CETP is discharged into natural bodies as on date..																												
			Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond) to remove any residual dust particulates for further disposal into sea	Storm water runoff from the facility during the first rain shall be sampled and analyzed for the presence of heavy metals or other criteria pollutants to adopt corrective and preventive actions to protect the marine water quality. All red and hazard category industry within APSEZ shall adopt spill prevention and	APSEZ	Continual	<p>There are provision of drains around coal stack yard to carry to runoff water to dump ponds. This water is either used for dust suppression or after sedimentation (to remove residual dust), is allowed disposal to sea.</p> <p>Presently Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi for APSEZ & APL both. The analysis reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>The marine water quality monitoring summary for last six months (Oct'21 to Mar'22) is as per below.</p> <p>Locations: 14 Nos. (APSEZ – 9 + APL – 5) Frequency: Once in a Month / Half Yearly</p> <table border="1"> <thead> <tr> <th>TEST PARAMETERS</th><th>UNIT</th><th colspan="3">Cumulative Surface</th><th colspan="3">Cumulative Bottom</th></tr> <tr> <th></th><th></th><th>Min</th><th>Max</th><th>Average</th><th>Min</th><th>Max</th><th>Average</th></tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	TEST PARAMETERS	UNIT	Cumulative Surface			Cumulative Bottom					Min	Max	Average	Min	Max	Average								
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				control program and no effluents shall be discharged into storm water-drains.			<table border="1"> <tr> <td>pH</td><td>--</td><td>7.3</td><td>8.26</td><td>8.02</td><td>7.5</td><td>8.21</td><td>8.03</td></tr> <tr> <td>BOD</td><td>mg/L</td><td>2.1</td><td>5.9</td><td>4.09</td><td>0</td><td>5.8</td><td>2.79</td></tr> <tr> <td>TSS</td><td>mg/L</td><td>24</td><td>144</td><td>70.45</td><td>30</td><td>118</td><td>64.34</td></tr> <tr> <td>DO</td><td>mg/L</td><td>5.3</td><td>6.7</td><td>5.92</td><td>4.9</td><td>6.5</td><td>5.61</td></tr> <tr> <td>Salinity</td><td>ppt</td><td>34.1</td><td>36.7</td><td>35.75</td><td>33.4</td><td>37.3</td><td>36.24</td></tr> <tr> <td>TDS</td><td>mg/L</td><td>29104</td><td>37604</td><td>35921</td><td>31828</td><td>37992</td><td>36488</td></tr> <tr> <td>Temperature</td><td>oC</td><td>29</td><td>30.2</td><td>30</td><td>29</td><td>30.1</td><td>30</td></tr> </table> <p>Approx. INR 14.31 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22, which also includes noise monitoring for overall APSEZ, Mundra.</p>	pH	--	7.3	8.26	8.02	7.5	8.21	8.03	BOD	mg/L	2.1	5.9	4.09	0	5.8	2.79	TSS	mg/L	24	144	70.45	30	118	64.34	DO	mg/L	5.3	6.7	5.92	4.9	6.5	5.61	Salinity	ppt	34.1	36.7	35.75	33.4	37.3	36.24	TDS	mg/L	29104	37604	35921	31828	37992	36488	Temperature	oC	29	30.2	30	29	30.1	30
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			Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil	Good dredging practices shall be adopted by APSEZ: (i).Improving the dredging accuracy (ii).Improving onboard automation and	APSEZ	Long Term	<p>No capital dredging has been done, since Apr 2015. Dredged material generated during maintenance dredging is being disposed at designated locations within deep sea as identified by NIO.</p> <p>Dredging Management plan is adopted for carrying out dredging and management of dredge material. Presently there are 3 nos. (2 Nos. Cutter suction + 1 No. Trailer suction) of dredgers are in operation for dredging.</p>																																																								

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			disposal practices, sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As part of the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly	monitoring, (iii). Reduce spill and loss, (iv). evaluating the need for installing silt screens near mangrove areas during the dredging phase operations, (v). Environment friendly dredging activities can be undertaken in such a way that the overall turbidity levels near the mangrove and ecologically sensitive zones shall not exceed 100 NTU or 200 mg/l of TSS (10% lethal level of fish) Existing marine monitoring program shall be continued as per			<p>Marine 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. The analysis reports of the same are being submitted to the concerned authorities on regular basis. Summary of marine water for the last six months is as mentioned above.</p> <p>The same practice will be continued in future also as per direction by MoEF&CC as well as GPCB.</p> <p>Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.</p>

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			basis.	the directions of MoEF&CC and GPCB.			
7	Groundwater quality and salinity ingress						
7.1	While Mundra block is enjoying safe ground water status as on date (based on the data published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra region. This	Level-2	APSEZ is not utilizing ground water for any type of use. APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	A dedicated desalination plant of capacity 4,50,000 m ³ /day (450 MLD) will be developed in progressive manner to meet the APSEZ requirements.	APSEZ	As and When Required	<p>Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through Gujarat Water Infrastructure Limited and same is sufficient to meet the present water demand.</p> <p>APSEZ does not draw any ground water.</p> <p>The desalination plant of additional capacities will be installed on modular basis considering future development and requirement.</p>

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	might increase the TDS and chloride levels in the ground water in future.						
7.2	Due to induced growth in the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.	Level-2	Ground water is not drawn by APSEZ for its operations. Natural streams (seasonal rivers) passing through the APSEZ area will not be disturbed, the micro-watershed in the area will not be disturbed. Due to the above reasons, the	The Govt. of Gujarat, Narmada, Water Resources, Water Supply & Kalpsar Dept.,(WRD) ¹² has been implementing various salinity ingress prevention projects	District Administration*	Long Term	<p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities.</p> <p>APSEZ does not draw any ground water for the fresh water requirement.</p> <p>However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals.</p> <p>Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan.</p> <p>Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain</p>

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			possibility of salinity ingress due to APSEZ development is not envisaged. Mundra and Anjar blocks fall under fresh water to medium salinity zones. It can be observed that little variation was observed in the ground water salinity levels from year 2013 to 2016 across the Mundra and Anjar blocks. This aspect confirms that the overall				<p>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"> • 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. • 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 farmers 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 is completed.

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			salinity ingress from the shore into the land due to existing APSEZ facilities and power plant outfalls are less significant.				<p>With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Narmada Water Resources, Water Supply & Kalpsar Dept., (WRD)1 has been implementing various salinity ingress prevention projects. Under Sardar Sarovar canal project, Govt. of Gujarat has proposed to implement about 8200 Km stretch of water canal and the project is at various stages of implementation. Under this project about 112,000 ha of land in about 180 villages will be benefitted with irrigation needs. This will significantly reduce the pressure on the ground water resources in the region.</p>										
				While the individual industries in the study area will continue to undertake ground water quality monitoring as per the environmental	All Concerned Stakeholders, District Administration and CGWB*	Continual Process	<p>APSEZ (9 Locations – half yearly) & Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water sampling and reports of the same are being submitted to the regulatory authorities on regular basis.</p> <p>The summary of APSEZ ground water quality monitoring for last six months (Oct'21 to Mar'22) are as below.</p> <p>Nos. of Location: 09</p> <table><tr><th>Parameters</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	Parameters	Unit	Min	Max	Average					
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				clearances issued for the respective projects, a regional level ground water conservation action committee can be formed under the guidance of state ground water board and district Administration.			<table><tr><td>pH @ 25 ° C</td><td>--</td><td>7.37</td><td>8.17</td><td>7.78</td></tr><tr><td>Salinity</td><td>ppt</td><td>0.95</td><td>11.85</td><td>3.95</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>0.08</td><td>0.05</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>0.07</td><td>0.17</td><td>0.10</td></tr><tr><td>Total Chromium as Cr</td><td>mg/L</td><td>0.07</td><td>0.09</td><td>0.08</td></tr><tr><td>Cadmium as Cd</td><td>mg/L</td><td>0.10</td><td>0.10</td><td>0.10</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>0.39</td><td>0.25</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>0.11</td><td>1.12</td><td>0.67</td></tr><tr><td>Insecticides/Pesticides</td><td>µg/L</td><td>Absent</td><td>Absent</td><td>Absent</td></tr><tr><td>Depth of Water Level from Ground Level</td><td>meter</td><td>1.80</td><td>2.15</td><td>1.99</td></tr></table> <p>* ND – Not Detectable</p> <p>Approx. INR 14.31 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2021-22, which also includes noise monitoring for overall APSEZ, Mundra.</p> <p>The freshwater requirement of all the industries within SEZ is being satisfied through APSEZ. All the industries are encouraged to monitor ground water quality as per the permissions granted by competent authorities.</p> <p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving</p>	pH @ 25 ° C	--	7.37	8.17	7.78	Salinity	ppt	0.95	11.85	3.95	Oil & Grease	mg/L	ND*	ND*	ND*	Hydrocarbon	mg/L	ND*	ND*	ND*	Lead as Pb	mg/L	0.04	0.08	0.05	Arsenic as As	mg/L	ND*	ND*	ND*	Nickel as Ni	mg/L	0.07	0.17	0.10	Total Chromium as Cr	mg/L	0.07	0.09	0.08	Cadmium as Cd	mg/L	0.10	0.10	0.10	Mercury as Hg	mg/L	ND*	ND*	ND*	Zinc as Zn	mg/L	0.15	0.39	0.25	Copper as Cu	mg/L	ND*	ND*	ND*	Iron as Fe	mg/L	0.11	1.12	0.67	Insecticides/Pesticides	µg/L	Absent	Absent	Absent	Depth of Water Level from Ground Level	meter	1.80	2.15	1.99
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							<p>Officials of APSEZ, Adani Power Limited and other member units, having role and responsibilities as defined above.</p> <p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities for ground water management.</p>
8	Waste Management						
8.1	Solid waste will be generated from industrial activities of APSEZ and other permitted facilities in the study area including Mundra town. These wastes would contain recyclable material, construction debris,	Level-2	APSEZ has been adopting Zero waste Initiatives and the entire waste generated from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	APSEZ will continue to adopt Zero Waste Initiative and wastes will be segregated at source and disposed to various recycling vendors, co-processing in cement plants. This initiative helps not only to reduce the waste to landfill significantly, but also to recycle the materials there by avoiding ecological impacts.	APSEZ	Continual Process	<p>Presently APSEZ has implemented Zero waste Initiatives as per 5R (Reduce, Reuse, Recycle, Recover & Reprocess) principles of waste management. At present, APSEZ has developed material recovery facility for 6.0 TPD capacities. A well-established system for segregation of dry & 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, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plants for Co-processing as RDF (Refused Derived Fuel). The same practice will be continued in future also. APSEZ has also been recognized for Zero Waste to Landfill certification from reputed organization.</p>

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	organic waste, inert material and e-waste etc. In the absence of any organized source segregation programs and material recycling strategies and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.						<p>APSEZ, Mundra is certified for Zero Waste to Landfill 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>APSEZ will continue proper solid waste management in his operational area.</p>
8.2	Considering an average solid waste	Level-2	APSEZ has made a provision for central waste	The existing waste segregation and material recycling	APSEZ	Continual	

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	generation of 0.25 Kg/person/day, the estimated solid waste from facilities within APSEZ will be in the order of 100 TPD (36,500 TPA).		management facilities within the existing site based on the future needs. As part of the Zero Waste Initiatives, no landfill facilities will be installed at APSEZ.	facilities will be augmented to dispose safely the wastes generated from APSEZ areas. Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016		Process	Industries located within the SEZ area are also complying with the waste management rules stipulated by statutory authorities and same is also being confirmed by APSEZ as well SPCB on regular basis.
8.3	About 35 TPD (13,000 TPA) of solid waste would be generated from the proposed industrial areas	Level-2	As per the MSW Rules 2016 all the industrial facilities and SEZs are required to adopt waste segregation facilities at	Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste	All Industries	Continual Process	

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	located outside the APSEZ area.		the respective properties and non-recyclable waste shall be disposed to landfill sites.	Management Rules 2016			
9	Ecological aspects (terrestrial and marine)						
9.1	About 1576 ha of shrub forest land contiguous to APSEZ area is applied for land diversion for various developmental activities. This might	Level -1	It is noted that the designated forest land is free from any native vegetation and comprises of Prosopis juliflora. It is also noted that no endangered species are	APSEZ has approached concerned authorities for diversion of designated forest land. Suitable compensatory afforestation plan shall be adopted based on the recommendations and directions of the concerned authorities. Due to adoption of	APSEZ/State Forest Department*	Long Term	Stage – 1 forest Clearance for about 1576.81 Ha Forest land has been obtained. Presently APSEZ is in the process of compliance to the stage – 1 Forest Clearance conditions, for further submitting to Govt. authorities for issuance of Stage-2 Forest Clearance.

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	have certain level of changes in the biodiversity in the study area.		present at the shrub forests that are applied for land diversion. It is also noted that no forest produce is reported from this designated forest land parcel due to lack of economic importance of plant species reported in the shrub forest. It is also noted that no tribal lands are located in the designated	compensatory afforestation program through a scientific manner, the overall ecological footprint in the district will be increased. Due to plantation of native tree species as part of greenbelt development, the overall biodiversity of the region will increase considerably when the project is fully developed.			

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			forest land parcel. Hence there will not be any change in biodiversity due to the proposed diversion.				
9.2	Mangrove conservation areas are located adjacent to the APSEZ area. Accidental discharges of industrial effluents into the marine environment would pose certain ecological risk.	Level -1	No development activities will be undertaken within mangrove conservation areas. APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	<p>As per study conducted by NCSCM in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr.</p> <p>Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between March 2017 (Total 2340) and September 2019 with an extent of 256 Ha (Total 2596 Ha Area) which is about 10.94% rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an increase in dense mangroves along with</p>

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			across the coast of Gujarat state in consultation with various organizations The Adani Foundation introduced 'Mangrove Nursery Development and Plantation' scheme in the area as an alternative income generating activity for the people of the region.				<p>the conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table><tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr><tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td><ul style="list-style-type: none">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</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
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									<p>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.</p> <ul style="list-style-type: none"> 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 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.

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									<ul style="list-style-type: none"> 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 – 1 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 Cattles / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg. 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

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									<div>for fodder supporting activities was approx. 206.11 Lacs during FY 2021-22.</div> <ul style="list-style-type: none">• Village Gauchar land development for the fodder cultivation to made fodder sustain village & Avail green fodder in 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.• 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.
							<div>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 mangrove species. Total 16 Ha. multi-species mangrove plantation has been carried out till</div>		

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							<p>March-22 association with M/s. GUIDE, Gujarat.</p> <p>Mangrove plantation done at Luni sea coast with fisher folk community during World Environment Day Celebration. Web talk show was organized on the occasion of "World Mangrove days On Multi species Mangrove bio diversity with Joint effort of GUIDE and Adani Foundation, Mundra. 8th June is celebrated as world ocean day. Adani foundation had celebrated the world ocean day by coastal cleaning activity at Juna Bandar, Luni Bandar and Bavadi Bandar.</p> <p>Mangroves nursery is developed in a Khari creek behind IOCL & 125000 Nos. of new saplings were planted in creek area by APSEZ.</p>
9.3	Outfall from the thermal power plants desalination and CETP would pose certain level of impact on the marine environment.	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the background temperature and salinity at mangrove conservation	All approved marine outfalls shall be monitored for salinity, temperature and other designated parameters as per consent to establish issued by GPCB. Existing marine environmental monitoring	APSEZ and Concerned Industry	Continual Process	<p>Presently marine monitoring is being carried out by the Adani power plant at the marine outfall locations and reports are being submitted to the concerned authorities on regular basis.</p> <p>APSEZ is carrying out Marine monitoring once in a month at 9 locations in deep sea by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Surat and Unistar Environment and Research Labs Pvt. Ltd., Vapi. The analysis reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>Adani power plant is also doing marine water quality at 5 locations (2 locations at outfall location) in deep sea by NABL and MoEF&CC accredited agency namely M/s.</p>

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			area will not increase from the prevailing background levels as the outfalls are located far away. APSEZ and respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated environmental and ecological parameters.	program shall be continued.			<p>Unistar Environment & Research Labs Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. The summary of marine water quality is shown above.</p> <p>The comparison of marine water results between CIA and current monitoring data are as below.</p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Max</th><th colspan="2">Min</th></tr><tr><th>CIA</th><th>Present</th><th>CIA</th><th>Present</th></tr><tr><td>Temp.</td><td>°C</td><td>30.2</td><td>30</td><td>28</td><td>29</td></tr><tr><td>Salinity</td><td>ppt</td><td>41.8</td><td>37.3</td><td>34.9</td><td>36.3</td></tr></table> <p>As per above results, it can be seen that there is no major deviation in the concentration of parameters and thus indicates that impacts are insignificant.</p>	Parameter	Unit	Max		Min		CIA	Present	CIA	Present	Temp.	°C	30.2	30	28	29	Salinity	ppt	41.8	37.3	34.9	36.3
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9.4	Terrestrial Ecology:	Level-1	APSEZ has developed greenbelt in an area of	The compensatory afforestation	APSEZ	Continual Process	APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial plantation/greenbelt development. APSEZ, Individual SEZ Industries and Adani Power Plant has developed																						

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	Study area doesn't have any notified national parks or ecological sanctuaries. Since the area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in the area is very small.		550ha as against the committed area of 430ha. A dedicated nursery is set up to promote plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	area to be monitored annually to check the survival rate of the plantation.			more than 700 Ha. area as greenbelt within the APSEZ area including SEZ industries & Adani Power Plant. Dedicated horticulture department is maintaining and monitoring the terrestrial green belt development on regular basis to check the survival rate of plantation. Total expenditures of the horticulture dept. of APSEZ during the FY 2021-22 within APSEZ is INR 921 lakhs.
10	Socio-economic aspects						
10.1	Population growth in the Mundra region was reported to be in the	Level-1	Dedicated townships are developed within APSEZ area with necessary	The existing townships will be expanded to accommodate about 4lakh people when the	APSEZ	As and When Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2057 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which

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	order of 85% during the past decade (2001-2011). Further expansion of the urban area could be possible due to induced economic growth in the region. Increase in population will have a additional need for public infrastructure in the region.		community infrastructure s such as hospital, school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR	project activity is fully developed.			<p>97.4% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 51 nos. of industries (processing & non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within Mundra town for their employees having basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate to accommodate the people considering present APSEZ development. The existing townships with associated facilities will be expanded as per requirement. Other infrastructure facilities have been developed for people are as follows.</p> <ul style="list-style-type: none"> • Multi-Specialty Hospital • School • Commercial complex • Religious place <p>APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation in the main five persuasions is mentioned below.</p> <ul style="list-style-type: none"> • Community Health

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			activities in the Mundra region since 2010. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				<ul style="list-style-type: none"> Sustainability Livelihood – Fisher Folk Education Rural Infrastructures <p>Adani foundation has spent approx. INR 6470.23 lakhs from April – 2018 to March – 2022 for CSR activities which also includes cost of rural infrastructure projects.</p> <p>Major works carried out since April 2018 as a part of CSR activities are as below.</p> <ul style="list-style-type: none"> Pond Deepening work at Vadala & Mota Bhadiya Artificial recharge borewell in Borana, Mangara & Dhrub village. Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities. Construction of 45 Toilet block and proper bathing place for labours. RO Plant – Samaghogha, Siracha village & Vallabh Vidyalaya at Mundra Basic sanitation facility (18 Nos) at Balvadi, medical centre and retiring places at labour settlements 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 FY 2021-22) which is having 10,000 litre storage which

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							<p>is 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 FY 2021-22) which is best ever option to. • Drip Irrigation 1158 Farmers (180 farmers are supported with 15% of amount of total cost for maximum 4.0 lac. in current FY 2021-22) • Participatory Ground Water Management in ten villages with holistic approach for Kankavati Sandstone Aquifer Programme. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Development of Prisha Park at Mundra. • Pond Bund strengthening at Zarpara Village • Approach Road Restoration at all Fisher folk vasahat. • Garden Development at Primary School Rampar village • Shed Development at Shukhpurvah Mundra • Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 223 home biogas in Dhrub, Zarpara and Navinal Villages. • Adani Foundation at Mundra-Kachchh has initiated multi-species plantation of mangroves in Kachchh in association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. 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.

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							<ul style="list-style-type: none"> Sea Weed Culture - A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red sea weeds Kappaphycus alvarezii, Gracilaria dura and green sea weed Ulva. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period. 50 RRWHS 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). <p>Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.</p>
10.2	The overall sex ratio was found to reduce by 28% in the Mundra taluk (study area) during the period 2001 - 2011. This	Level-2	Adani foundation is taking up several girl child education programs as part of CSR	Suitable regional level awareness programs on the girl child protection and encouragement programs in line with state and national policies shall be adopted	APSEZ, Other development projects and District Administration*	Long Term	<p>Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below.</p> <ul style="list-style-type: none"> The Adani Foundation provided scholarship support to motivation and encouragement of fishermen boys and girls for higher education under this program. APSEZ provide 100% fees support to girls as a scholarship.

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	could be attributed to increase in influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced economic growth in the region.		activities to create awareness about girl child protection.	under Corporate Social Responsibility programs in association with district authorities.			<ul style="list-style-type: none"> • Uthhan Project promotes girl child education, Creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samridhhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it. • Separate sanitation facilities for girl child in schools. • Suposhan Project focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescents under this Project and brought them to considerable status. • Beti Vadhavo Programme was organized in 32 Villages in the presence of Village Sarpanch and other leaders in year 2017-18. We explained people about the various topics i.e. importance of girl child, Sex Ratio, Gender Equality and laws regarding Child abortion. This initiative was well accepted by community and we have observed a visible change in their mindset. We have facilitated 560 daughters with Kit (Small Bed sheet, Mosquito net, Soap and Cream with nutritious food for mother) To create awareness about health, personal hygiene, child education and nutritional diet in fishermen community, various awareness programs have been organized. • During the year various activity like, Covid-19 awareness in village & Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National Deworming Day, National Nutrition Month had been celebrated.

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							<ul style="list-style-type: none"> Project Suposhan is initiated with the Motive Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages. <ul style="list-style-type: none"> ✓ 100 beneficiaries covered in Menstrual Hygiene Day - with slogan called "RED-ACHHA HAI" ✓ 204 beneficiaries covered in Breastfeeding Week ✓ 320 beneficiaries covered in National Deworming Day ✓ 20 villages covered in celebration of NATIONAL NUTRITION MONTH ✓ 42 FAMILY COUNSELLING ✓ 2059 Women participated in celebration of Women's Day week. To reduce malnutrition and anemia amongst Children 95 % & adolescent girls and pregnant & lactating women by 70 % in three years Reduction IMR and MMR Support Awareness & Cover 100 % Vaccination taken by Child & women. SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other dignitaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta. The National girl child day was celebrated with ICDC Department with Vahli Dikri Yojna form filling, paediatric health camp and Baby health kit distribution at Mundra. Mrs. Ashaben-CDPO Mundra was remain present in this event. Total 61

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							<p>forms has received approval letter from GOG and 15 forms filled upon the same day.</p> <ul style="list-style-type: none"> Adani Foundation is working with 15 Self help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. <p>About INR 6470.23 lakhs has been spent on various CSR activities in the Mundra region since April 2018 to till Mar 2022 including cost of community health and education for woman and girl child.</p>
10.4	Due to economic growth leading to rapid urbanization, which prompts the need for healthcare facilities in the region. For an influx of 6 lakh people from APSEZ operations and	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide primary and secondary health care services to Adani group employees and the local populace of Mundra. The existing 100	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the growth scenario at APSEZ development.	APSEZ	Long Term	<p>Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township.</p> <p>Primary health center and community health center are in place within the Mundra taluka.</p> <p>Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below.</p> <p>Adani foundation has spent approx. INR 6470.23 lakhs from April – 2018 to Mar – 2022 for CSR activities cost including cost of community health.</p> <ul style="list-style-type: none"> Mobile Health Care Units and Rural Clinics 12 Rural Clinics 09 villages of Mundra, 03 villages of Anjar & Mandvi block has benefited by rural clinic service.

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	additional 3 Lakh from induced growth by the year by 2030 (fully developed scenario), total hospitals facilities with about 540 beds would be required.		bed Adani hospital at Mundra has been catering the services ranging from wellness and preventative care.				<ul style="list-style-type: none"> • Support to 1409 vulnerable patients • 31 villages covered, with 94 types of general and lifesaving medicines through Mobile healthcare unit • 57420 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 charges • 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 • 34 senior Citizens linked up with Ayushman Yojana and 67 Senior Citizens were referred to GKGH Bhuj for chronic illness. <p>Other than this, Adani Foundation has also worked for fight against COVID – 19 pandemic situations for last two years.</p> <p>Present Hospital facilities are adequate to avail the medical treatment for Mundra region considering present development. Other Occupational Health centres, primary health centres and community health centres are also in place in Mundra to take care the people residing in Mundra. Adani group is also operating high quality health care services to the people of Kutch at G. K. General Hospital, Bhuj having</p>

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							750 beds facilities on public private partnership (PPP) model, which is 60 km far from Mundra. APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.
10.5	Due to rapid economic development in the region, several employment opportunities can be generated to the local people. When the area is fully developed by the end of 2030, the working population of the Mundra taluk would increase from current level of 55,000 to as high as 4,00,000,		APSEZ has been giving preferences to people from Gujarat for providing employment opportunities based on eligibility and skills. In Mundra, special programmes have been conducted by Adani Foundation to enhance the employability of youth from fisherfolk communities. Based on the need assessment	APSEZ is committed to provide support for fishermen livelihood activities and has submitted a detailed 5 years plan to MoEF&CC with a total budget of Rs.13.5 Cr.	APSEZ	Short Term	Following support provided during this compliance period as a fisherfolk livelihood. <ul style="list-style-type: none"> 1031 families has benefitted by water supply at nine fisher folk vasahats under Machhimar Ajivika Uparjan Yojana. 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. Average 75 KL of water was supplied to 676 households at 5 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana and other 4 fisherman vasahat has linkaged with Narmada water through GWIL and Mundra Gram Panachayat from which 355 households get benefited. 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ 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.

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	which will be 45% of the total envisaged population in Mundra Taluk by the end of 2030.		results, several livelihood options have been introduced by the Adani Skill Development Centre, Mundra. In these centres, youth can join and get vocational training for a number of technical and non-technical skills. An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum possible extent.				<ul style="list-style-type: none"> 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 wormicompost 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 leverage Government schemes. 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 Cattles / 3008 farmers and hence

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							<p>enhancing cattle productivity. Dry Fodder 895398 Kg Green –2425230 Kg.</p> <ul style="list-style-type: none"> 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 turn over of Rs. 24 Lacs with Profit of 1 Lac. This initiative has supported more than 1800 farmers indirectly. Dragon fruit farming is on going 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. <p>APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes:</p> <ul style="list-style-type: none"> Vidya Deep Yojana Vidya Sahay Yojana – Scholarship Support Adani Vidya Mandir Fisherman Approach in SEZ Machhimar Arogya Yojana Machhimar Kaushalya Vardhan Yojana Machhimar Sadhan Sahay Yojana Machhimar Awas Yojana

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							<ul style="list-style-type: none"> • Machhimar Shudhh Jal Yojana • Sughad Yojana • Machhimar Akshay kiran Yojana • Machhimar Suraksha Yojana • Machhimar Ajivika Uparjan Yojana • Bandar Svachhata Yojana <p>These initiatives are planned for the period 2016 – 2021 with a committed expense of INR 13.5 Cr as submitted earlier in detail in the report namely "Silent Transformation of Fisher folk at Mundra", .</p> <p>Till, Mar'22 approx. 11.53 Cr. INR, has already been spent in support for fishermen livelihood activities.</p>

Annexure – i

TEST REPORT

Report No.	URC /21/12/Water/APL-0001		
Name & Address of Customer	M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port) PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	18/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Pond Water	Location	Nr.ATT-2A
Sample Qty.	5 Lit.	Appearance	Colorless
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	17/12/2021
Sampled By	UERL Lab	Sampling Method	UERL/CHM/SOP/116
UERL Lab ID. No.	21/12/Water/APL-0001		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
1.	Colour	IS 3025(Part 4)	Pt. Co. Scale	5.0
2.	Odour	IS 3025(Part 5)1983	--	Agreeable
3.	Total Suspended Solids	APHA 23 rd Ed.,2017,2540 –D	mg/L	28
4.	pH @ 25 ° C	APHA 23 rd Ed.,2017,4500-H*B	--	7.39
5.	Temperature	IS 3025(Part 9)1984	°C	29.6
6.	Oil & Grease	IS 3025(Part39)1991, Amd. 2	mg/L	BDL(MDL:2.0)
7.	Total Residual Chlorine	IS 3025(Part 26)1986,	mg/L	BDL(MDL:0.1)
8.	Ammonical Nitrogen	IS 3025(Part 34)1988,	mg/L	2.12
9.	BOD (3 days at 27 °C)	IS 3025(Part 44)1993Amd.01	mg/L	5
10.	COD	IS 3025(Part 58)2006	mg/L	30.1
11.	Arsenic (as As)	APHA 23 rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
12.	Mercury (as Hg)	APHA 23 rd Ed.,2017, 3112-B	mg/L	BDL(MDL:0.001)
13.	Lead (as Pb)	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
14.	Cadmium (as Cd)	IS 3025(PART 41) 1992	mg/L	BDL(MDL:0.003)
15.	Hexavalent Chromium	APHA 23 rd Ed.,2017,3500CrB	mg/L	BDL(MDL:0.05)
16.	Total Chromium (as Cr)	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
17.	Copper (as Cu)	IS 3025 (PART 42) 1992	mg/L	BDL(MDL:0.05)
18.	Zinc (as Zn)	IS 3025(PART 49) 1994	mg/L	BDL(MDL:0.05)

TEST REPORT

Report No.	URC /21/12/APL-0001		
Name & Address of Customer	M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port) PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	18/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Pond Water	Location	Nr.ATT-2A
Sample Qty.	5 Lit.	Appearance	Colorless
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	17/12/2021
Sampled By	UERL Lab	Sampling Method	UERL/CHM/SOP/116
UERL Lab ID. No.	21/12/APL-0001		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
19.	Selenium (as Se)	IS 3025(Part 56)2003	mg/L	BDL(MDL:0.01)
20.	Nickel (as Ni)	APHA 23 rd Ed.,2017,3111-B	mg/L	BDL(MDL:0.02)
21.	Cyanide (as CN)	IS 3025(Part 27)1986	mg/L	BDL(MDL:0.05)
22.	Fluoride (as F)	IS 3025(PART 60) 2008	mg/L	0.56
23.	Dissolved Phosphate (as P)	APHA 23 rd Ed.,2017,4500-P, D	mg/L	0.14
24.	Sulphide as S	APHA 23 rd Ed.,2017,4500 S ⁻² F	mg/L	BDL(MDL:0.05)
25.	Phenolic Compound	IS 3025(Part 43)1992, Amd.2	mg/L	BDL(MDL:0.01)
26.	Bio Assay test (%)	IS:6582-1971	%	90 % survival of fish after 96 hrs. in 100% effluent
27.	Manganese (as Mn)	APHA 23 rd Ed.,2017, 3500 Mn B	mg/L	BDL(MDL:0.1)
28.	Iron (as Fe)	IS 3025(PART 53) 2003	mg/L	0.113
29.	Vanadium (as V)	APHA 23 rd Ed.2017-3500 – V	mg/L	N.D.
30.	Nitrate (as NO ₃ -N)	APHA 23 rd Ed.,2017,4500 NO ₃ -B	mg/L	0.14

Remarks: BDL= Below Detection Limit, MDL = Minimum Detection Limit

Opinion & Interpretation (If required):

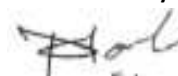
*****End of Report *****

Checked By



(Nilesh C. Patel)
(Sr. Chemist)

Authorized By



(Nitin B. Tandel)
(Technical Manager)

Page 2 of 2

URC/CHM/F-2/05

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

TEST REPORT

Report No.	URC /21/12/Water/APL-0002		
Name & Address of Customer	M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port) PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	18/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Pond Water	Location	Nr.ATT-4
Sample Qty.	5 Lit.	Appearance	Colorless
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	17/12/2021
Sampled By	UERL Lab	Sampling Method	UERL/CHM/SOP/116
UERL Lab ID. No.	21/12/Water/APL-0002		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
1.	Colour	IS 3025(Part 4)	Pt. Co. Scale	5.0
2.	Odour	IS 3025(Part 5)1983	--	Agreeable
3.	Total Suspended Solids	APHA 23 rd Ed.,2017,2540 –D	mg/L	24
4.	pH @ 25 ° C	APHA 23 rd Ed.,2017,4500-H*B	--	7.53
5.	Temperature	IS 3025(Part 9)1984	°C	29.7
6.	Oil & Grease	IS 3025(Part39)1991, Amd. 2	mg/L	BDL(MDL:2.0)
7.	Total Residual Chlorine	IS 3025(Part 26)1986,	mg/L	BDL(MDL:0.1)
8.	Ammonical Nitrogen	IS 3025(Part 34)1988,	mg/L	2.18
9.	BOD (3 days at 27 °C)	IS 3025(Part 44)1993Amd.01	mg/L	5
10.	COD	IS 3025(Part 58)2006	mg/L	34.2
11.	Arsenic (as As)	APHA 23 rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
12.	Mercury (as Hg)	APHA 23 rd Ed.,2017, 3112-B	mg/L	BDL(MDL:0.001)
13.	Lead (as Pb)	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
14.	Cadmium (as Cd)	IS 3025(PART 41) 1992	mg/L	BDL(MDL:0.003)
15.	Hexavalent Chromium	APHA 23 rd Ed.,2017,3500CrB	mg/L	BDL(MDL:0.05)
16.	Total Chromium (as Cr)	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
17.	Copper (as Cu)	IS 3025 (PART 42) 1992	mg/L	BDL(MDL:0.05)
18.	Zinc (as Zn)	IS 3025(PART 49) 1994	mg/L	BDL(MDL:0.05)

TEST REPORT

Report No.	URC /21/12/APL-0002		
Name & Address of Customer	M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port) PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	18/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Pond Water	Location	Nr.ATT-4
Sample Qty.	5 Lit.	Appearance	Colorless
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	17/12/2021
Sampled By	UERL Lab	Sampling Method	UERL/CHM/SOP/116
UERL Lab ID. No.	21/12/APL-0002		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
19.	Selenium (as Se)	IS 3025(Part 56)2003	mg/L	BDL(MDL:0.01)
20.	Nickel (as Ni)	APHA 23 rd Ed.,2017,3111-B	mg/L	BDL(MDL:0.02)
21.	Cyanide (as CN)	IS 3025(Part 27)1986	mg/L	BDL(MDL:0.05)
22.	Fluoride (as F)	IS 3025(PART 60) 2008	mg/L	0.49
23.	Dissolved Phosphate (as P)	APHA 23 rd Ed.,2017,4500-P, D	mg/L	0.16
24.	Sulphide as S	APHA 23 rd Ed.,2017,4500 S ⁻² F	mg/L	BDL(MDL:0.05)
25.	Phenolic Compound	IS 3025(Part 43)1992, Amd.2	mg/L	BDL(MDL:0.01)
26.	Bio Assay test (%)	IS:6582-1971	%	90 % survival of fish after 96 hrs. in 100% effluent
27.	Manganese (as Mn)	APHA 23 rd Ed.,2017, 3500 Mn B	mg/L	BDL(MDL:0.1)
28.	Iron (as Fe)	IS 3025(PART 53) 2003	mg/L	0.121
29.	Vanadium (as V)	APHA 23 rd Ed.2017-3500 – V	mg/L	N.D.
30.	Nitrate (as NO ₃ -N)	APHA 23 rd Ed.,2017,4500 NO ₃ -B	mg/L	0.12

Remarks: BDL= Below Detection Limit, MDL = Minimum Detection Limit

Opinion & Interpretation (If required):

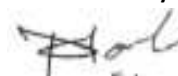
*****End of Report *****

Checked By



(Nilesh C. Patel)
(Sr. Chemist)

Authorized By



(Nitin B. Tandel)
(Technical Manager)

Page 2 of 2

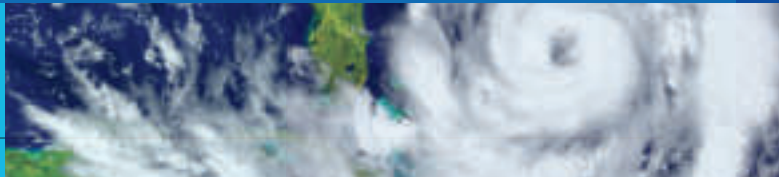
URC/CHM/F-2/05

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

Annexure – 9

Disaster Management Plan **Mundra** (Natural Calamities)

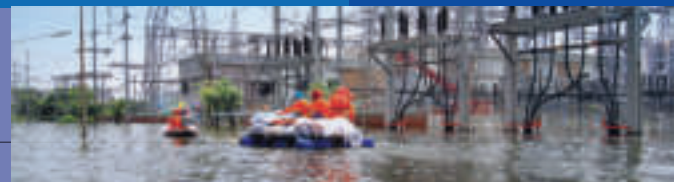
Cyclone



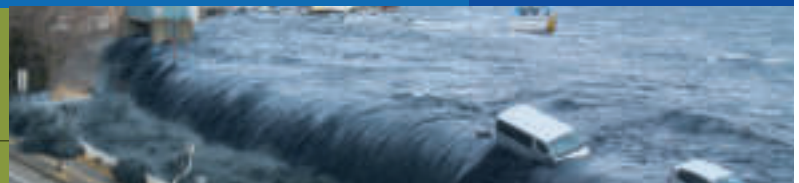
Earthquake

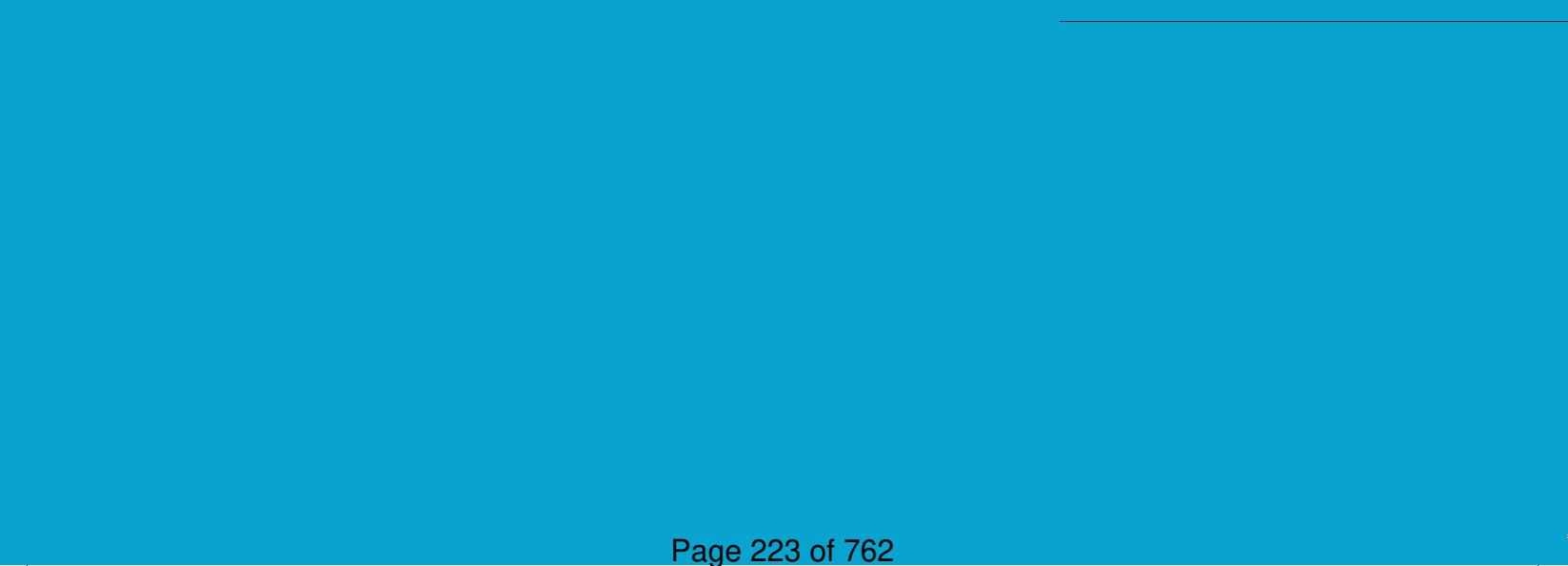
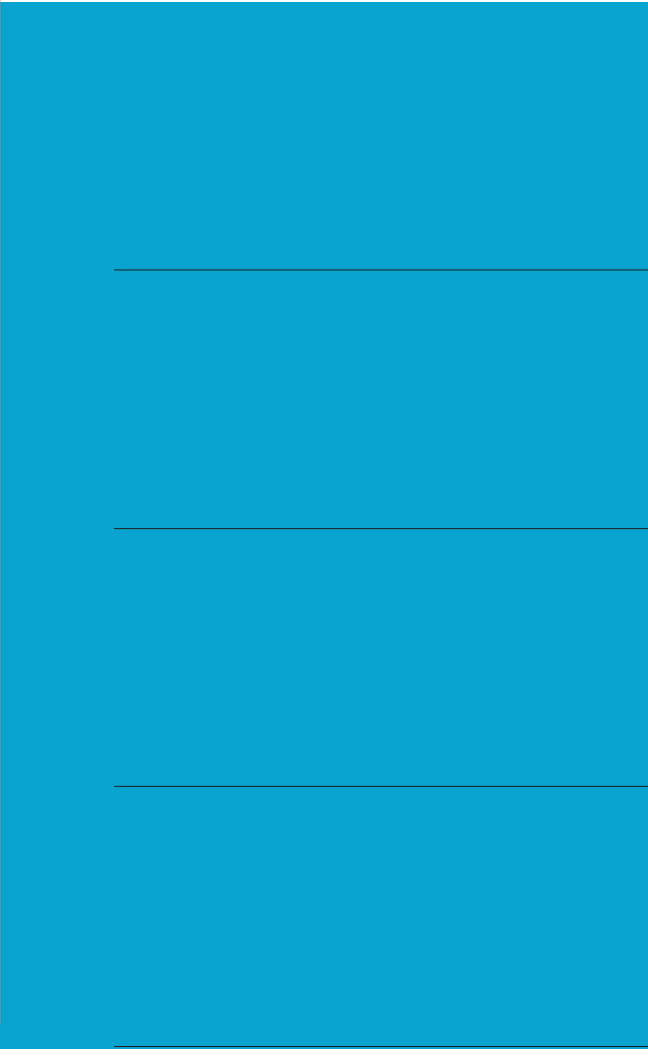
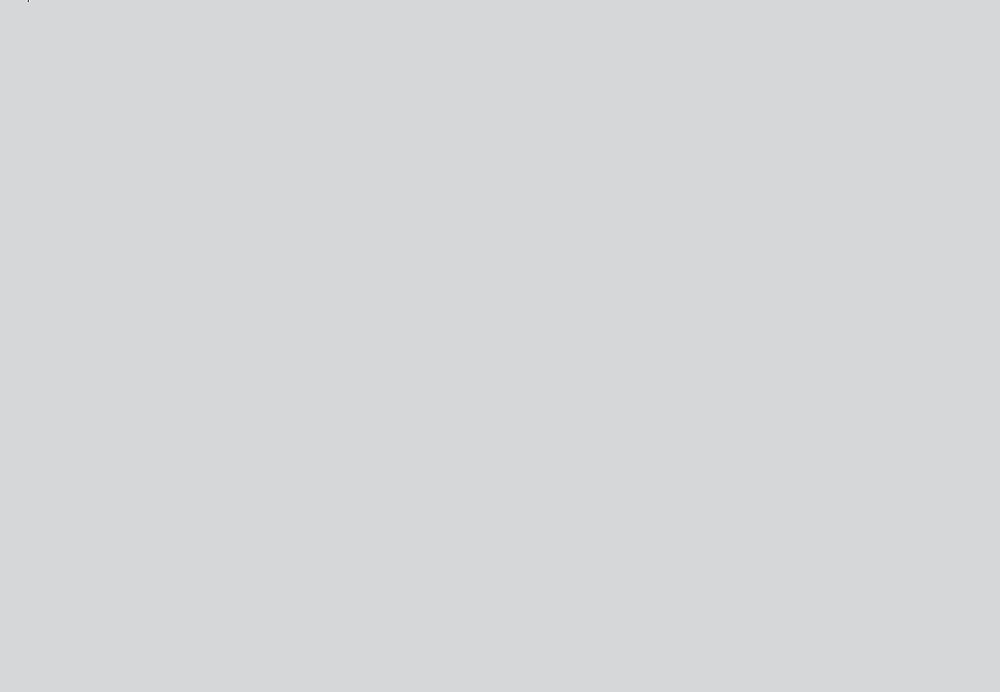


Flood/Heavy Rain



Tsunami







Contents

01 Cyclone

64 Earthquake

86 Flood/Heavy Rain

138 Tsunami

Disaster Management Plan for **Cyclone**



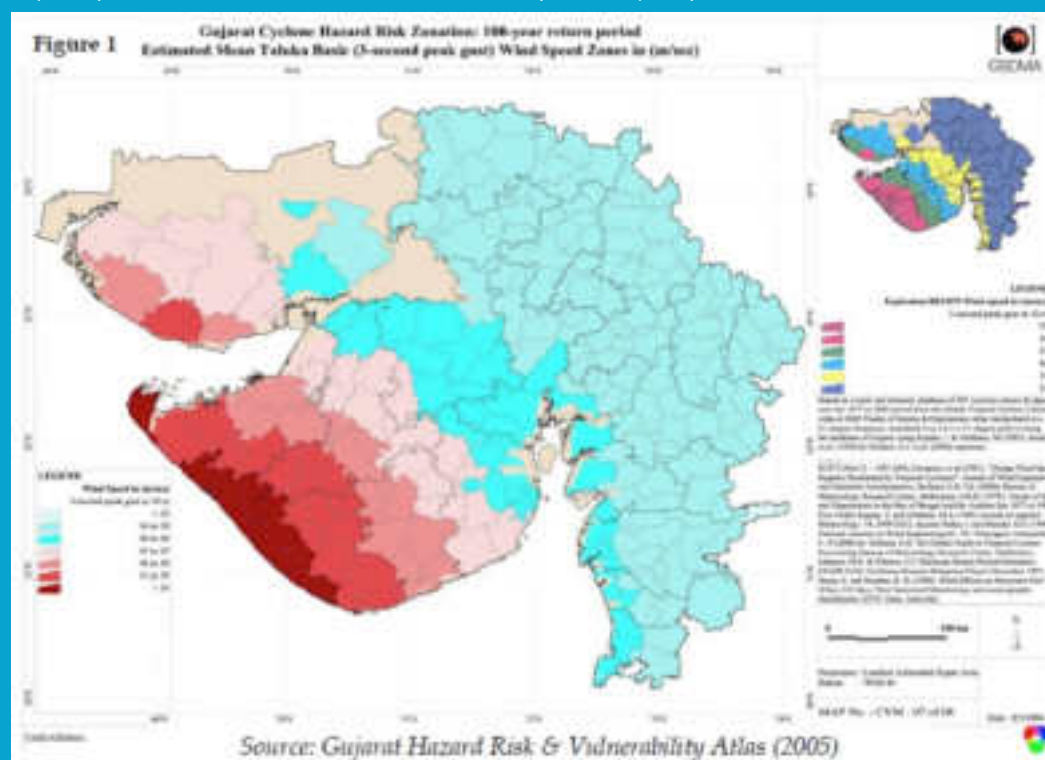


Cyclone

Important Information

- Regular power supply may be cut off for a considerable time (days) if the cyclone is severe, due to the failure of transmission lines.
- Both road and railway connectivity may be cut off for some time.
- Local villagers may try to forcibly enter port and local administration/police may be unable to help the port authorities.
- There may be unpredicted inundation from an unforeseen direction.
- All preparations to face such eventualities must be taken. Drinking water and adequate stock of essentials, for sustenance of the colony and nearby villages, have to be planned in advance.
- Adequate stock of essential medicines should be maintained.
- **Cyclone alarm and response** classification of tropical disturbances over the Indian seas. The cyclone currents rotate in clockwise direction in Indian subcontinent.
- If any other incident (i.e. fire, toxic release, oil spillage) occurs because of natural calamities, actions mentioned in the onsite emergency plan & oil spill contingency plan need to be taken.

Gujarat cyclone hazard risk zonations. Settlement-wise cyclone frequency



Classification of tropical disturbances	Speed (Kmph)	Speed (knots)
Low	< 31	< 17
Depression	31 – 51	17 – 27
Deep Depression	52 – 62	28 – 33
Cyclone	63 – 87	34 – 47
Severe Cyclone	88 – 117	48 – 63
Very Severe Cyclone	118 – 221	64 – 119
Super Cyclone	> 222	> 120

Useful web sites for tracking cyclones

- www.imd.ernrt.in
- www.supertyphoon.com/Indian.html
- www.npmoc.navy.mil/products
- www.solar.ifa.hawaii.edu/tropical/tropical.html
- www.underground.com/tropical

Generally port installations are designed, based on the following criteria

- To withstand maximum cyclonic wind speed of 55 mtrs/sec as per IS875 (Part III).
- Restricted operating wind speed of 26 mtrs/sec so that equipment can be moved to the parking position.
- Safe operating wind speed up to 20mtrs/sec

Action plan

- A. Actions – Pre-cyclone preparations till 24 hrs strike.
- B. Actions – 24 hours strikes to landfall.
- C. Actions – During cyclone till Dissipating.
- D. Actions – Post cyclone stage: recovery, insurance, restoration & relief.
- E. Checklists to be used at different stage of cyclone.

A Pre-cyclone Preparations till 24 hrs strike

This activity starts on intimation of possible cyclone hitting the Port (Normally before 3 to 4 days, and at least 48 hrs before the predicted cycle).

Marine Control (Signal Station)

- Prime duty of signal station is to collect the weather data, give warning to all by hoisting warning signals and control all marine activities.
- Marine Head of the Port is the controlling authority of Signal Station, who is assisted by 2 DGM Marine Operations.
- Marine Control is the eyes and ears of the port.
- Marine Control station is the Permanent Nodal Agency to gather information about low pressure formation, cyclone formation, and all details of cyclone. Marine control shall pass on all such information to the CEO and all HODs.
- The port's radar system is installed on top of the Marine Operation Building (MPT & WB) station; Vessel Traffic Management System (VTMS) is with the marine control.
- The information is to be collected from Indian Meteorological department, local radar system/Local TV networks news/Radio and Web-site.
- All information related to low pressure formation and cyclone shall be immediately sent to CEO and all HODs by mail, SMS, followed by telephone to ensure that they have received the message. In case any recipient is out of headquarters, the information shall be passed on to the HOS.
- The Marine Control Station shall maintain the contact details of CEO, all HODs and, HOSs, in addition to all installations (HR department shall supply contact details of all concerned and the list is to be kept updated every 3 months).
- On confirmation of cyclone, Marine Head shall make arrangements for food, water and all facilities necessary for the smooth functioning of the marine control, as proposed by Cyclone Management Centre.

Cyclone Management Centre:

- On receipt of information of approaching cyclone a Crisis Management Centre (CMC) at Adani house, First floor, Conference room shall be started at least 48hrs prior to the approach of cyclone.
- CMC formation shall be ordered by the CEO or the Executive Director (Corp. Affairs).
- First and Second floor of a permanent building is the ideal choice and hence the first floor of Adani House has been chosen for setting up of the CMC.
- CEO or the Executive Director (Corp. Affairs) shall be overall-in-charge of the CMC and shall take all necessary steps for proper functioning of the control room.
- All information shall be passed over to CMC by the Marine Control, when CMC starts functioning.
- All coordination and control shall be done by the CEO from the CMC.
- The CMC shall have stand-by power supply (Diesel powered Generator) which can last at least 48 hrs, in case of power failure. A diesel bowser shall be kept stand-by at a sheltered location near Adani House to supplement the existing 1800 ltrs of fuel which is available for the 320 KV Generator. The CMC shall be easily accessible and well connected through at least 3 modes of communication (telephone, walkie-talkie with charging facility and mobile phone) in addition to functional public address system.
- The communication system between marine control, CMC, CEO and HODs shall not fail at any cost.

Control Room shall have the following facility

- Two numbers of laptop with internet link.
- Communication systems as described above.
- UPS and stand-by generator with fully charged battery and diesel for 4 days continuous running.
- Toilet facility with at least 2x1000 liters capacity overhead water tank.
- Dry food items and bottled water for 3 people for 4 days.
- One vehicle and one stand-by vehicle with adequate fuel and drivers.
- Adequate chairs, tables and sofas.
- Marine Head shall also arrange food and water for persons working at Marine Control round the clock during cyclone through HR & Admin.

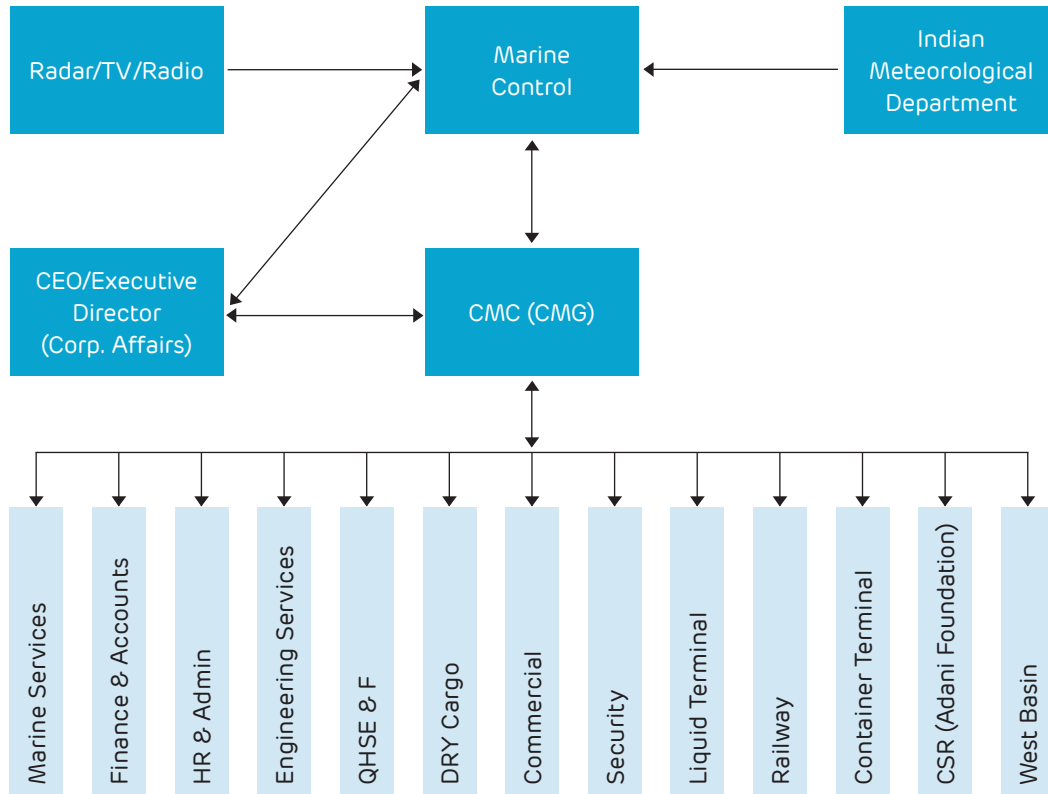
Crisis Management Group:

- Crisis Management Group (CMG) will be a permanent body to deal with all crisis and it is formed by CEO.
- On confirmation of possible cyclone attack on the port, the Crisis Management Group (CMG) shall meet at the CMC or other convenient place as determined by the CEO.
- CEO Shall appoint departmental HOD/HOS as Coordinator and Convener of the CMG.
- All meetings of the Crisis Management Group (CMG) shall be conducted in the CMC.
- All HODs/HOS shall be members of CMG, in absence of CEO, Executive Director (Corp. Affairs) shall be the Chairman of CMG and Coordinator shall be the convener.
- CEO may declare emergency so that all staff and officers shall be at their duty stations and congregate at their designated stations for taking review of the situation and for implementing orders received from their respective HODs, who are CMG members.
- No officer shall leave his station during the emergency period.
- CMC shall be manned round the clock and shall be headed by CEO or someone nominated by CEO. He shall be at least of the rank of HOD.
- All advance preparations before the onset of cyclone, actions during cyclone and recovery shall be reviewed by CEO/Executive Director (Corp. Affairs) at CMC with the concerned CMG members.

Crisis Management Group – Responsibilities

All HOD's and HOS's shall be members of crisis group for cyclone management and post restoration activities in addition to members nominated by CEO as per the situation.

The crisis management group shall be active till the full restoration of port activities.



Commands Structure/Designated Persons

- The following table shows the command structure for each department.
- In case the officer in the first column is not available, the second in command automatically takes over.
- Designation of the first column is the HOD and second column is the successor.
- In case of absence of both, the senior most officers of the dept. to assume charge.

Sr.No.	Head	Successor
1	CEO	Executive Director (Corporate Affairs)
2	HOD (Marine)	HOS (Marine)
3	HOD (Finance)	HOS (Finance)
4	HOD (HR & Admin)	HOS (HR & Admin)
5	HOD (ES)	HOS (ES)
6	HOD (QHSE & F)	HOS (QHSE & F)
7	HOD (Dry Cargo)	HOS (Dry Cargo)
8	HOD (Commercial)	HOS (Commercial)
9	HOD (Security)	HOS (Security)
10	HOD (Liquid)	HOS (Liquid)
11	HOD (Railway)	HOS (Railway)
12	HOD (Container Terminal)	HOS (Container Terminal)
13	HOD (West Basin)	HOS (West Basin)
14	HOD (CSR – Adani Foundation)	HOS (CSR – Adani Foundation)

* Roles of HODs [West basin (ES & DC)] and HODs [MPT (ES & DC)] are same. HODs [West Basin] will assist to Head – West Basin.

Duties and Responsibilities of CEO /Executive Director (Corp. Affairs) and HODs:

- On intimation of imminent cyclone, all HODs shall inform their subordinates to take all prescribed precautions as per the checklist and stand-by for further instruction.
- All HODs and officers shall have departmental walkie-talkie and mobile phones with them, with fully charged batteries.
- All HODs shall collect sufficient cash from the CFO, with the approval of CEO for contingency expenditure.
- All the members of the crisis group are required to inspect their area of responsibility to make sure all necessary precautions have been taken.
- In addition to the following, if there are any additional requirements, they shall be promptly attended to. Detailed duty and responsibility of the CEO and HODs are listed below.

• Group Position

• Port Position

• Alternative

• Site-Main Controller

CEO

Executive Director (Corp. Affairs)

- Keep close contact with marine control, CMG/Head Marine and get latest update on the cyclone and its course.
 - Call for emergency meeting of the CMG for appraisal.
 - Instruct all HODs to be ready. Also instruct HODs to form groups of officers and communicate the duties and responsibilities of all subordinate officers for their readiness (a group formed).
 - Monitor cyclone management action plan/check list.
 - Declare and ensure state of emergency and preparedness is maintained all throughout, till recovery and restoration is complete.
 - Finalize the program for shutting down operations and evacuation and other operations as deemed necessary.
 - CEO shall coordinate with CMG.
 - Liaison with District Collector, Indian navy, Coast Guard, SP, Local Admin.
- Instruct the SEZ corporate affairs/Adani foundation to inform local villages of the danger arising from the imminent approach of cyclone and advise them to move to safer areas and offer all possible assistance.
 - Review the condition of stack yard, stock of cargo inside transit shed, and initiate cargo safety action plan with all HODs.
 - Review safety of dangerous cargo if any on board the ship, shed or nearby.
 - Plan for casting off ships with dangerous cargo and dispatch of dangerous cargo from the port by road on priority basis.
 - Finalise roster for removal of ships to roads from the port with Head Marine and HODs, marine operations.
 - Review drainage, evacuation of surge/tidal water with ES-Civil dept. and instruct civil department to complete all related work within 24 hrs.
 - Review action plan for safety of port and port equipment with Marine, Dry Cargo, ES, railway and CT.
 - Review the plan for emergency power supply and water supply with MUPL.
 - Finalize with Admin/HR and HSE, the action plan for the safety of employees to colony including emergency evacuation in case of tidal waves.
 - Instruct Admin/HR to coordinate all arrangements for food and water.
 - Ask all HODs to be ready with resources to meet unpredicted emergencies like Sea water inundation, and wind speeds being more than predicted speeds etc.
 - Issue order to declare HOD finance as the coordinating officer for insurance.
 - Review the insurance position and renew policies if lapsed.
 - Sanction cash for emergencies, to be maintained by HODs.
 - Review the preventive arrangements made by HODs as per checklist.
 - Keep the corporate head office informed of all incidents and activities.

Crisis Management Group Responsibilities

<ul style="list-style-type: none"> • Group Position • Port position • Alternative • Incident Controller <p>HOD – Marine</p> <p>HOS – Marine</p>	<ul style="list-style-type: none"> • Have close coordination and supervision of the marine control to be fully alert day and night to monitor the cyclone and get the latest information. • Pass on the latest cyclone updates to CEO/Executive Director (Corp. Affairs) and all CMG members for advance planning. • Take active part in the formation of CMG with the approval of CEO. • Take action to preserve all vital records and documents. • Co-ordinate with HSE and take their advice for health, safety and environmental issues particularly if ships with dangerous or toxic cargoes are present in the port. • Ensure that applicable implementation procedures are reviewed and are in position. • Inform master of the ships about the cyclone and ask
	<p>them to be prepared to move out on short notice.</p> <ul style="list-style-type: none"> • Keep all the tugs and crafts on stand-by for emergency evacuation of ships to roads on short notice. • Initiate emergency action plan for the safety of SPMs. • Prepare a roster for evacuation of ships, in consultation with HOD of various SBUs. • Arrange emergency kit for safety of personnel. • Plan evacuation of all ships from the port on confirmation of the cyclone. • Ship movements may not be feasible in the last 24 hrs period and wind may start increasing in advance. These aspects and tidal forecast may be taken into consideration in executing evacuation. • Discuss and finalize with master of tugs and other officers necessary action to be taken for the protection and safety of tugs, port crafts and navigational aids, during cyclone after evacuation of ships. • Keep all navigational survey equipment in good condition for use after passage of cyclone. • Control of shipping. • Obtain approval from CEO for taking all necessary action for the safety of the port and port crafts. • Considering the condition of the channel depth, marine head shall prepare a chart for evacuation of the ships from the port. • Marine head shall apprise CEO of all actions being undertaken. • Even with all preplanning also, there may be occasioning that one or two ship remains in the port during cyclone. Action plan for such situation to be planned in advance. • Additional movable fenders to be inserted between ship and berth and increasing the nos of mooring ropes etc are to be planned. • Keep enough wire ropes ready for use in case of emergency. • Coordinate for proper functioning Of CMC. • Prepare duty roster for manning of Crisis Management Centre by officers of the Administration, Finance & Accounts and Commercial. • Keep track of the cyclone and take all necessary action for cargo management with the help of various SBU's Head. • Visit the port and coordinate with various SBU's Head to ensure safety of cargo stacked in stack yard and cargo stored in covered areas. • Management of Hazardous waste may be done with the guidance of HOD, QHSE & F. • Action plan to move Hazardous cargo to safe place to be finalized. • Liaison with all stake holders to relieve their anxiety if any. • The roster of all departments may be collected, combined and kept in the CMC for ready reference. • Mobilize and monitor vehicles as per the checklist. • Coordinate with Coast Guard to patrol the seafront.

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- Liaison with Marine Police and ensure proper patrolling.
 - During the course of cyclone Fishing Boats may try to berth on the vacant spaces and damage the berth or sink there.
 - Plan in advance to prevent such incidents.
 - Arranges food and water to the personnel on roster duty with the help of HOD Admin.
 - Liaise with local administration and communicate inputs from and to the SEZ Corporate affairs/Adani foundation.
 - Advance planning to keep audio/video records of all events.
 - Ensure proper storage of valuable documents and equipment.
 - News of weather forecast to be circulated frequently to the industries/units inside SEZ and surrounding areas.

<ul style="list-style-type: none"> • Group Position • Port Position • Alternative • Secondary Support Team <p>Head F & A</p> <p>HOS F & A</p>	<ul style="list-style-type: none"> • Maintain cash/funds for disbursement to all dept. as per requirement. • Take over the function as nodal officer for all insurance related activity. • Keep all valuable records and data in safe custody. • Provide Disbursement Statement for processing claims. • Depute officer to each dept. to assess the requirement and needs of affected dept. • Assist in procurement and process purchasing/leasing of equipment. • Prepare to help Admin/HR for hiring of special services for food, shelter and transport as the situation demands. • Prepare to document all events, damages and claims.
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<ul style="list-style-type: none"> • Position • Port position • Alternative • Primary support team <p>HOD HR & Admin</p> <p>HOS HR & Admin</p>	<ul style="list-style-type: none"> • Keep in touch with CMC/CMG, perform coordination with concurrence of CEO. • Attend CMG meetings, as directed by CEO/Executive Director (Corp. Affairs). • Have enough staff and vehicles ready to attend emergencies. • Supply contact details of all officers and staff to Marine control and CMC. • Discuss and finalize with HOD QHSE & F, the action plan for the safety and shelter of all officers, staff and people residing in the staff colony. • HR department shall supply contact details of all concerned list is to be kept updated every 3 months • Collect the duty roster of all dept. and their posting position to finalize arrangements for provisions, water and other essential for 4 to 5 days, • Finalize arrangements for safety of colony in
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- consultation with HOD Admin.
- Advise colony occupants to store drinking water, cooking materials, cooking gas, candles etc. to meet emergencies.
 - Ask the canteens to store adequate raw materials, gas etc for at least a week.
 - Coordinate evacuation with transport and HOD Admin in township areas if situation so warranted with the clearance from CMC.
 - Finalize in coordination with HOD Admin & HOD Security, the plan to ensure safety of Port properties and Colony.
 - Coordinate with HSE and Medical officers for attending to emergencies.
 - Coordinate with other field group (DC, Marine, ES, Container, CT, Liquid, Railway, Security, and QHSE&F) for food and drinking water for the persons engaged in cyclone duty and restoration work.

- May need additional help of HOD Commercial for procurement of large quantities of materials.
- Arrange emergency kit for safety of personnel.
- Make a list of staff that can be evacuated from all departments (DC, Marine, ES, Container, CT, Liquid, and Railway).

- Position
- Port Position
- Alternative
- Incident Controller

HOD – ES (MPT & WB)

HOS – ES (MPT & WB)

- Stay updated about the course of cyclone.
- Make detailed inspection of all facilities and plan for preventive actions in case of cyclone attack.
- Make responsibility chart for safe parking of all equipment and communicate the implementation system to field groups for on-site action.
- Plan for checking the condition of all stand-by equipment like DG sets, Diesel engine driven welding sets, De-watering pumps etc.
- Plan and advice the procedure for parking and anchoring of all equipment to the field group.
- Plan with HOD Commercial for the procurement of essential materials.
- Keep all valuable data and records in proper safe custody.
- Finalize a team of engineers and staff for round the clock emergency duty.
- Plan for adequate dry food and water, with the

assistance of HOD Admin for the people who may be required to be on emergency duty.

- Plan for emergency de-watering units, emergency lights etc.
- Draw available resource pool and keep a list of qualified contractors with contact number. Keep at least one team on stand-by for emergency power transmission line repairs and reconditioning.
- Call the officers and personally apprise them the action to be taken in the next 24 hrs (24 hrs pre cyclone).
- The last pre-cyclone period may be curtailed due to unexpected sudden increase of wind speed.
- Arrange emergency kit for safety of personnel.
- The action team should be apprised of such a situation taking place in advance.
- Cargo operation may have to be stopped early for moving equipment to safety and taking out Ships.
- Though the port operation shall continue till the time the wind speed permits, all preparatory arrange must be in place to complete all planned safety work before the wind speed reaches the threshold limit.
- Plan for parking all non-working equipment prior to the last 24hrs.
- Attend the CMG meeting and apprise CEO/Executive Director (Corp. Affairs) the action plan to be taken to prevent damage to the port equipment and installation in case the cyclone hit the port.
- Arrange sand-bags and heavy weights to prevent light materials from flying and to create a barrier to reduce the impact.

Instruction to be given to the designated groups for anchoring the equipment

- Stop operations in consultation with HOD Dry Cargo & Container Terminal when the wind speed increases.
- The loading and unloading booms of ship loader, ship unloader and container cranes, HMCs shall be lifted and latched.
- If latching is not functioning, repair it or tie with wire ropes for additional protection.
- Ship loader and ship unloader, HMC etc shall be travelled to the designated parking position lower the anchoring pins into hole and lock.
- In case of hydraulic locking, lower the locking jaws and lock it with rails.
- Park and secure the boom of all stacker & reclaimers at the designated place.
- In addition, block all the wheels of all rail-mounted equipment mechanically.
- Lock all control rooms and operators cabins.
- Switch-off power supply to equipment, after they are parked and secured.
- Check all MCCs and tunnels and ensure there is no possibility of surface water entry inside.

- Inspect all roads, culverts, drainage system and water supply system.
- Take action to rectify defects on war footings to complete within 24/30 hrs.
- Inspect all buildings, roof of temporary buildings, and top of conveyor galleries.
- Take action for repair and strengthening.
- Inspects the seashore of the port and take action for protection if warranted.
- Plan action group to attend to emergencies, co-ordinate with MUPL for maintaining water supply.
- Check all buildings, conveyor gallery and roofs tops and strengthen them to withstand the cyclonic wind.
- Coordinate with HOD Commercial to procure and store enough sand/cement and other construction material to tackle emergency.
- An experienced engineer may be attached with commercial to help in arranging civil construction materials.
- Take all necessary precautions to seal entry of surface water inside wagon tippler tunnel and MCCs and control rooms.
- Plan for a group of officers and staff for stand-by duty during cyclone.
- Plan to keep adequate diesel to operate the de-watering pumps.

- Position
- Port Position
- Alternative
- Primary Support Team

HOD – QHSE & F

HOS – QHSE & F

- Assist CEO as instructed.
- Co-ordinate with respective HOD/HOS with respect to emergency actions.
- HOS of all sections of QHSE&F will assist HOD – QHSE&F.
- Assist in evacuation of all personnel except key personnel.
- Provide HSE&F facilities (Assist for rescue, evacuation, and other necessary arrangements).
- Ensure availability of emergency kit (torch, PPEs, rope, first-aid, whistle, VHF sets, PA system, fire extinguisher etc)
- All Emergency vehicles are to be ready to operate, completely filled with fuel, and stand-by drivers.
- Liaison with mutual-aid partners for assistance.
- Arrange necessary staff of fire, medical & rescue with necessary arrangements.

- Assess high risk areas where there could be chance of major environmental pollution.
- Arrange emergency kit for safety of personnel.
- Remove/Securing of Hazardous and toxic cargo.
- Providing necessary arrangements to prevent pollution and to protect the environment.
- Suggest optimal strategies to conduct emergency isolation of damaged equipment, emergency transfer of materials etc.
- Render assistance for trapped personnel.
- Recommend the appropriate procedures to isolate damaged units without introducing new hazards.
- Coordinate as per plan for all preparations to meet the emergencies.
- Set up casualty collection centre and arrange first aid posts.
- Arrange enough stock of medicines, antidotes, oxygen, stretchers etc.
- Keeping in mind that Road and Rail connectivity may be cut off for required period of time.
- Maintains a list of blood groups of each employee with special reference to rare blood groups.
- Arranges additional medicine and equipment as required.
- Ensure fully equipped Ambulance in ready state.
- Ensures that the casualty section of Port hospital has specialists round the clock during cyclone.
- Arranges for extra beds and in emergency contact with the Adani Hospital and Bhuj Hospital for extra medical supplies.
- Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment.
- Duty Doctor to be onsite with team who acts as liaison officer for all medical services.
- Advise regular medicine takers to keep adequate stock of medicine with them like BP patients,

diabetics etc through e-mail communication.

- Immediate disposal of hazardous waste and biomedical waste to disposal facility.
- Plan for securing ambient air quality monitoring instruments throughout the area.
- Co-ordinate with engineering services for securing the stakes.

- Position
- Port Position
- Alternative
- Incident Controller

HOD–Dry Cargo
(MPT & WB)

HOS–Dry Cargo
(MPT & WB)

- As soon as getting the information about cyclone, personally visit all stack yards, plots and other cargo storage area, including transit shed if any and inspect the condition of stacking.
- Inspect all drainages and if found blocked inform civil engineering to immediately clear the drainages to ensure free follow of flood water.
- Confirm that hazardous and toxic cargoes are properly protected to prevent environmental issues.
- Take action to evacuate all perishable cargo, and ask the owner to arrange for evacuation as quickly as possible.
- Arrange emergency kit for safety of personnel.
- Take action to identify all expensive materials and take action to protect them to prevent losses during cyclone.
- Arrange to segregate and protect cargo in sheds.
- Co-ordinate with HOD Marine in de-berthing vessel to vacate the berth.

- Discuss with DC team and HOD Marine and operations may have to be stopped early, so that they get time to move out all ships.
- Take all possible action in coordination with CMC and owners of cargo to ensure no or minimum loss of cargo during cyclone and possible tidal inundation.
- Have a final inspection of cargo before the onset of heavy wind.
- Liaison with HOD Security for safety of cargo.
- Preserve all records in safe place to save it from cyclone and possible inundation.
- All cargo handling equipment like, pay loaders, front end loaders, bull dozers, dumpers, trailers, cranes, forklifts etc. shall be kept ready with adequate fuel to use them on emergency, during cyclone and later during restoration. These equipment are to be parked in safe, protected area.
- Arrangement schedule of enough operators/workmen to operate equipment during cyclone in emergencies and for restoration.
- Mobilization of additional manpower and cargo handling equipment from the port, Stevedores and C & F agents to meet emergencies and later to segregate unaffected cargo and make arrangements to protect cargo, till evacuation.
- Officer of Dry Cargo will coordinate with Security about the local road network in case of road blockage, to clear the blockage in coordination with state government and local administration, through Corporate Affairs.
- Corporate Affairs will also explore alternative mode of connectivity, so that some form of connectivity with the main stream is immediately established.

- Position
- Port Position
- Alternative
- Secondary Support Team

HOD – Commercial

HOS – Commercial

- Collect details of all materials in store and plan for procurement of adequate stock of consumables and construction materials.
- Discuss with all HODs about their possible requirements.
- Make physical verification of the stores for proper stocking to prevent damage during cyclone.
- Co-ordinate with ES-civil for repair of stores if found wanting.
- During cyclonic season sufficient stock of consumables like tarpaulins, gunny bags, ropes and wires for port crafts, diesel oil, kerosene oil, hurricane lantern, candles, petromax lamps, torch lights with batteries and bulbs, electrical items, sand-bags, cement etc are kept in stock.
- Stock adequate roofing materials and fixtures, for emergencies.

- Few sealed packets of bleaching powder shall be available in stores for sanitation.
- Few gas cutting sets may be kept in stores for emergency. The quantity may be decided in consultation with ES.
- All the materials which are likely to get damaged by water-inundation shall be protected by a tarpaulin cover and kept above ground level.
- All electrical and electronic items shall be shifted to safe place fully wrapped.
- Stores which needs to be kept in controlled temperature, like belt splicing materials etc. are to be moved to places where DG sets are available, or arrange one DG set for emergency supply.
- Spares shall be sealed in polyethylene covers and kept to save it from cyclone damage.
- Electrical items should be kept in high raised rake to prevent water contamination.
- Cut edge of conveyor belts should be either covered or a coat of rubber solution shall be applied.
- Arrange to keep stand-by staff round the clock to issue these materials any time during the emergency and restoration period.
- All valuable records and computers shall be properly stored to save them.
- Inform HOD-Finance of approximate funds required.
- Selling of recyclable hazardous waste must be prioritized.

- Position
- Port Position
- Alternative
- Primary support team

HOD – Security

HOS –Security

- Plan for effective traffic control and its regulation in port area during and after cyclone.
- Coordinate with QHSE&F for fire and safety issues.
- Inspect the circumference of the port and in case of damages to compound wall get them repaired with the help of HOS civil Engg, immediately.
- Close all possible vulnerable points.
- Clear all internal roads within port area for smooth traffic.
- Plan for posting extra watch and security guard team for intensifying patrolling of stores, substations, berths, transit sheds, warehouses, administrative building, loco sheds, workshops, water supply installations etc. in addition to all entry and exit points.
- Arrange emergency kit for safety of personnel.
- Issue orders to all gates to effectively control the entry of unauthorized persons or vehicles inside the protected area.
- Plan to intensify the patrolling of periphery and inside the port, including the berth area.

- Liaison with police and local aid agencies after informing the CEO.
- During the Pre-cyclone, Cyclone and recovery period no visitor shall be permitted inside the protected area.
- In case of authorized visitors, they shall be apprised of the cyclone and its effect. They may be escorted to safe place. Liaison with Admin for their accommodation and transport

- Position
- Port Position
- Alternative
- Incident Controller

HOD – Liquid

HOS – Liquid

- Coordinate with Marine Control and CMG.
- Inform the masters of the ship regarding the progress of cyclone, and ask them to be prepared to move out on short notice.
- Discuss with Marine HOD and finalize the ship movement program in advance.
- Keep all officers and staff ready for emergency action on intimation of cyclone (Notice of 24 hrs or less only may be given for evacuation)
- Plan for a well-prepared emergency group to stand-by during cyclone to meet unpredicted emergencies.
- As soon as getting the information about cyclone, personally visit all the areas of Liquid Terminal.
- Make necessary arrangement for shifting of critical cargo.
- Inspect all drainages and if found blocked inform Admin/Civil to immediately clear the drainages to ensure free follow of drained water.

- Confirm that hazardous and toxic cargoes are properly protected to prevent environmental issues.
- Take action to evacuate all perishable cargo, and ask the owner to arrange for evacuation as quickly as possible.
- Co-ordinate with HOD Marine in de-berthing vessel to vacate the berth.
- Discuss with HOD Marine to stop operations early, so that they have time to move out all ships.
- Take all possible action in coordination with CMC and owners of cargo to ensure that there is no or minimum loss of cargo during the cyclone and possible tidal inundation.
- Arrange emergency kit for safety of personnel.
- Have a final inspection of cargo before the onset of heavy wind.
- Liaison with HOD Security for safety of cargo.
- Protect all records in safe place to save it from cyclone and possible inundation.
- All tankers and other equipment shall be kept ready with adequate fuel to use them in case of emergency, during cyclone and later during restoration. This equipment must be parked in a safe, protected area.
- Schedule enough staff to operate equipment during cyclone, in emergencies and for restoration.
- Inform QHSE&F about disposal of hazardous waste.
- Remove all loose material from the open areas and secure at proper place.

- Position
- Port position
- Alternative
- Incident Controller

HOD – Railway

HOS – Railway

- Maintain co-ordination with marine control regarding the status of the cyclone.
- Ensure that wagons and locomotives are parked in a safe area in case the wind speed increases
- Arrange an emergency kit for the safety of personnel.
- Liaison with Indian railway authority.
- Co-ordinate with Operations department for wagon loading.
- Railway team to stay in continuous contact with other emergency services (such as QHSE & F, Security, other services).
- Inspect the railway track, loco, signals and other assets belonging to Railway.
- As soon as information about the cyclone is received, personally visit the concern areas.
- Inspect all drainage/culverts and if found blocked inform civil engineering to immediately clear the drainages to ensure free follow of water.

- Confirm that oil/grease containers are secured.
- Arrange emergency kit for safety of personnel.
- Liaison with HOD Security for safety of cargo.
- Preserve all records in safe place to save them from cyclone and possible inundation.
- Arrange enough operators/workmen to operate equipment during cyclone in case of emergencies and for restoration.

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Incident Controller <p>HOD – CT</p> <p>HOS – CT</p>	<ul style="list-style-type: none"> • Maintain contact with Marine control for the status of the cyclone. • Containers must be stacked in threes only (as per possibility) • All hand held UHF/batteries, emergency torch, mobile phones must be fully charged for use in emergency in case of total power failure. • Should be ready to stop activity in case increases of wind speed. • As soon as getting the information about cyclone, personally visit wharf and back-up area. • Ensure condition of storm lock-pin. • Confirm that hazardous and toxic cargoes are properly protected to prevent environmental issues. • Take action to evacuate all perishable cargo, and ask the owner to arrange for evacuation as quickly as possible. • Arrange emergency kit for safety of personnel.
	<ul style="list-style-type: none"> • Co-ordinate with HOD Marine in de-berthing vessel to vacate the berth. • Discuss with HOD Marine to stop operations early, so that they get time to move out all ships. • Take all possible action in coordination with CMC and owners of cargo to ensure no or minimum loss of cargo during cyclone and possible tidal inundation. • Have a final inspection of cargo before the onset of heavy wind. • Liaison with HOD Security for safety of cargo. • Preserve all records in safe place to save them from the cyclone and possible inundation. • Arrange fuel for equipment and cranes for emergency. • All cargo handling equipment ITVs, cranes, forklifts etc. shall be arranged to use them on emergency and later during restoration. This equipment is to be parked in a safe, protected area. • Arrange enough operators/workmen to operate equipment during cyclone in case of emergencies and for restoration. • Mobilization of additional manpower and cargo handling equipment from port, stevedores and C & F agents to meet emergencies and later to segregate unaffected cargo and make arrangements to protect cargo, till evacuation.

B 24 Hours strikes to landfall

<ul style="list-style-type: none"> • Position • Port position • Alternative • Site-main Controller <p>CEO</p> <p>Executive Director (Corp. Affairs)</p>	<ul style="list-style-type: none"> • Ensure from HODs that all precautionary measures are completed in advance and obtain written feedback. • To ensure that all documents and records are kept in safe places by HODs. • Hold review meeting of the CMG at regular interval, minimum 3 times daily till full recovery and resumption of port operations. • Have frequent overall physical verification inside the port area. • Advise all members of CMG to be present at CMC or at temporary Emergency Control Room during cyclone. • Authorize release of required funds. • Appraise corporate office of the situation and action taken. • Coordinate with District collector, Tahasildar, Indian Navy, Coast guard and Marine Police for advance precautionary actions.
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- Take all necessary steps to help local authorities for evacuation and sheltering the people of nearby villages who may be affected.
- Approve information to the media.
- In case of high tidal prediction, employees and families staying in the colony need to be relocated. Also instruct Admin to look in to the possibility of shifting people on the ground floor to first floor or above.
- Instruct Admin/HR department to arrange enough grocery items, dry food and drinking water for emergency requirements.
- Provide timely status reports to the authorities.
- Take active role for corporate social responsibility along with Adani Foundation.

• Group Position
• Port Position
• Alternative
• Incident Controller

HOD – Marine
HOS – Marine

**Directs and Co-ordinates all Field Operations/
Precautions:**

- Keep track of the course of cyclone and inform all pilots and staff and officers about the latest position. Keep inform all HODs.
 - On information from Marine Control about increasing wind speed, ask HOD of Dry Cargo, Container Terminal and Liquid Terminal to stop all loading, unloading of cargoes, discharging and bunkering operations.
 - Discuss with CEO, HOD Dry Cargo, Container, Liquid and Pilot to start evacuation of the ship to the roads as per the roster finalized earlier.
 - Ship on oil/liquid berth is to be given priority for evacuation.
 - Coordinate with HSE to ensure ship with hazardous and toxic cargo are taken out first.
 - Evacuation shall be completed before the wind speed reaches threshold value.
- To ensure this, evacuation may have to be started earlier.
 - Preserve all records and documents safely.
 - Keep all the necessary officers and staff stand-by for emergency duty.
 - In coordination with HOD Security, ensure evacuation of all dock workers and private labour, visitors, shippers, consignees from the port area.
 - Ensures implementation of the disaster response plan and coordinating with the Fire Fighting Authorities. .
 - After evacuation of all ships, arranges to protect Tugs and Port crafts by proper docking and tie up to withstand simultaneous cyclone wind and destructive tides.
 - Deploy craft- and mobilize resources to confine and clean up spill if any.
 - Keep adequate provision of food and water for men on emergency duty.
 - Inform possible time of return to normalcy to all cargo interests, shipping agents, stevedores.
 - If due to any reason a ship could not be taken out, this ship needs to be protected well against breakage of mooring ropes and possible drifting and banging on to the berth.
 - Several restraints, as situation demands, with bollards needs to be done.
 - A team of staff along with DC/Pilot needs to be on stand-by duty for the period of cyclone to take spot decisions.
 - Enough good quality ropes, shackles and other required materials, shall be supplied to the group.
 - This matter shall be brought to the notice of the CEO and Corporate Head.

SPM Preparedness for Cyclone

- Flush both floating and subsea hose strings with seawater.
- Disconnect both floating hose strings from SPM buoy, shift and secure at safe location.
- Blind both j-piping arm flanges.
- Disconnect both mooring hawser assemblies and transfer to a safe location or on board of Diving support vessel.
- Secure:
 - > All loose and portable equipment & spares from SPM buoy.
 - > Hatches doors and replace seals if needed.
 - > All doors and latches for tightness.
 - > Locked close position of all deck & central chamber valves.
 - > Ensure that all hazardous and toxic cargo is identified.

• Co-Ordinator

• Marine Control (Shift Incharge)

- The coordinator shall work as the convener of CMG.
- The duty of the coordinator is to coordinate with all CMG members and help to implement all decisions.
- All officers on duty must have walkie-talkie and mobile phone with them with fully charged batteries.
- Keep few extra walkie-talkies ready at CMC for emergency work.
- Keep a record of walkie-talkies to prevent loss.
- He shall work as a convener of the CMG and shall report directly to CEO.
- He shall help all CMG members for the pre-cyclone arrangements and post cyclone re-commissioning.
- The extra man power required for all departments shall be arranged by him, by lateral shifting or by hiring for specific purpose and period.
- Circulate cyclone bulletins to all external customers at every 12 Hrs.
- A salvage team with a salvage vehicle shall be maintained at the Marine control under the control of the senior pilot, who shall be on duty during cyclone.
- This salvage team is to be used for attending to emergencies during cyclone.
- For manning the same, staffs have to be provided in coordination with HOD Marine & ES.
- This vehicle shall be able to move around in port area and shall be provided with, a DG set, portable welding machine, gas cutting sets, wire ropes, shackles, first aid box, emergency light, necessary tools and tackles etc.
- Liaise with Site Incident controller (HOD Marine) and is responsible for keeping the Fire and rescue Dept. in a state of alertness on a 24 hour.
- Keeps CMG, HOD Marine, HSE and HOD Security informed of any crisis & lead team directly to incident site.
- Initiates firefighting procedures immediately and ensures firefighting team reaches the incident location with the correct resources.
- The fire team also shall work as rescue /evacuation and other emergencies.
- Assist in the evacuation of workers to the assembly points in liaison with HR. Plan with assistance of HSE, for adequate men to stand-by duty in emergencies.
- Arrange safety equipment e.g. fire suits, protective gloves and goggles, breathing apparatus as required.
- The emergency set should be so arranged that it can start functioning immediately on reaching the emergency point (D/G set is ready with POL and battery, emergency light sets ready, gas cutting set is connected and ready, welding set ready, enough welding rods are available.)
- Men on duty should contain at least, one welder, an electrician, riggers etc.
- Coordinate with Medical department for maintaining mobile first aid centre.

- Support Staff
- Senior Pilot
- Pilot

- Senior Pilot to be stationed at Marine Control.
- Assist Pilots to take out ships on to the roads.
- Assist Pilots to secure port craft properly, taking into consideration of severity of the cyclone.
- Maintains 24 hour vigilance towards the channel / anchorage & port
- On receipt of any incidence inform CEO/HOD Marine refrains from exchanging any information with unauthorized persons unless authorized to do so by the CEO.

- Maintains contact with vessels on VHF.
- A salvage vehicle with tools and tackles, a portable welding set, portable DG sets, gas cutting set, ropes of different size, portable lights should be maintained at the Disposal of the Marine control station under the senior Pilot.
- To man the same, persons from different department shall be arranged by the Coordinator.

- Group Position
 - Port Position
 - Alternative
 - Incident Controller
- HOD–Dry Cargo
(MPT & WB)
- HOS–Dry Cargo
(MPT & WB)

- All normal operations to be stopped. Only emergency operations (securing of MHC/goliath/LMC/equipment/ hoppers/dumpers/trailers) to be continued.
- Ensure that cranes are parked at safe locations with lowered and secured booms.
- All mobile truck-loading hoppers at jetty are arrested at their wheels to prevent horizontal movement due to wind and secured from above by arranging guy ropes.
- All equipment (pay loaders/excavators etc) to be parked at OSY 10 or nominated OSY with full fuel.
- All dumpers/trailers to be parked at OSY 5/nominated place with full fuel.
- All godown gates to be closed.
- Keep emergency kit ready.
- Communication mediums like VHF, mobile phones and PA systems checked and tested.
- As soon as the wind speed approaches 20mtrs/sec, issue instruction to stop all operation and move the equipment to parking position.

- Only emergency team members to remain in the port.
- 2 Pilot Vehicles stand-by near Tug berth building and FCC control room.
- Following team of operators remains at stand-by (at Tug Berth building) for emergency action.
 - > Crane operators- 3 Nos
 - > Loader operators - 6 Nos
 - > Excavator operators - 4 Nos.
 - > Forklift operators- 2 Nos.
- Emergency team in continuous contact with other emergency services (such as QHSE & F, security, other services)
- All costly and critical materials are secured properly to avoid loss due to wind or water inundation.

- Group Position
- Port Position
- Alternative
- Primary Support Team

HOD – Security

HOS – Security

- Maintain adequate personnel to man all exit and entry points and to make regular surveillance survey of the port, periphery and vulnerable points.
- Ensure sufficient security.
- Maintain patrols and ensure unsafe practices are eliminated.
- Liaise with Site Incident Controller (HOD Marine).
- Keeps CMG, HOD Marine, HSE and HOD Security informed of any crisis & lead team directly to incident site.
- Control the entry of unauthorized persons and vehicles.
- Permit the entry of authorized personnel and outside agencies for rescues operations without delay.
- Allows the entry of emergency vehicles such as ambulances without hindrances.
- Ensure that all people are aware of the assembly points, where the transportation vehicles are available.

- Match the headcount with the list available at the assembly point section of that area.
- Help Admin/HR with evacuation as and when asked for.
- Carry out reconnaissance of evacuated area before declaring the same as evacuated and report to HOD Security/CMG.
- Keep adequate fuel and vehicles for emergency duty.
- Disperses crowd and cordons off restricted areas to prevent looting.
- During heavy cyclone there may be instances of local villagers rushing inside the port area, HOD Security may be prepared to meet such emergencies.
- HOD Security and HOS Security shall frequently take rounds inside the port area to ensure that everything is in order and shall submit compliance to CMG.

- Position
- Port Position
- Alternative
- Incident Controller

HOD – ES
(MPT & WB)

HOS – ES
(MPT & WB)

- Maintain roster of officers and staff for duty during cyclone and restoration period.
- As soon as the cyclone is confirmed to strike within 24 hrs start preventive preparations.
- Apprise the team the modus operandi of parking and securing all equipment.
- Transport all non-operating equipment to the designated parking place, and lock all movements. Close the doors and windows of operators cabins and electrical control rooms.
- Form teams for safety and securing of all equipment and vital units.
- With coordination with all Department HODs like Dry Cargo, Container Terminal, Liquid Terminal and HSE etc. pull out equipment one by one from operation and move to safe, designated parking area.
- Instruct the leader of the team to be personally responsible and obtain feedback in writing, which may be submitted to CEO, after physical verification.

- Ship loader and ship unloader shall be parked at the designated area, lower the locking bar into the slot in the jetty.
- In case of hydraulically operated rail clamp, lower them to hold on to the rail, and block all wheels mechanically.
- Securing each equipment before submitting the clearance to higher ups.
- All equipment shall be stopped the moment wind approaches 20mtrs/sec, raise the booms and latch them, tie up if latch is not reliable.
- Move to and position at the respective earmarked parking position and lock.
- Loading boom of stacker reclaimers should be lowered and latched at the parking position.

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- Make necessary arrangements to secure roof sheets.
 - In case of any difficulty to travel to the parking position lower the boom to the travelling rail, any one side and tie down with the rail.
 - Block the travelling wheels and slew wheels mechanically.
 - Additionally the rail mounted equipment may be tied to the rails by wire rope and clamps depending on the severity of the predicted cyclone.
 - Tie down all raised conveyor belt to prevent dismounting, especially belt on the tippers of stacker reclaimer, ship loaders and open conveyor belts at Berth.
 - Do not use wire rope to tie down conveyor belt, also ensure to use gunny bags or old belt pieces between the belt and rope to prevent damage to the belts.
 - Power supply to all points to be shut off after parking the equipment.
 - Ensure that all lighting towers are lowered to minimize damage to them during cyclone.
 - There shall be 3 level of inspection after the parking of all equipment by the leader of the anchoring team, HOS-ES and HOD-ES.
 - Personally inspect all equipment (Ship unloaders, HMCs, ship loaders, Stacker Reclaimers, portliness, transistor etc. and satisfy the safety of the parking done.
 - Parking done should as per the guide line of the manufactures.
 - The hoppers at the berth shall be locked with the rails to prevent movements at high wind speed.
 - Remove all locomotives to the loco shed and block all wheels.
 - Inspect the wagon tipplers/Tunnels and ensure the de-watering pumps are in working condition. The motors may be wrapped to ensure that water does not spoil the insulation in case of power failure and inundation. (Ensure to remove the wrappings before switching on)
 - Ensure that no surface water make entry into the MCC tunnels etc, in coordination with ES-Civil.
 - The indexers and Side arm chargers may be parked at the parking position and movements blocked. Arrange for switching off power supply to all equipments from the MCCs and Switch yard after they are parked.
 - All DG sets to be made functional with adequate stock of fuel for at least 4 days of operation.
 - The DG sets should be installed on high pedestal to prevent it from getting submersed in water.
 - DG in the guest house, water supply system, signal station and CMC also need to be maintained.
 - Provide all assistance to maintain power supply to colony and water pumping system. Keep adequate drinking water and dry food in the substation for all the staff on emergency duty.
 - All important Sub stations have to be manned during cyclone.
 - Monitors the rendering of assistance for rescue of personnel.
 - Ensures the dept. group remains alert on duty for electrical isolation of equipment during an emergency.
 - Render all assistance for upkeep and restoration of water supply system.
 - Lead the group from the front to ensure prevention of damages.
 - Inspect the workshops and ensure the equipment are covered properly to save them from severe wind and water. (Temporary roof may be blown off, hence costly equipment may be wrapped with tarpaulin.
 - Personally inspect all ES auxiliary equipment.
 - Render help to others who request for help, such as Civil and Railways.
 - Ensure that all doors of transfer towers are closed and tied to prevent opening due to the gushing wind.
 - On intimation of imminent cyclone have a second inspection of the port in Co-ordination with Head of all SBU's.
 - Get up to date condition from the all officers and workmen on duty.
 - Ensure completion of cleaning of all roads culverts and drainages.
 - If any work is left out take action to complete it within 24 hrs Or cyclone strike.
 - Complete all necessary action to prevent flow of saline water into plain water storages.
 - Confirm that all rainwater entry points to the Substations & tunnels are sealed.
 - Offer all necessary assistance to HOD-ES for preventive actions.
 - Be prepared for tackling inundation due to tidal water.
 - When cyclone is confirmed keep contractors men stand-by, for emergency works during and immediately thereafter, men are not available.
 - Complete strengthening of shoreline, buildings and other civil works, including housing colonies.
 - Keep adequate construction material for taking up emergency works during cyclone.
 - Keep a set of engineers and workmen on stand-by duty for such works.
 - Help Admin co-ordinate evacuation of port areas and to mobilize, collect and distribute relief material.

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- In coordination with HOD-ES, keep DG sets for the operation of tube wells.
 - Coordinate with port railway officers for assistance they may require for preventive actions.
 - In consultation with CMG keep adequate de-watering pumps operated with diesel engines.
 - Attend CMG meetings.
 - All equipment shall be stopped the moment wind approaches 20mtrs/sec, raise the booms and latch them, tie up if latch is not reliable.
 - Keep adequate construction material for taking of emergency works.
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| <ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support Team <p>HOD – QHSE & F</p> <p>HOS – QHSE & F</p> | <ul style="list-style-type: none"> • Re-check the vulnerable areas with respect to safety and environment. • Re-check for removal/securing of hazardous and toxic cargo. • Arrange all necessary arrangements (rescue, medical, safety, environment, fire) ready. • Liaison with mutual-aid partners for assistance. • Assist CEO/Executive Director (Corp. Affairs) as instructed. • Co-ordination with respective HOD/HOS with respect to emergency actions. • Ensure necessary action through CMG. Provide necessary assistance to CMG. • Assist with evacuation of all personnel except key personnel. • Provide HSE & F facilities (Assist with rescue, evacuation, and other necessary arrangements). |
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- Set up casualty collection centre and arrange first aid posts.
 - Arrange enough stock medicines, antidotes, oxygen, stretchers, keeping in mind that road and rail connectivity may be cut off for required period of time.
 - Arranges additional medicine and equipment as required.
 - Arrange a fully equipped ambulance in ready state.
 - Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment.
 - Immediately co-ordinate with mutual aids for necessary help/support if required.
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| <ul style="list-style-type: none"> • Position • Port Position • Alternative • Secondary Support Team <p>HOD – Finance</p> <p>HOS – Finance</p> | <ul style="list-style-type: none"> • Initiate action to keep cash as discussed with CEO. • Inform HODs about the procedure of issuing of cash. • A separate Insurance Cell under an AGM finance is being formed to deal with all insurance matters. • As directed by CEO verify validity of all insurance. • Issue circular to all HODs indicating the procedure to be followed for raising insurance claims. • Form separate teams to handle the finance matters of each department so that all cash expenditure and accounts are properly maintained. |
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<ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support Team
HOD – HR & Admin
HOS – HR & Admin

- Keep close liaison with CMC/CMG/HSE and perform coordination with the concurrence of CEO.
- Keep enough staff and vehicles for emergencies.
- All activities related to safety and shelter of all officers' staff and staff colony is the responsibility of the administration and HR.
- Issue instructions to all personnel to close all doors and windows and stay indoor during the actual cyclone period.
- Opening of doors and windows will result in rushing of wind, force opening of other doors and windows and destruction of roof.
- Circulate leaflets among all, including colony, on cyclone information.
- Coordinate evacuation of townships and people staying in low lying areas situation so warranted with the clearance from CEO.

- Make announcement to colony and nearby villages by Adani Foundation/Corporate affairs about the severity of the imminent cyclone and advice local population to move to safer shelters.
- Adani Foundation/Corporate affairs in coordination with local authorities to arrange for emergency drinking water and food materials to the evacuees.
- Liaison arrangements for shelters and food for evacuated persons.
- Collecting details of evacuated people. This will be necessary to settle claims, if any, at a later date.
- Consult Legal Advisor and obtain their advice for legalizing all the port's actions.
- Coordinate with other field group (all departments) for food and drinking water for the persons engaged in cyclone duty and restoration work.
- Document all events and actions in coordination with other HODs for future reference.

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Incident Controller
HOD – LT
HOS – LT

- Emergency team in contact with Central Control Room for necessary preparedness.
- All concerned employees and contractual staff informed.
- Contractor staff evacuated from the port and verified.
- All personnel remaining in the port cautioned against venturing out during effective period
- Transportation arranged for evacuation of emergency team if required. (Employees and contractual staff)
- Emergency team to stay in continuous contact with other teams for emergency services (such as QHSE & F, Security, other services)
- Liquid Control (CTF and VEG Oil) Co-ordinate with Marine Control for cyclone bulletins every 6 Hrs.
- Stop all activities, remove all tanker lorries from Liquid Terminal and do not allow any tanker lorries to enter the Liquid Terminal area.
- Vessels at berth are to be informed to keep main engine

- on stand-by at short notice for emergency cast-off in coordination with marine.
- All equipment/computers in control to be covered and protected against water ingress due to heavy rain.
- All storage tanks' shell and roof manholes to be boxed up.
- Ensure flange joint connection are tightened.
- Ensure roads and pathways are cleaned and not obstruct for any vehicle movement during emergency.
- Jetty supervisor to ensure that no personnel are allowed on the jetty areas.
- Jetty supervisor to brief all workers/labors to remain alert and nominated shelters. Only minimal mooring member to remain in the port and no worker/labour to be on the berth.
- All hydra and jetty/technical vehicle to be parked in the safe shelter.

- Position
- Port Position
- Alternative
- Incident Controller

HOD – Railway

HOS – Railway

- All normal operations stopped. Only on emergency operations of evacuate of Locomotive and wagon shifting to safe places.
- All equipment (Locomotive & wagons etc) to be parked at suitable railway yard.
- Transportation arranged for evacuation of staff (employees and contractual staff)
- Only Emergency team members to remain in the port.
- 2 vehicles stand-by near Railway building and FCC control room.
- Following teams are nominated and tool talked for anticipated emergency action.
 - > Loco Pilot
 - > Loco Maintenance
 - > Track Maintenance
 - > Signal Maintenance

- Emergency team to stay in continuous contact with other teams for emergency services (such as QHSE & F, Security, other services)
- To ensure all contracted and company staff apart from emergency team is evacuated.
- To communicate any pending evacuation from port to emergency team.
- To be in continues touch with marine control room and Railway control room.

- Position
- Port Position
- Alternative
- Incident Controller

HOD – CT

HOS – CT

- Maintain close contact with Marine control for the status of the cyclone.
- All employees concerned and contractual staff informed contractor staff evacuated from the port and verified.
- All personnel remaining in the port cautioned against venturing out during effective period.
- Empty containers not to be stacked more than 3 high. loaded containers can be stacked up to 4 high.
- All hand held UHF/batteries, emergency torch, mobile phone fully charged for use in emergency in case of total power failure.
- Operation to be suspended based on information of marine control.
- Only emergency team to be available at site.
- Power supply to all points to be shut off after parking the equipment.

- Ensure that all lighting towers are lowered to minimize damage to them during cyclone.
- All equipment shall be stopped the moment wind approaches 20mtrs/sec, raise the booms and latch them, tie up if latch is not reliable.
- There shall be 3 level of inspection after the parking of equipment.
- By the leader of the anchoring team, HOS-ES, HOD-ES.
- Personally inspect all equipment (Ship unloaders, HMCs, ship loaders, stacker reclaimers, trailer etc.) and ensure correct parking of equipment.
- Move the equipment to parked position.
- Travel and position to the respective earmarked parking position and lock.
- Loading boom of Stacker Reclaimers should be lowered and latched at the parking position.
- In case of any difficulty to travel to the parking position lower the boom to the travelling rail, any one side and tie down with the rail.
- Block the travelling wheels and slew wheels mechanically.
- Additionally the rail mounted equipment may be tied to the rails by wire rope and clamps depending on the severity of the predicted cyclone.

C During cyclone till dissipating

1	Ensure that all emergency teams and mobile first aid centre are ready for meeting emergencies, as planned. The salvage team at signal station must be ready.
2	Before switching off the power supply ensure all the DG sets are in working condition and enough fuel and operating personnel are in place. The DG Sets should be installed on high pedestal to prevent it getting submersed in water.
3	Ensure that no one venture out of the office or shelter if the speed of wind is more than 100kmph. Personnel in open may be thrown by force of wind.
4	During cyclone, no one should open doors or windows, force of wind will force open other doors and windows. Opened windows or doors cannot be closed and chances of roof lifting upwards are high.
5	An emergency team with adequate man power, tools and plants, portable welding sets and gas cutting sets with adequate ropes and other consumables shall be maintained during cyclone for rescue and salvage operation.
6	Switch of power supply to all installations from the main power supply source. All important and vital installation shall be manned.

D Post cyclone stage: Recovery, insurance, restoration & relief

The purpose of post cyclone activity is to resume port operation as early as possible.

If the eye of the cyclone has passed over the port, wait for complete passing of the rear cyclone before inspection. Confirm the same from the radar station/signal station.

Site-Main Controller - CEO/Executive Director (Corp. Affairs)

- a. Collect the details of damages if any from HODs immediately.
- b. Ask all members of the CMG to immediately inspect their area of responsibility, along with their subordinate staff and officers and report their finding within 3 hrs. of ceasing of the heavy wind.
- c. Ask the HODs to submit preliminary estimate immediately, followed by detailed estimate.
- d. HOD - Marine to be asked to complete the survey of channel and berth as quickly as possible, to resume shipping activity.
- e. All required activities to resume port operations are to be discussed and finalized with HODs.
- f. A department-wise detailed programme is to be drawn up to resume normal port operations.
- g. Regular follow up to complete the work as programmed is to be done.
- h. Emergency powers for procurement and award of contract are to be evoked.
- i. HODs are required to submit the details and programs immediately.
- j. Reports on condition of tugs and other port crafts, ship unloader, ship loaders, HMCs and other auxiliary equipments after thoroughly inspection by HOD.
- k. All other cargo handling equipments like container handling equipment if any shall be inspected by HOD and detailed report to be obtained..
- l. MCCs, Stacker Reclaimers, Wagon tippler and Wagon tippler tunnel,
- m. Conveyor belts, conveyor galleries, Locomotives, Rail load out system etc shall also be inspected carefully by HOD and reports to be obtained condition of Liquid berth and equipments and SPM.
- n. Condition of all civil structures, Roads, Culverts and drainages and water supply system.
- o. Ask all HODs to submit details to HOD - Finance to process insurance claims.
- p. Coordinate the CSR activities.
- q. Keep contact with District Collector and local state Govt. official and offer all possible help for rehabilitation of displaced villagers.
- r. Inform all stockholders regarding all clear & restoration of the port operation. Also inform the same to the corporate office.
- s. Confirm the termination of the emergency after the threat is over.
- t. Lead the Crisis Management Group for early restoration of facilities and resume port activities.

Incident Controller: HOD – Marine [Marine & SPM]

- a. Marine – HOD shall immediately arrange for survey of channel and berth and inform the condition to CEO/COO, Who in turn inform the corporate office and stake holders.
- b. Restoration work if any may be done in association with Head ES.
- c. Shall check the navigational aid system take action for rectifications if required
- d. Check all tugs and mooring crafts and they should be made fully functional as quickly as possible.

SPM

- a. Checking both mooring hawser assemblies and replace the components as required.
- b. Replacements of both 9" PP pick ropes of mooring hawsers.
- c. Inspection of each floating hoses on both floating hose strings.
- d. Underwater inspection of each individual hoses on both subsea hose string and subsea umbilical.
- e. Underwater inspection of all deep sea floats for their integrity.
- f. Checking subsea hose strings configuration at low and high tide.
- g. Verifying chain angle of all six anchor chains to be within limits, at low and high tide.
- h. SPM buoy body inspection – integrity of seal on all hatches and doors.
- i. Operational check of all navigational and safety equipment.
- j. Carry out the system pressure test from floating hose string end to PLEM valve up to 15 bars and hold for 3 hours. Visual check by divers for any abnormalities on floating hoses and subsea hoses.
- k. Carryout "Free Span and Lateral displacement" survey of subsea pipeline and provide support wherever necessary i.e. if it is beyond recommended allowable span.

Incident Controller: HOD – ES (MPT & WB)

- a. Shall immediately depute the electrical engineer to have an update of power supply.
- b. In case of power outage, coordinate with Electrical supply authorities for restoration of power supply
- c. If power is available, and MCCs are O.K, charge MCCs one by one after thorough checking.
- d. Depute the same team which has parked the equipment to release the equipment for operation after removing all blockages.
- e. If any equipment is found to be damaged report the matter to higher ups and take action for early repair or decommissioning.
- f. Do not start operating, until all parking locks & additional tie-ups are removed
- g. Equipments also can be charged one by one after charging the MCCs after obtaining written clearance from the engineer in charge.
- h. Ensure that the equipments electrical system is perfect before charging. Keep records of all measurements.
- i. Inspect the tunnel and dewater the accumulated water.
- j. Inspect all electrical and mechanical system thoroughly before trial run.
- k. All lighting towers which were lowered to be raised up.
- l. Damaged street lights and damaged internal lighting system to be repaired and re-commissioned.
- m. All belt clamping/tie-up must be removed before trial run of conveyors.
- n. Arrange for de-watering of tunnel with diesel pump if power supply is not readily available.
- o. Ensure all DG sets works till normal power supply is resumed.
- p. Inspect the water supply system and take all action to establish normal water supply immediately.
- q. In case of any difficulty, bring it to the notice of CEO/Executive Director (Corp. Affairs) (Corp. Affairs).
- r. In case of water logging, arrange diesel pumps and pump out water.
- s. Drainage system if damaged should be repaired immediately.
- t. Inspect all roof tops and if any roof is blown off, take action for replacement.
- u. Coordinate with Admin/HR for clean-up activities.
- v. HODs of West Basin will assist the Head – West Basin.

Primary support team: HOD – HR & Admin

- a. Shall take up rehabilitation work of port colony.
- b. Take all actions necessary to rehabilitate the officers and staff of the port.
- c. Coordinate with civil department to clean up the colony and premises.
- d. Arrange for provisions till normalcy is established.
- e. Food arrangements to people on resumption work to be coordinated.

Primary support team: HOD – QHSE&F

- a. Assist to CEO/Executive Director (Corp. Affairs)
- b. Assess damage (human) and send for further treatment.
- c. Assess the property damage and prepare report in consultation with concern department.
- d. Assist all HODs with restoration.
- e. Arrange for environmentally safe disposal of post emergency generated effluents/waste.
- f. Updating DMP based on faced natural calamities.

Secondary support team: HOD – Commercial

- a. Shall inspect all stores and estimate loss or damages if any and take immediate action for re-equipping the items.
- b. Coordinate with all HODs for requirements of consumables and spares.
- c. Discuss with CEO/Executive Director (Corp. Affairs) to ease norms of procurement for immediate supply of stores.
- d. He shall help HOD Commercial for procuring the items necessary for cyclone damage repairs. Post Cyclone

Incident controller: HOD – Railway

- a. Shall depute teams of staff to check the condition of all railway track and track electrification and signalling system.
- b. Contractor shall be instructed to depute adequate numbers of teams to survey the entire railway lines and system and submit feedback within the shortest possible time (fix the time period for feedback)
- c. Condition shall be reported to CEO/Executive Director (Corp. Affairs) (Corp. Affairs) and take action to repair and resume operations.
- d. If track electrification is damaged, coordinate with Indian Railways to press in diesel locos till the electric line is repaired, and resume operation with conventional signalling.
- e. Any help for repair and decommissioning may be taken from HOD - ES.
- f. He shall also inspect the Locomotives of the Port, and arrange for trial running to put them into operation.
- g. Inspect the Locomotives of the Port, and arrange for trial running to put them into operation.

Incident controller: HOD – Operations [DC (MPT & WB), CT, LT]

- a. Shall inspect all areas along with concerned HODs to estimate loss and damages if any. Prepare report and submit to CEO.
- b. The condition of stored hazardous/toxic cargo to be inspected along with HSE and immediate action as advised by HSE to be taken up.
- c. Deploy men and equipments to segregate and salvage all cargo.
- d. Coordinate with ES HOD, for assistance in de-watering and plot/shed repairs.
- e. Discuss with CEO/Executive Director (Corp. Affairs) and HODs for resumption of partial or full operations.
- f. Take all actions for early resumption of port activities.
- g. Coordinate with HOD - Marine to resume shipping operations.
- h. Coordinate with HOD - Finance for insurance claims.
- i. All costly and critical materials are stacked properly to avoid loss due to wind or water inundation.
- j. Estimate the losses and damages along with BD and inform CEO/Executive Director (Corp. Affairs).

Secondary support team: HOD – Finance & Accounts

Insurance claims

- a. All HODs to prepare loss and damage list and estimate the costs of rectification and submit the same to HOD - Finance, who is the nodal officer for claiming insurance, with copies to CEO/Executive Director (Corp. Affairs) (Corp. Affairs). The details shall contain photograph also.
- b. Shall coordinate with insurance company to arrange the surveyor as quickly as possible, so that rectification work can start immediately.
- c. May coordinate with all HODs to prepare additional documents if required.
- d. May collect the details of claims with supporting documents from HODs in a time frame to be fixed by him for early settlement of all claims.
- e. Timely submission of insurance claims necessary for claiming losses.

Primary support team: HOD – Security

- a. Restoration of road traffic & port entry system from and to the port disrupted due to the cyclone.
- b. Shall be well versed with all road communication of the area.
- c. Shall coordinate with local administration/State administration to clear the roads in consultation with Corporate Affairs.
- d. Port may also be required to engage men and machine to Clear the road blockages.

Secondary support team: CSR HOD – Adani foundation [General Responsibilities]

The company has a social responsibly to save the life and property of the people living in the peripheral areas. This work involves the following activities. These activities may be done in association with local administration.

- a. Inform the public by public announcement the danger level of the cyclone and its effects and consequences.
- b. Leaflets are to be circulated about the danger level.
- c. If Tidal inundation is expected the villagers may be informed of the consequences.
- d. Request them to move to safer places to escape from heavy wind and tidal actions.
- e. Moving to Cyclone shelter is the best option. If cyclone shelter is not nearby, they may be asked to move to permanent structures available nearby. Provide them all assistance for evacuation.
- f. Provide the villagers adequate dry food (chuda, gudo, biscuits, baby food etc.) items and potable water in adequate quantity.
- g. Water tankers with potable water may be kept stand-by.
- h. Services of medical team may be extended to the peripheral villages with necessary medicines and first aids.
- i. Advise them to remain indoors during cyclone.
- j. After the cyclone there may be shortage of food and water.
- k. Water has to be provided for their basic needs till normalcy is established.
- l. Start community Kitchens to provide them with food.
- m. Help in rehabilitation of all displaced people in coordination with local Govt. Agencies and NGOs.

- Position
- Port Position
- Alternative
- Secondary Support Team in-charge - Telecommunication

- Take charge of all communication systems of fixed and portable.
- Ensure availability of sufficient numbers of electronic communication equipment to the port control station, Base Control and anywhere else as necessary.

- Position
- Port Position
- Alternative
- Secondary Support Team in-charge - IT

- Take charge of all necessary communication system.
- Take all necessary back up of data.
- Assess damage of assets and restore

E Checklist

- Checklist for CEO/Executive Director (Corp. Affairs)
- Following Checklists prepared which shall be used at the time of declaration of Cyclone.

Checklist – 1	CEO/Executive Director (Corp. Affairs) (Corp. Affairs)
Checklist – 2	Marine Services
Checklist – 3	Engineering Services
Checklist – 4	Dry Cargo
Checklist – 5	Liquid Terminal
Checklist – 6	Container Terminal
Checklist – 7	HR & Admin
Checklist – 8	Security
Checklist – 9	Railway Services
Checklist – 10	West Basin
Checklist – 11	QHSE&F

CEO - Emergency Preparedness				
Cyclone-Check List				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency Control Room established at suitable location with communication facilities			
2	All teams have reported their readiness for dealing with emergencies.			
3	Testing of communication (PA System, Mega phones, VHF, UHF and Landline) with all on site Emergency Control Rooms.			
4	Assess the situation and declare emergency.			
5	Alarms sounded followed by verbal order by PA system.			
6	Evaluate transportation/evacuation/food arrangements.			
7	Confirm readiness of medical facilities.			
8	Liaise with government bodies, other stake holders and mutual aid, partners for providing support if necessary.			
9	Obtain status of situation from the government Emergency Control Room and disseminate information.			
10	All high value assets such as cranes, RTG's, RMQC, GSU's, Tugs, Craft, Railway Locos, Dredgers, Stacker, reclaimers are secured.			
11	All vehicles topped up with fuel.			
12	Walkie Talkie sets fully charged along with spare charged batteries.			
13	Emergency numbers to be kept with all emergency vehicles			
14	List of emergency contacts & suppliers.			
15	All non-essential persons have been evacuated from the port.			
16	Roads and pathways are clear for emergency movement.			
17	All departments are maintaining a diary noting down action taken.			
18	Reports on condition of Tugs and other Port crafts, ship un loader, ship loaders, HMCs and other auxiliary equipments after thoroughly inspection by HOD.			
19	Condition of Oil berth and equipments and SPM.			
During Effective Period				
1	All personnel notified against venturing out during effective period, All personnel to remain indoor, observant and be alert.			
2	Take frequent updates from departments for any damage to property or injury to personnel.			
3	Provide necessary support by on site emergency team.			
After Effective Period				
1	Announcement to be made declaring end of emergency or PA system and other means of communication.			
2	Advise emergency teams to carry out on-field assessment.			
3	Personnel to be advised not to enter damaged buildings/structures.			
4	Launch search and rescue operations for missing personal.			
5	Get reports on casualties and injuries to personnel. Arrange for medical assistance.			
6	Carry out assessment of damage to property and all high value assets within the port including ships.			
7	Reports to be consolidated with photographs from all departments for insurance claims.			
8	Gradual resumption of port operation.			

Marine Services - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. All personnel notified against venturing out during effective period.			
5	A team is formed to identify and removal of items from jetty which may fall into sea due to strong wind such as life buoy with stand, gangway etc.			
6	Electric equipment at jetty/Tug berth covered and protected against water ingress.			
7	If flood as consequence of Cyclonic Storm/Hurricane is anticipated, Oil Spill Management Plan is activated.			
8	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Marine Building.			
9	6 Nos of raincoats, charged emergency torches, 2 battery operated torches with spare batteries, 6 life jackets, ropes (50 meters x 6), life buoys available for emergency use.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
11	List of emergency contacts & suppliers available.			
SPM				
1	SPM Floating Hose to be flushed and removed 3 days before predicted arrival of cyclone. The Hoses may be brought to South Basin.			
Tugs/Marine Police & Coast Guard Crafts				
1	Tugs ME to be kept at short Notice to meet any emergency situation.			
Marine Control (MMPT & WB)				
1	WB Marine Control to issue cyclone bulletins every 6 Hrs.			
2	Vessel at berth and at anchorage informed about cyclone warning.			
3	Vessels at berth are informed to keep Main Engine stand-by at short notice for emergency castoff.			
4	All equipments/computers in MMPT control covered and protected against water ingress due to heavy rain.			
5	All hand held UHF/batteries, emergency torch, mobile phones are fully charged for use in emergency incase of total power failure.			
Jetty Supervisor				
1	Jetty supervisor to ensure all lines of vessels at berth are always kept taught.			
2	Jetty Supervisor briefed all mooring crew to remain alert, careful and to move in pairs. No Mooring Crew to stand close to the berth.			
3	All Hydra and jetty/technical vehicles parked at safe shelter.			

Marine Services - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Appropriate storm warning signal hoisted (as per GMB instruction)			
2	Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
5	All operations must be stopped and personnel moved to a safe location from where they can be evacuated. Transportation arranged for evacuation of staff (employees and contractual staff)			
6	Team is formed to identify and remove items which may fall into the sea due to strong wind, from the jetty, such as life buoy with stand, gangway etc.			
7	Electric equipment at jetty/tug berth covered and protected against water ingress.			
8	Material & equipment that cannot be moved are covered.			
9	All loose items on jetty are secured.			
10	If flood as consequence of cyclonic storm/hurricane is anticipated, ensure Oil Spill Management Plan is activated			
11	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Marine Building.			
12	Arrangement made for stand-by vehicle.			
13	Vessels at berth to be casted off if wind speed > 30 Kts with HOD permission.			
14	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Tugs/Marine Police & Coast Guard Crafts				
1	Tugs Main Engine kept at short Notice to meet any emergency situation.			
Marine Control (MMPT & WB)				
1	WB Marine Control to issue cyclone bulletins every 6 Hrs.			
2	WB Marine Control to send cyclone bulletin SMS from 3 day before predicted arrival of cyclone.			
3	All vessel at berth and at anchorage are informed about cyclone warning.			
4	Vessels at berth are to be informed to keep Main Engine on stand-by for emergency castoff, at short notice.			
5	All equipments/computers in MMPT control to be covered and protected against water ingress due to heavy rain.			
6	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			

Jetty Supervisor				
1	Jetty supervisor to ensure that all lines of vessels at berth are always kept taught. Vessel to be instructed to double up mooring lines, if required.			
2	Jetty Supervisor to brief all mooring crew to remain alert, careful and should move in pairs. No Mooring Crew to stand close to the berth.			
3	All Hydra and jetty/technical vehicle to be parked at safe shelter.			

Marine Services - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Appropriate storm warning signal hoisted (as per GMB instruction)			
2	Emergency team in contact with Central Control Room for necessary preparedness.			
3	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated Transportation arranged for evacuation of staff (employees and contractual staff)			
5	Electric equipment covered and protected against water ingress.			
6	Electric equipment at jetty/Tug berth covered and protected against water ingress.			
7	2 pilot vehicles stand-by near marine canteen shelter.			
8	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Marine Building.			
9	Vessels at berth to be casted off if wind speed > 30 Kts with HOD permission.			
10	Adequate no of raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes , life buoys to be kept on stand-by for emergency use. Raincoats- 6 nos, gumboots- 6 nos, helmets- 6 nos, gantline- 50 meter x 6 nos available.			
11	All work permits revoked.			
12	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
13	List of emergency contacts & suppliers available.			
Tugs/Marine Police & Coast Guard Crafts				
1	MMPT Tugs anchored in South Basin (west of turning circle).			
2	Marine Police & Coast Guard Crafts secured at Ro Ro.			
3	West Basin Tugs secured at WB4.			
4	Doors and hatches on Tug's upper deck kept closed.			
5	Tugs Main Engine kept on stand-by to meet any emergency situation.			

Marine Control (MMPT & WB)				
1	WB Marine Control to issue cyclone bulletins every 6 Hrs.			
2	WB Marine Control to send cyclone bulletin SMS to all concerns.			
3	All vessel at berth and at anchorage are informed about cyclone warning.			
4	All vessels informed to keep Main Engine Sby at short notice.			
5	All equipments/computers in MMPT control covered and protected against water ingress due to heavy rain.			
6	All hand held UHF/batteries, Emergency torch, Mobile Phone fully charged for use in emergency incase of total power failure.			
7	MMPT and WB Radar/VHF Antennas are secured properly to prevent damage.			
Jetty Supervisor				
1	Jetty supervisor to ensure that no personnel are allowed on the Jetty areas.			
2	Jetty Supervisor to brief all mooring crew to remain alert and nominated shelters. Only minimal mooring crew member to remain in the port and no Mooring Crew to be on the berth.			
3	All Hydra and jetty/technical vehicle parked at safe shelter.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	DPC, MMPT Marine Control Officer and data entry operator to take shelter in New Marine Building with all hand held VHF, UHF, emergency light and mobile phones.			
4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			
After Effective Period				
1	Assess damage to equipments, building and unsafe condition.			
2	Initiate restart process.			

Engineering Service-MPT - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Sr. No.	Activity	Yes	No	Remarks
1	Engineering Service-MPT Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation identify tasks to be undertaken identify resources available for tasking determine gaps in information and resources access expert advice as required develop and implement tactical plans for response and recovery operations			
4	People are made aware of do's and don'ts before, during and after Cyclone			part of training. List of do's and don'ts enclosed

5	A backup team is formed to identify potential flying objects (Roofing, sheeting, temp sheds etc.) and secure/remove them.			Team will comprise of backup and stevedoring shift Incharge from DC, shift Incharge of ES and safety.
6	Connection of all the electrical equipment/appliances are checked and if not required the same are disconnected. Electrical supply/ connection for all the unwanted items are disconnected			
7	Portacabins to be secured properly and relocation of electronic equipment from various porta cabins to designated location . Note : Equipment which are prone to be affected by cyclone should properly secured or tied such as pota cabin etc			
8	Following team of ES-MPT are nominated and tool talked for anticipated emergency action. A) Shift Incharge- Electrical ES-MPT (For LT , Dry Cargo & Common SBU) B) Shift Incharge-Mechanical ES-MPT (For LT , Dry Cargo & Common SBU) C) Shift Incharge-Civil ES-MPT (For LT , DRY Cargo & Common SBU)			
9	Coordination with labour contractors for making necessary arrangements towards evacuation of labours (Approx. 400 No's) deployed at FCC , Conveyor ,Jetty , Steel Yard & Liquid terminal . Actual evacuation to be done only after port shutdown is declared from CEO office.			List of average manpower in port on normal operation day is enclosed
10	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
11	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
12	List and contact details of customers ,contractors and port emergency contacts. Refer List			
ES-MPT Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external contractor			
2	To appraise ES-MPT shift Incharge every 12 hrs who in turn will appraise their reportees & colleagues.			
3	All emergency equipment such as de-watering pump to be maintained up to operational condition . Hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
ES MPT -HOS				
1	Respective ES-MPT-HOS to ensure that all the arrangement for securing Cranes/Mobile Equipment is in order.			
2	Respective ES -MPT-HOS in coordination with emergency team to appraise the contracted labour supervisor at jetty and backup of the developments.			
3	Pictorial records of the sequence of events and preparedness (For Insurance Purpose) to be maintained			For insurance purpose

Note : At the time of cyclone & tsunami warning , priority to be given to worker, technician working on jetty or below jetty.

Engineering Service -MPT - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	ES-MPT squeezes to bare essential maintenace activity with limited resources to ensure quick rap up.			
2	ES-MPT Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	Mobile harbour cranes & Goliath cranes is properly parked and lashed in boom down condition. .			
4	Appropriate team of technical staff is deployed for anticipated emergency action. A) Shift Incharge B) Engineers/Technician			
5	Material & equipment that cannot be moved are covered.			
6	All loose items on jetty/backup are secured.			
7	Nomination of Emergency response vehicles (2 No's)			
8	All work permits revoked. Work at height is stopped and not permitted.			
9	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
ES-MPT Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external contractor .			
2	To inform all contracted and company staff about cyclone to evacuate their staff.			
3	To take feedback of evacuation process and highlight progress/issues emergency team.			
4	To check all hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure. Emergency equipment such as DG Set , de-watering pump , hydra , excavator , forklift to be maintained & operational condition.			
5	All computers/peripherals in MPT control to be covered and protected against water ingress due to heavy rain.			
ES-MPT HOS				
1	Respective ES-MPT-HOS to ensure that all the arrangement for securing Cranes/Mobile Equipment is in order.			
2	ES-MPT-HOS in coordination with emergency team to instruct the contracted labour supervisors at jetty and backup to ensure proper and adequate evacuation of labours and their staff			
3	Keep pictorial records of the sequence of events and preparedness(For Insurance Purpose)			For insurance purpose

Engineering Service -MPT - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	All normal operations stopped. Only emergency operations (securing of MHC/Goliath/LMC/ equipment/Hoppers/dumpers/trailers) to be continued.			
2	Cranes are parked at safe locations with lowered and secured booms.			

3	All mobile truck loading hoppers at Jetty are arrested at their wheels to prevent horizontal movement due to wind and secured from its top by arranging guy ropes.			
4	ES-MPT Emergency Response team having nominated member of FCC control room , DG House substation , Workshop , ES-MPT coordination desk is handy with VHF sets , Emergency Torches, Rain Coat.			
5	Central control room (Adani House) issues Port closure notice			
6	All equipment (Pay loaders/excavators etc.) to be parked at OSY 10 or nominated OSY with full fuel.			
7	All dumpers/Trailers to be parked at OSY 5/nominated place with full fuel.			
8	All godown gates are kept closed.			
9	Transportation arranged for evacuation of staff (employees and contractual staff)			
10	Emergency Kit, Food supplies and drinking water checked and tested.			
11	Communication mediums like VHF, Mobile phones and PA systems checked and tested			
12	Only Emergency team members to remain in the port.			
13	2 pilot vehicles stand-by near Tug berth building and FCC control room.			
14	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
15	Shall immediately depute the electrical engineer to have an update of power supply.			
16	Ensure that the equipments electrical system is perfect before charging. Keep records of all measurements.			
17	Ensure all DG sets works till normal power supply is resumed.			
18	In case of power outage, Coordinate with Electrical supply authorities for restoration of power supply			
19	Drainage system if damaged should be repaired immediately. Inspect all roof tops and if any roof is blown off, take action for replacement.			
20	Necessary required sand bag to be kept as a send by to support the roof sheets.			
ES-MPT Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external contractor .			
2	To ensure all contracted and company staff apart from emergency response team is evacuated.			
3	To highlight any pending evacuation from port to emergency team.			
4	To be in continues touch with marine control room and FCC control room.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	Emergency team members, shift manager and coordination desk personnel t take shelter in their respective control rooms with all hand held VHF, UHF, emergency light and mobile phones.			
4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			

After Effective Period				
1	Take headcount of all the personnel. (FCC , Steel Yard, Jetty , tug berth building & Liquid terminal)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
4	Assess damage to equipment, resources and cargo.			
5	Initiate restart process.			
6	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
7	Inspect all electrical and mechanical system thoroughly before Trial run.			
8	All lighting towers which were lowered to be raised up.			
9	Damaged street lights and damaged internal lighting system to be repaired and recommissioned.			
10	All belt clamping/tie-up must be removed before trial run of conveyors.			

Dry Cargo - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Dry Cargo Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	People are made aware of do's and don'ts before, during and after Cyclone			part of training. List of do's and don'ts enclosed
5	A backup team is formed to identify potential flying objects (Roofing, sheeting, temp sheds etc.) and secure/remove them.			Team will comprise of backup and stevedoring shift Incharge from DC, shift Incharge of ES and safety.
6	Connection of all the electrical equipment/appliances are cheked and if not required the same are disconnected. Electrical supply/ connection for all the unwanted items are disconnected			
7	All non-operating godowns gates closed.			

8	Cargo secured inside warehouse and Open Plots. Tarpaulin sheets kept ready where ever fertilizer and agri cargo stored. An inventory to cover 3 Lakh MT of cargo to be maintained.			
9	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
10	All Spare equipment (Pay loaders/excavators etc.) parked at OSY 10. In case of occupancy of OSY10, suitable open yard to be nominated.			
11	All Spare dumpers/Trailers to be parked at OSY 5/nominated place.			
12	Portacabins to be secured properly and relocation of electronic equipment from various porta cabins to designated location			
13	Following team of operators are nominated and tool talked for anticipated emergency action. A) Crane Operators- 3 No's B) Loader Operators - 6 No's C) excavator operators - 4 Nos. D) Forklift operators- 2 No's			List of average manpower in port on normal operation day is enclosed
14	Coordination with labour contractors for making necessary arrangements towards evacuation of labours (Approx. 650 No's) , Drivers (150 No's) , Surveyors (120 No's) and Equipment Operators (75 No's) deployed at FCC , Maruti , Steel Yard, Stevedoring and Backup . Actual evacuation to be done only after port shutdown is declared from CEO office.			
15	Drinking water (10 bottles of 20 litre) and dry non perishable food available for 30 people (2 days) at Tug berth building and FCC control room			
16	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
17	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
18	List and contact details of customers ,contractors and port emergency contacts.			
Dry Cargo Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To appraise Jetty /Backup and FCC shift Incharge every 12 hrs who in turn will appraise their reportees.			
3	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
Dry cargo Shift manager				
1	DC Shift Manager to ensure that all the arrangement for securing Cranes/Mobile Equipment is in order.			
2	DC Shift Manager in coordination with emergency team to appraise the contracted labour supervisor at jetty and backup of the developments.			
3	Keep pictorial records of the sequence of events and preparedness (For Insurance Purpose)			For insurance purpose

Dry cargo - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Dry cargo operations squeeze to bare essential productivity with limited resources to ensure quick rap up.			
2	Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	All jetty operations to stop if wind speed exceeds 30 Knots or heavy rainfall occurs.			
4	All non operational godown gates kept closed.			
5	Cargo secured inside warehouses and Open Plots. Cargo covered near gates inside warehouses.			
6	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
7	All spare equipment (Pay loaders/excavators etc.) parked at OSY 10 or nominated OSY.			
8	All Spare dumper/Trailers parked at OSY 5/nominated place.			
9	Following team of operators is deployed for anticipated emergency action. A) Crane Operators- 3 No's B) Loader Operators - 6 No's C) Excavator operators - 4 Nos. D) Forklift operators- 2 No's			
10	Material & equipment that cannot be moved are covered.			
11	All loose items on jetty/backup are secured.			
12	Nomination of Emergency response vehicles (2 No's)			
13	Vessels at Berth prepared for emergency cast off.			
14	All work permits revoked. Work at height is stopped and not permitted.			
15	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Dry Cargo Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To inform all contracted and company staff about cyclone to evacuate their staff.			
3	To take feedback of evacuation process and highlight progress/issues emergency team.			
4	To check all hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
5	All computers/peripherals in MPT control to be covered and protected against water ingress due to heavy rain.			
Dry Cargo Coordination desk				
1	DC Shift Manager to ensure that all the arrangement for securing Cranes/Mobile Equipment is in order.			
2	DC Shift Manager in coordination with emergency team to instruct the contracted labour supervisors at jetty and backup to ensure proper and adequate evacuation of labours and their staff			
3	Providing other dept. including safety, security, etc. mobile equipment and vehicles as per requirement given by them.			
4	Keep pictorial records of the sequence of events and preparedness(For Insurance Purpose)			For insurance purpose

Dry cargo - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	All normal operations stopped. Only emergency operations (securing of MHC/Goliath/LMC/ equipment/Hoppers/dumpers/trailers) to be continued.			
2	Cranes are parked at safe locations with lowered and secured booms.			
3	All mobile truck loading hoppers at Jetty are arrested at their wheels to prevent horizontal movement due to wind and secured from its top by arranging guy ropes.			
4	FCC control room and DC coordination desk is handy with VHF sets , Emergency Torches, Rain Coat.			
5	Central control room (Adani House) issues Port closure notice			
6	All equipment (Pay loaders/excavators etc.) to be parked at OSY 10 or nominated OSY with full fuel.			
7	All dumpers/Trailers to be parked at OSY 5/nominated place with full fuel.			
8	All godown gates are kept closed.			
9	Transportation arranged for evacuation of staff (employees and contractual staff)			
10	Emergency Kit, Food supplies and drinking water checked and tested.			
11	Communication mediums like VHF, Mobile phones and PA systems checked and tested			
12	Only Emergency team members to remain in the port.			
13	2 pilot vehicles stand-by near Tug berth building and FCC control room.			
14	Following team of operators remain at stand-by (at Tug Berth building) for emergency action. A) Crane Operators- 3 No's B) Loader Operators - 6 No's C) excavator operators - 4 Nos. D) Forklift operators- 2 No's			
15	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
16	All costly and critical materials are stacked properly to avoid loss due to Wind or water inundation.			
Dry Cargo Coordination desk				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To ensure all contracted and company staff apart from emergency team is evacuated.			
3	To highlight any pending evacuation from port to emergency team.			
4	To be in continues touch with marine control room and FCC control room.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	Emergency team members, shift manager and coordination desk personnel t take shelter in their respective control rooms with all hand held VHF, UHF, emergency light and mobile phones.			

4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			
After Effective Period				
1	Take headcount of all the personnel. (FCC, backup, steel yard, jetty & tug berth building)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
4	Assess damage to equipment, resources and cargo.			
5	Initiate restart process.			
6	Photographs to be taken for assessing damages to cargo and property for insurance.			
7	Communication to be sent to all clients regarding assessed and potential damage to cargo.			
8	Estimate the losses and damages inform to CEO			
9	Discuss with CEO and HODs for resumption of partial or full operations. Take all actions for early resumption of Port activities.			

Liquid Terminal - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. All personnel notified against venturing out during effective period.			
5	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Liquid Building.			
6	11 Nos of raincoats, charged emergency torches, 2 battery operated torches with spare batteries, 6 life jackets, ropes (50 meters x 6), life buoys available for emergency use.			
7	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
8	List of emergency contacts & O & M Agency contact number shall be available			

Liquid Control (CTF and VEG Oil)				
1	Co-ordinate with Marine Control for cyclone bulletins every 6 Hrs.			
2	Inform all contractors to remove all their equipment from liquid terminal area and put in proper location.			
3	Vessel at berth and at anchorage informed about cyclone warning.			
4	All hand held UHF/batteries, emergency torch, mobile phones are fully charged for use in emergency incase of total power failure.			
5	Check & clean of dyke wall for all tanks. (Ensure valves of dyke wall are in open condition)			
6	Floating roof tank ensure the tank roof draining system valves must be in open condition, and Pipe line shall be thoroughly cleared, NRV shall be in working condition.			
7	Material (i.e., Oil Drums, sludge tanks etc.) & equipment that cannot be moved are to be covered.			
8	Check earthing of pipelines & tanks with help of ES E & I.			
9	Clean the spillage material for prevent slippery surface.			
10	All storm water drainage system(sumps and clear passage of line) should be clean and cover properly			
11	Kept appropriate PPE's.			
12	Electric machinery is covered and protected against water ingress.			
Jetty Supervisor				
1	Jetty supervisor to ensure all lines of vessels at berth are always kept tight			
2	Jetty Supervisor briefed all workers/labors be alert, careful and to move in pairs. No one to stand close to the berth.			
3	All Hydra and jetty/technical vehicles parked at safe shelter.			
4	Safe guard all loose material including Hose and drums and other loose material			

Liquid Terminal - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Appropriate storm warning signal hoisted (as per GMB instruction)			
2	Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	All concerned employees and contractual staff informed. Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated. Only Emergency team members to remain in the port. Transportation arranged for evacuation of staff (employees and contractual staff)			
5	Material & equipment that cannot be moved are covered.			
6	All loose items on jetty are secured.			
7	Arrangement made for stand-by vehicle.			
8	Evacuate all tank trucks from Liquid Terminal			

9	All work permits revoked.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
11	Remove all loose materials(i.e Hoses shifted to be Hose shed) and equipment (i.e. MOBILE PUMPS etc.) from jetty & Liquid terminal area.			
Liquid Control (CTF and VEG Oil)				
1	Co-ordinate with Marine Control for cyclone bulletins every 6 Hrs.			
2	Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.			
3	All vessel at berth informed about cyclone warning. In case of severe cyclone, vessels to be informed to move out of Gulf of Kutch to keep well clear of the cyclone.			
4	Vessels at berth are to be informed to keep Main Engine Sby at short notice for emergency castoff.			
5	All equipment/computers in control to be covered and protected against water ingress due to heavy rain.			
6	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			
7	All storage tanks shell and roof manholes to be box up			
8	Ensure flange joint connection to be tighten.			
9	Check foundation of all tank & pumps.			
10	Removed all employees from the operational activity.			
11	If flood as consequence of Cyclonic Storm/Hurricane is anticipated, ensure Oil Spill Management Plan is activated.			
12	Adequate drinking water and dry non perishable food at jetty area.			
13	All electrical and diesel driven pumps should be ready in all respects for immediate use.			
14	Ensure roads and pathways are cleaned and not obstruct for any vehicle movement during emergency			
15	Safe guard surface heat tracing system of pipeline			
Jetty Supervisor				
1	Jetty supervisor to ensure that all lines of vessels at berth are always kept tight. Vessel to be instructed to double up mooring lines, if required.			
2	Jetty Supervisor to brief all Labors to remain alert, careful and should move in pairs. No one to stand close to the berth.			
3	All Hydra and jetty/technical vehicle to be parked at safe shelter.			
4	Dis-Connections of flexible hose with the shipping vessels and communicate Marine Dept./Shipping			
5	Adequate drinking water and dry non perishable food at jetty area.			
6	Safe guard all loose material including Hose and drums and other loose material			

Liquid Terminal - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Appropriate storm warning signal hoisted			
2	Emergency team in contact with Central Control Room for necessary preparedness.			

3	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, All personnel remaining in the port cautioned against venturing out during effective period.			
4	Transportation arranged for evacuation of emergency team if required. (employees and contractual staff)			
5	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Liquid Control (CTF and VEG Oil)				
1	Co-ordinate with Marine Control for cyclone bulletins every 6 Hrs.			
2	Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.			
3	Vessels at berth are to be informed to keep Main Engine Sby at short notice for emergency castoff in coordination with marine.			
4	All equipment/computers in control to be covered and protected against water ingress due to heavy rain.			
5	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			
6	VHF Antennas are secured properly to prevent damage.			
7	All storage tanks shell and roof manholes to be box up			
8	Ensure flange joint connection to be tighten.			
9	If flood as consequence of Cyclonic Storm/Hurricane is anticipated, ensure Oil Spill Management Plan is activated.			
10	Adequate drinking water and dry non perishable food at jetty area.			
11	All electrical and diesel driven pumps should be in stand-by position.			
12	Ensure roads and pathways are cleaned and not obstruct for any vehicle movement during emergency			
Jetty Supervisor				
1	Jetty supervisor to ensure that no personnel are allowed on the Jetty areas.			
2	Jetty Supervisor to brief all workers/Labors to remain alert and nominated shelters. Only minimal mooring member to remain in the port and no Worker/Labor to be on the berth.			
3	All Hydra and jetty/technical vehicle to be parked at safe shelter.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	Veg oil Control Staff and CTF Control Staff to take shelter in Liquid Office(Old Control) room with all hand held VHF, UHF, emergency light and mobile phones.			
4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			
After Effective Period				
1	Assess damage to equipment, building and unsafe condition.			
2	Initiate restart process.			
3	The condition of stored hazardous/toxic cargo to be inspect.			

Container Terminal - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All employees concerned and contractual staff informed. All personnel notified against venturing out during effective period.			
5	A team is formed to identify and removal of items from jetty which may fall into sea due to strong wind such as life buoy with stand, gangway etc.			
6	Park the cranes and equipment at safe location, QC boom must be up and secure them			
7	If flood as consequence of Cyclonic Storm/Hurricane is anticipated, Oil Spill Management Plan is activated.			
8	Sufficient Drinking water and dry non perishable food available at CT2 and CT3 operation buildings.			
9	Adequate no of raincoats, charged emergency torches, 2 battery operated torches with spare batteries, 6 life jackets, ropes (50 meters x 6), life buoys available for emergency use.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
11	List of emergency contacts & suppliers available.			
Tower Control room (CT2 and CT3)				
1	Tower Control to issue cyclone bulletins every 6 Hrs.			
2	All hand held UHF/batteries, emergency torch, mobile phones are fully charged for use in emergency incase of total power failure.			
Wharf Supervisor				
1	Wharf supervisor to ensure all lines of vessels at berth are always kept taught and all hatch covers closed. Vessels instructed to double up mooring lines, if required.			
2	Wharf Supervisor briefed all to remain alert, careful and to move in pairs. No ITV , Operators, checker stand close to the QC, Vessel and on wharf.			
3	All golf cars, other cars and LMV vehicles parked at safe shelter.			

Container Terminal - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Appropriate storm warning signal hoisted (as per GMB instruction)			
2	Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	All employees concerned and contractual staff informed. Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated. Only Emergency team members to remain in the port. Transportation arranged for evacuation of staff (employees and contractual staff)			
5	Material & equipment that cannot be moved are covered.			
6	All RTG, QC are secured.			
7	Arrangement made for stand-by vehicle.			
8	Vessels at berth to be casted off if wind speed > 30 Kts with container terminal head permission.			
9	All work permits revoked.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Tower Control (CT2 & CT3)				
1	Tower Control to issue cyclone bulletins every 3 Hrs.			
2	Tower controller to send cyclone bulletin SMS from 3 day before predicted arrival of cyclone.			
3	Vessels at berth are to be informed to keep Main Engine Sby at short notice for emergency castoff.			
4	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			
Wharf Supervisor				
1	Wharf supervisor to ensure that all lines of vessels at berth are always kept taught. Hatch covers to be closed. Vessel to be instructed to double up mooring lines, if required.			
2	Wharf Supervisor to brief all to remain alert, careful and should move in pairs. No one to stand close to RTG, QC and on wharf.			
3	All loose materials, technical vehicle to be parked at safe shelter.			

Container Terminals - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Appropriate storm warning signal hoisted (as per GMB instruction)			
2	Emergency team in contact with Central Control Room for necessary preparedness.			
3	All employees concerned and contractual staff informed. Contractor staff evacuated from the port and verified, All personnel remaining in the port cautioned against venturing out during effective period.			

4	Transportation arranged for evacuation of emergency team if required. (employees and contractual staff)			
5	All containers bring down up three high (as per possibility)			
6	Vessels at berth to be casted off if cyclone wind speed is expected to be > 30 Kts with HOD permission.			
7	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Marine Police & Coast Guard Crafts				
1	Marine Police & Coast Guard Crafts to be cast off from RoRo pontoon.			
CT2 and CT3 Tower control room				
1	CT2 and CT3 Control to communicate cyclone bulletins every Hr.			
2	CT2 and CT3 Control to send cyclone bulletin SMS to all concerned.			
3	All hand held UHF/batteries, Emergency torch, Mobile Phone fully charged for use in emergency incase of total power failure.			
Wharf Supervisor				
1	Wharf supervisor to ensure that no personnel are allowed on the Jetty areas.			
2	Wharf Supervisor to brief all mooring crew to remain alert and nominated shelters. Only minimal mooring crew member to remain in the port and no Mooring Crew to be on the berth.			
3	All Cranes must be in anchored position.			
During Effective Period				
1	No personnel shall be allowed to be exposed himself to the cyclone during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	CT2 and CT3 Control Officer and Planners to take shelter in New CT operation Building with all hand held VHF, UHF, emergency light and mobile phones.			
4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			
After Effective Period				
1	Assess damage to equipments, building and unsafe condition.			
2	Initiate restart process.			

Administration - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources;			

4	All concerned employees and contractual staff informed. All personnel notified against venturing out during effective period.			
5	Drinking water (50 bottles of 20 ltr) and dry non perishable food available at all Canteens			
6	10 Nos of raincoats, 06 nos. charged emergency torches, 06 battery operated torches with spare batteries in each control room, ropes (50 meters) in each buses available for emergency use.			
7	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
8	List of emergency contacts & suppliers available.			

Administration - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Emergency team to be in contact with Central Control Room for necessary preparedness.			
2	Drinking water (50 bottles of 20 ltr) and dry non perishable food available at all Canteens			
3	All concerned employees and contractual staff informed. Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated. Only Emergency team members to remain in the port. Transportation arranged for evacuation of staff (employees and contractual staff)			
5	Arrangement made for stand-by vehicle.			
6	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			

Administration - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team in contact with Central Control Room for necessary preparedness.			
2	Drinking water (50 bottles of 20 ltr) and dry non perishable food available at all Canteens			
3	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, All personnel remaining in the port cautioned against venturing out during effective period.			
4	Transportation arranged for evacuation of emergency team if required. (employees and contractual staff)			
5	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			

During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
4	All doors and windows of buildings kept shut.			
After Effective Period				
1	Assess damage to equipments, building and unsafe condition.			
2	clean up the colony and premises			
3	Arrange for provisions till normalcy is established. Food arrangements to people on resumption work to be coordinated.			

Security Services - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Obtain status of Cyclone at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Be in touch with Marine Control Room for updates			
3	Establishment of Emergency Control Room at suitable location with communication facilities			
4	A team is to be formed for emergency.			
5	All vehicles to be topped up with fuel – prior to effective period and top up on daily basis.			
6	Walkie talkie sets to be fully charged along with stand-by batteries			
7	Keep mobiles (personal/official) fully charged			
8	Ensure emergency lights are functioning			
9	Ensure mega phones are functioning (change old batteries)			
10	Ensure public announcement (PA system) on ERT vehicle is functioning			
11	Ensure Digital Cameras and Handy Cam fully charged.(ERT, PSC, MSB, MWB)			
12	Ensure security guards in possession of all PPEs and whistle			
13	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), At respective gate & 01 at ISCR,			
14	Traffic Cone to be removed and kept in closed room (may be affected by high wind)			
15	Frontier from roads to be removed and kept in Covered Godown in stacking mode.			
16	Search lights to be kept ready dully functional.			
17	Hammer and cutting tools (available with Fire Dept).			
18	Bottled drinking water to kept in all emergency vehicles			
19	First Aid Box to be kept with all emergency vehicles dully updated from medical wing.			
20	Emergency numbers to be kept with all emergency vehicles			
21	"Security Reinforcement to be kept ready at Guards colony with due provision of transport (whichever transport mode is available)			

22	Alternate route for Hospital and other locations to be checked and available with all emergency teams.			
23	Detailed briefing of security guards to be carried out			
24	Communication to be done as per requirement (to save battery of mobile & VHF)			
25	Removal of security guard from remote and isolated location as per instruction of ISCR.			
26	Ensure rain coat available with all Security personnel on duty			
27	List of emergency contacts & suppliers.			
28	Material & equipment that cannot be moved are to be covered.			
29	Hoist appropriate storm warning Signal.			
30	Remove all loose materials and equipment from jetty & other area.			
31	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).			
32	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
33	Ensure roads and pathways are cleaned			

Security Services - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Obtain status of cyclone at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Be in touch with Marine Control Room for updates			
3	Establishment of Emergency Control Room at suitable location with communication facilities			
4	A team is to be formed for emergency.			
5	All vehicles to be topped up with fuel – prior to effective period and top up on daily basis.			
6	Walkie talkie sets to be fully charged along with stand-by batteries			
7	Keep mobiles (personal/official) fully charged			
8	Ensure emergency lights are functioning			
9	Ensure mega phones are functioning (change old batteries)			
10	Ensure public announcement (PA system) on ERT vehicle is functioning			
11	Ensure Digital Cameras and Handy Cam fully charged.(ERT, PSC, MSB, MWB)			
12	Ensure security guards in possession of all PPEs and whistle			
13	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), At respective gate & O1 at ISCR,			
14	Traffic Cone to be removed and kept in closed room (may be affected by high wind)			
15	Frontier from roads to be removed and kept in Covered Godown in stacking mode.			
16	Search lights to be kept ready dully functional.			
17	Hammer and cutting tools (available with Fire Dept).			
18	Bottled drinking water to kept in all emergency vehicles			

19	First Aid Box to be kept with all emergency vehicles dully updated from medical wing.			
20	Emergency numbers to be kept with all emergency vehicles			
21	Security Reinforcement to be kept ready at Guards colony with due provision of transport (whichever transport mode is available).			
22	Alternate route for Hospital and other locations to be checked and available with all emergency teams.			
23	Detailed briefing of security guards to be carried out			
24	Communication to be done as per requirement (to save battery of mobile & VHF)			
25	Removal of security guard from remote and isolated location as per instruction of ISCR.			
26	Ensure rain coat available with all Security personnel on duty			
27	List of emergency contacts & suppliers.			
28	Material & equipment that cannot be moved are to be covered.			
29	Hoist appropriate storm warning Signal.			
30	Remove all loose materials and equipment from jetty & other area.			
31	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).			
32	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
33	Ensure roads and pathways are cleaned			

Security Services - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
General Points				
1	Obtain status of Cyclone at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Be in touch with Marine Control Room for updates			
3	Establishment of Emergency Control Room at suitable location with communication facilities			
4	A team is to be formed for emergency			
5	All vehicles to be topped up with fuel – prior to effective period and top up on daily basis			
6	Walkie talkie sets to be fully charged along with stand-by batteries			
7	Keep mobiles (personal/official) fully charged			
8	Ensure emergency lights are functioning			
9	Ensure mega phones are functioning (change old batteries)			
10	Ensure public announcement (PA system) on ERT vehicle is functioning			
11	Ensure digital cameras and handy cam fully charged (ERT, PSC, MSB, MWB)			
12	Ensure security guards in possession of all PPEs and whistle			
13	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), at respective gate & 01 at ISCR			

14	Traffic cone to be removed and kept in closed room (may be affected by high wind)			
15	Frontier from roads to be removed and kept in covered godown in stacking mode.			
16	Search lights to be kept ready and fully functional.			
17	Hammer and cutting tools (available with Fire Dept).			
18	Bottled drinking water to kept in all emergency vehicles			
19	First Aid Box to be kept with all emergency vehicles duly updated from medical wing.			
20	Emergency numbers to be kept with all emergency vehicles			
21	Security Reinforcement to be kept ready at Guards colony with due provision of transport (whichever transport mode is available).			
22	Alternate route for Hospital and other locations to be checked and available with all emergency teams.			
23	Detailed briefing of security guards to be carried out			
24	Communication to be done as per requirement (to save battery of mobile & VHF)			
25	Removal of security guard from remote and isolated location as per instruction of ISCR.			
26	Ensure rain coat available with all Security personnel on duty			
27	List of emergency contacts & suppliers.			
28	Material & equipment that cannot be moved are to be covered.			
29	Hoist appropriate storm warning Signal.			
30	Remove all loose materials and equipment from jetty & other area.			
31	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).			
32	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
33	Ensure roads and pathways are cleaned			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			
2	All personnel to be notified against venturing out during effective period.			
3	All personnel to remain indoor, observant and be alert.			
4	Avoid taking shelter near old or damaged buildings or near tress.			
5	All doors and windows to be shut.			
6	Avoid the top floor of buildings. Stay close to ground floor.			
7	Close the visitors' gate.			
8	Occupy pre-determined post for controlling security of installation.			
9	Call up additional help from Barracks.			
10	Ensure that unauthorized persons/vehicles do not enter the gate.			
11	Provide security men for firefighting & rescue.			
12	Arrange for transport of higher authorities to the terminal.			
13	Transport vehicles would be provided near emergency control center.			
14	Depute security guards for controlling traffic at scene of disaster.			
15	Produce a list of port staff on duty in co-ordination with time office.			
16	Ensure availability of security men at gates so that they can lead authorities to disaster site.			

17	Ensure that non-essential persons do not crowd affected area.			
18	Instruct all drivers to take shelter at canteens (concrete buildings).			
19	Ensure vehicles are parked at designed parking areas, with wheels are blocked			
20	Close the gate ant stop allowing visitors and transport trucks either inward or out ward.			
21	If caught in open areas during cyclone find a safe shelter immediately			
After Effective Period				
1	Assess damage to equipment, building and unsafe condition.			
2	Do not enter in damaged buildings			
3	Use Mobile Phones only for emergency calls			
4	It is advisable to wait for all clear message on PA System/Walki-Talki			
5	Start search operation for Living Things			
6	Do not use any damaged electronic goods			
7	Drink boiled water			
8	Confirm with concerned that storm has subsided, before you move out.			
9	Start restorative measures & repairs.			

Railway Services - Emergency Preparedness				
Level - 1 When cyclone is 1000 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Railway emergency team formed for dealing with the emergency			List Enclosed
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	People are made aware of do's and don'ts before, during and after Cyclone			Part of training. List of do's and don'ts enclosed
5	A Railway team is formed to identify potential flying objects (Roofing, sheeting, temp sheds etc.) and secure/remove them.			Team will comprise of Railway Operation and Maintenance.
6	Connection of all the electrical equipment/appliances are cheked and if not required the same are disconnected. Electrical supply/ connection for all the unwanted items are disconnected			
7	All Spare equipment (Locomotive and wagon etc.) parked at suitable Railway yard.			
8	Portacabins to be secured properly and relocation of electronic equipment from various porta cabins to designated location			

9	Following teams are nominated and tool talked for anticipated emergency action. A) Loco Pilot B) Loco Maintenance C) Track Maintenance D) Signal Maintenance			
10	Coordination with contractors for making necessary arrangements towards evacuation of labours (Approx.250 No's) Actual evacuation to be done only after port shutdown is declared from CEO office.			List of average manpower in port on normal operation day is enclosed
11	Drinking water (10 bottles of 20 litre) and dry non perishable food available for 30 people (2 days) at Railway control room.			
12	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
13	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
14	List and contact details of customers ,contractors and port emergency contacts.			
Railway Services - Emergency team Coordinator				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To appraise shift Incharge every 12 hrs who in turn will appraise their reportees.			
3	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
Railway Shift Incharge				
1	Railway Shift Incharge to ensure that all the arrangement for securing Assets Like locomotives,Wagons,Static cranes, Mobile Equipment Compressor.			
2	Railway Shift Incharge in coordination with emergency team to appraise the contracted labour supervisor at Railway Yard and Operation/Maintenance areas of the developments.			
3	Keep pictorial records of the sequence of events and preparedness (For Insurance Purpose)			For insurance purpose

Railway Services - Emergency Preparedness				
Level - 2 When cyclone is 500 km away from Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Railway operations squeezes to bare essential productivity with limited resources to ensure quick rap up.			
2	Emergency team to be in contact with Central Control Room for necessary preparedness.			
3	All Railway operations to stop if wind speed exceeds 30 Knots or heavy rainfall occurs.			
4	All Spare equipment (Locomotive and wagon etc.) parked at suitable Railway yard.			

5	Following teams are nominated and tool talked for anticipated emergency action. A) Loco Pilot B) Loco Maintenance C) Track Maintenance D) Signal Maintenance			
6	Material & equipment that cannot be moved are covered.			
7	All loose items at Railway Yard and Loco shed are secured.			
8	Nomination of emergency response vehicles (2 No's)			
9	All work permits revoked. Work at height is stopped and not permitted.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Railway Services - Emergency team Coordinator				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To inform all contracted and company staff about cyclone to evacuate their staff.			
3	To take feedback of evacuation process and highlight progress/ issues emergency team.			
4	To check all hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
5	All computers/peripherals in MPT & West Basin control to be covered and protected against water ingress due to heavy rain.			
Railway Shift Incharge				
1	Railway Shift Incharge to ensure that all the arrangement for securing Assets Like locomotives,Wagons,Static cranes, Mobile Equipment Compressor.			
2	Railway Shift Incharge in coordination with emergency team to appraise the contracted labour supervisor at Railway Yard and Operation/Maintenance areas of the developments.			
3	Providing other dept. including Safety, Security, etc. mobile equipment and vehicles as per requirement given by them.			
4	Keep pictorial records of the sequence of events and preparedness			For insurance purpose

Railway Services - Emergency Preparedness				
Level - 3 A day before when the cyclone is to strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	All normal operations stopped. Only on emergency operations of evacute of Locomotive and wagon shifting to safe places.			
2	Railway emergency team is handy with VHF sets , Emergency Torches, Rain Coat.			
3	Central control room (Adani House) issues Port closure notice			
4	All equipment (Locomotive & wagons etc.) to be parked at suitable railway yard.			
5	Transportation arranged for evacuation of staff (employees and contractual staff)			
6	Emergency Kit, Food supplies and drinking water checked and tested.			

7	Communication mediums like VHF, mobile phones and PA systems checked and tested			
8	Only Emergency team members to remain in the port.			
9	2 vehicles stand-by near Railway building and FCC control room.			
10	Following teams are nominated and tool talked for anticipated emergency action. A) Loco Pilot B) Loco Maintenance C) Track Maintenance D) Signal Maintenance			
11	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
Railway Services - Emergency team Coordinator				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To ensure all contracted and company staff apart from emergency team is evacuated.			
3	To highlight any pending evacuation from port to emergency team.			
4	To be in continues touch with marine control room and Railway control room.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	All personnel to remain indoor, observant and be alert.			
3	Emergency team members, shift manager and coordination desk personnel t take shelter in their respective control rooms with all hand held VHF, UHF, emergency light and mobile phones.			
4	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
5	All doors and windows of buildings kept shut.			
6	Avoid top floor of buildings. Stay close to ground floor.			
After Effective Period				
1	Personnel informed to vacate buildings,Cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
4	Assess damage to equipment, resources.			
5	Initiate restart process.			
6	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
7	Communication to be sent to all clients regarding assessed and potential damage to cargo.			
8	Coordinate with port railway for complete inspection of Railway track and system.			
9	Condition shall be reported to CEO and take action to repair and resume operations.			
10	Inspect the Locomotives of the Port, and arrange for trial running to put them into operation.			

WEST BASIN - EMERGENCY PREPAREDNESS				
Level 1: When Cyclone is 1000 KM Away From Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	HODs have a meeting above the impending emergency steps			
2	Emergency team to be established and should know their roles and responsibilities.			List Enclosed
3	Emergency team is in contact with Central Control Room and Head West Basin for necessary preparedness.			
4	Ensure that all roads are free from any blockage.			
5	Emergency team to carry out the following tasks as per the direction of CEO & Head-West Basin: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
6	People are made aware of do's and don'ts before, during and after Cyclone			Part of training. List of do's and don'ts enclosed
7	A backup team is formed to identify potential flying objects (Roofing, sheeting, temp sheds etc.) and secure/remove them.			Team will comprise of Dry Cargo shift Incharge, MHS Shift Incharge, E&I Shift Incharge, Safety Shift Incharge, Admin Incharge etc.
8	Connection of all the electrical equipment/appliances are checked and if not required the same are disconnected. Electrical supply/connection for all the unwanted items are disconnected			
9	All non-operating godowns gates closed.			
10	Cargo secured inside warehouse and Open Plots. Tarpaulin sheets kept ready where ever fertilizer and agri cargo stored. An inventory to cover 3 Lakh MT of cargo to be maintained.			
11	In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
12	Minimum equipment (2 pay loaders/2 excavators) to be parked near approach road of D - Yard (receiving side). Rest Spare equipment (2 Pay loaders/2 excavators) to be parked at the open space near the entrance of F&G Yard (discharge side). Rest of the equipment to be parked beyond ARD 8.			
13	All other spare equipment (trailer, hydra, boom-truck, bob-cat etc) to be parked in open space of Workshop.			
14	Portacabins to be secured properly and relocation of electronic equipment from various porta cabins to designated location.			
15	Minimum Numbers of Operators and Drivers to be Remain in a Shift; A) Crane Operators - 3 Nos B) Loader Operators - 4 Nos C) Excavator Operators - 4 Nos. D) Forklift Operators - 1 Nos E) Hydra Operator - 2 Nos F) Trailer Driver - 1 Nos G) Utility Drivers - 4 Nos H) Bus Drivers - 3 Nos I) JLG Operator - 1 Nos.			

16	Coordination with labour contractors for making necessary arrangements towards evacuation of labours, Drivers, Surveyors and Equipment Operators and Employees working at West Basin. Actual evacuation to be done only after port shutdown is declared from CEO office.			Considering full operation (all berths are occupied, Both WLS are working, 4 point of TLS are working, Maximum stacking & Reclaiming) see the sheet of Details of Routine Men-power at West Basin.
17	Drinking water (20 bottles of 20 litre) and dry non perishable food available for minimum 60 people (2 days). However the quantity shall be changed with respect to the staff to be deputed at West Basin during emergency after finalization with respective HODs and Head-West Basin.			
18	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
19	Emergency team in continuous contact with other emergency services (such as Safety, Fire, Security, Other Services)			
20	List and contact details of customers, contractors and port emergency contacts to be available.			
21	All Individual Section Incharge have to get updated news frequently and the same to be communicated to contract agencies and other outsiders (i.e. surveyors, vendors, men-power providing agencies, transporters, coal customers etc).			
22	No visitors will be allowed.			
Central Control Room/Marine Control Room				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers.			
2	To appraise jetty/backup and WLS-TLS shift incharge [MHS, E&I and DC] every 12 hrs who in turn will appraise their reportees.			
3	To intimate or communicate any emergency to the operation, emergency departments, engineering services and other services.			
Shift Incharge of Individual Sections				
1	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
2	MHS Shift Incharge has to ensure that all the arrangement for securing Cranes, Staker Reclaimer and other Equipment is in order.			
3	DC Shift Incharge has to ensure that all the Equipment (i.e. payload, excavator) inside the vessel or jetty has been removed.			
4	DC - MHS Shift Incharge has to ensure that pota-cabins on jetty and back-up either properly secured or removed at safe place.			
5	All Shift Incharge of Individual Section are to be in coordination with emergency team to appraise the contracted labour supervisor at jetty and backup of the developments.			
6	Keep pictorial records of the sequence of events and preparedness (For Insurance Purpose)			
7	E&I Shift Incharge to ensure that all temporary connections have been removed and isolation of equipment/machineries wherever required.			
8	Admin Incharge and Individual Incharge to ensure that all vehicles are fully charged with fuel and have sufficient drivers.			

9	DC Incharge has to remain in touch with DC Head and Head- West Basin in case to hold the operation.			
10	Security Incharge to ensure that all the routes are free from traffic and to control the vehicular movement.			
11	DC Incharge to ensure that the approaches within the yards are free from cargo.			
12	DC Incharge to be in continuous with the Railway for rake operation control and with transporters for control of dumpers/trucks.			
13	ES & MHS Shift Incharge to be in touch with the supervisors of contract agencies working under Engineering Services for instructing and guiding them with respect to emergency. Also for evacuation.			
14	Safety Shift incharge will also intimate to the PMC Safety and officials for any information with respect to emergency and also for evacuation (if required).			
15	DC incharge must be touch with contract agencies (supervisors) and customers for giving information to them regarding emergency and to tak action with accordingly. Also for evacuation. all visitors will be stopped.			
16	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			

WEST BASIN - EMERGENCY PREPAREDNESS				
Level 2: When Cyclone is 500 KM Away From Mundra				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	HODs have a meeting above the impending emergency steps			
2	The operations squeezes to bare essential productivity with limited resources to ensure quick rap up.			
3	Emergency team to be in contact with Central Control Room for necessary preparedness.			
4	All jetty operations to stop if wind speed exceeds 16 meter/second or heavy rainfall occurs. This is with respect to the GSU and Stacker Reclaimer operations.			
5	Ensure all temporarty things have been reomved.			
6	all visitors will be stopped.			
7	Drinking water (20 bottles of 20 litre) and dry non perishable food available for minimum 60 people (2 days). However the quantity shall be changed with respect to the staff to be deputed at West Basin during emergency after finalization with respective HODs and Head- West Basin.			
8	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
9	Minimum equipment (2 Pay loaders/2 excavators) to be parked near approach road of D - Yard (Receiving side). Rest Spare equipment (2 Pay loaders/2 excavators) to be parked at the open space near the entrance of F&G Yard (Discharge side). Rest of the equipment to be parked beyond ARD 8.			
10	All other spare equipment (trailer, hydra, boom-truck, bob-cat etc) to be parked in open space of Workshop.			

11	Minimum Numbers of Operators and Drivers to be Remain in a Shift; A) Crane Operators - 3 Nos B) Loader Operators - 4 Nos C) Excavator Operators - 4 Nos. D) Forklift Operators - 1 Nos E) Hydra Operator - 2 Nos F) Trailer Driver - 1 Nos G) Utility Drivers - 4 Nos H) Bus Drivers - 3 Nos I) JLG Operator - 1 Nos.			
12	Material & equipment that cannot be moved are covered.			
13	All loose items on jetty/backup are secured.			
14	Nomination of Emergency response vehicles [5 No's (ERT-1, 2 Adani Utilities-2, FLS Utility-2)]			
15	Vessels at Berth prepared for emergency cast off.			
16	All work permits revoked. Work at height is stopped and not permitted.			
17	Emergency team in continuous contact with other emergency services (such as Safety, Fire, Security, Other Services)			
18	All Individual Section Incharge have to get updated news frequently and the same to be communicated to contract agencies and other outsiders (i.e. surveyors, vendors, men-power providing agencies, transporters, coal customers etc).			
Central Control Room/Marine Control Room				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers.			
2	To inform all contracted and company staff about cyclone to evacuate their staff.			
3	To take feedback of evacuation process and highlight progress/ issues emergency team.			
4	To check all hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
Shift Incharge of Individual Sections				
1	All computers/peripherals in West Basin to be covered and protected against water ingress due to heavy rain.			
2	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency in case of total power failure.			
3	MHS Shift Incharge has to ensure that all the arrangement for securing Cranes, Staker Reclaimer and other Equipment is in order.			
4	DC Shift incharge has to ensure that all the equipment (i.e. payload, excavator) inside the vessel or jetty has been removed.			
5	DC - MHS Shift incharge has to ensure that porta-cabins on jetty and back-up either properly secured or moved to a safe place.			
6	All Shift Incharge of Individual Section are to be in coordination with emergency team to appraise the contracted labour supervisor at jetty and backup of the developments.			
7	Keep pictorial records of the sequence of events and preparedness (For Insurance Purpose)			
8	E&I Shift Incharge to ensure that all temporary connections have been removed and isolation of equipment/machineries wherever required.			
9	Admin Incharge and Individual Incharge to ensure that all vehicles are fully charged with fuel and have sufficient drivers.			

10	DC Incharge has to remain in touch with DC Head and Head-West Basin in case to hold the operation.			
11	Security Incharge to ensure that all the routes are free from traffic and to control the vehicular movement.			
12	DC Incharge to ensure that the approaches within the yards are free from cargo.			
13	DC Incharge to be in continuous with the Railway for rake operation control and with transporters for control of dumpers/trucks.			
14	ES & MHS Shift Incharge to be in touch with the supervisors of contract agencies working under Engineering Services for instructing and guiding them with respect to emergency. Also for evacuation.			
15	Safety Shift Incharge will also intimate to the PMC Safety and officials for any information with respect to emergency and also for evacuation (if required).			
16	DC Incharge must be touch with contract agencies (supervisors) and customers for giving information to them regarding emergency and to tak action with accordingly. Also for evacuation.			
17	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			

WEST BASIN - EMERGENCY PREPAREDNESS				
Level - 3: A Day Before When the Cyclone is to Strike				
Cyclone - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	HODs have a meeting above the impending emergency steps			
2	All normal operations stopped. Only emergency operations (securing of GSU cranes, Security of Stacker & Reclaimers, Securing the mobile hoppers, Shifting of ground equipment i.e. payloader-excavator-skid loader-hydra-dumpers-trailer-sweeping machines-JLG-Boom truck etc, boom resting of MHCs) to be continued.			
3	Removal of staff from working on heightened structure or nearby seaside.			
4	Both the Control Rooms must have VHF sets with sufficient batteries, Emergency Torches, Rain Coat, Life Jackets, routine PPEs etc).			
5	Central control room (Adani House) issues Port closure notice			
6	All equipment (Pay loaders/excavators etc) to be parked at ARD 8.			
7	All pota-cabins to be secured with fixed heavy structures.			
8	Transportation arranged for evacuation of staff (employees and contractual staff)			
9	Emergency kit, food supplies and drinking water checked and tested.			
10	Communication mediums like VHF, mobile phones and PA systems checked and tested			
11	Only emergency team members and minimum staff to be remain in the port.			
12	Minimum equipment (2 pay loaders/2 excavators) to be parked near approach road of D - Yard (receiving side). Rest spare equipment (2 Pay loaders/2 excavators) to be parked at the open space near the entrance of F&G Yard (discharge side). Rest of the equipment to be parked nearby ARD 8.			

13	All other spare equipment (trailer, hydra, boom-truck, bob-cat etc) to be parked in open space of Workshop. In case of extreme situation, the equipment to be kept inside the workshop.			
14	Minimum Numbers of Operators and Drivers to be Remain in a Shift; A) Crane Operators - 3 Nos B) Loader Operators - 4 Nos C) Excavator Operators - 4 Nos D) Forklift Operators - 1 Nos E) Hydra Operator - 2 Nos F) Trailer Driver - 1 Nos G) Utility Drivers - 4 Nos H) Bus Drivers - 3 Nos I) JLG Operator - 1 Nos			
15	Emergency team in continuous contact with other emergency services (QHSE, Fire, Security, Marine and others)			
16	In case of extreme condition, only minimum staff will remain in port (upon seeing the condition). All the mobile equipment to be parked beyond ARD 8 (considering unmanned and open area).			
Central Control Room/Marine Control Room				
1	To circulate cyclone bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To ensure all contracted and company staff apart from emergency team is evacuated.			
3	To highlight any pending evacuation from port to emergency team.			
4	To be in continues touch with POC.			
During Effective Period				
1	All personnel notified against venturing out during effective period.			
2	Elevators to be electrically isolated.			
3	All personnel to remain indoor, observant and be alert.			
4	Emergency team members, Shift Incharge and coordination desk personnel take shelter in their respective control rooms with all hand held VHF, UHF, emergency light and mobile phones.			
5	People (Employees and Contractors) advised not to take shelter near old or damaged buildings or near tress.			
6	No personnel should be on open height structure as well as equipment (i.e. GSU, MHC, Stacker-Reclaimer).			
7	All doors and windows of buildings kept shut.			
8	Avoid top floor of buildings. Stay close to ground floor.			
9	Ensure the warden of the individual buildings are present.			
After Effective Period				
1	Take headcount of all the personnel. (FCC, Backup, Steel Yard, Jetty & Tug berth building)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured stating the type and extent of injury.			
4	Assess damage to equipment, resources and cargo.			
5	Initiate restart process.			
6	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
7	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

Pre-Assessment Checklist [Preparedness in Early Stage]				
1	Ensure that all the important document are preserved at a proper place.			
2	Enusure that Emergency team has been prepared along with Roles & Responsibility.			
3	Ensure each representative of each department has a substitute (Dry Cargo, E&I, MHS SR, MHS Conv, MHS GSU, MHS WLS TLS, MHS Utility, ES CWS, ES Civil, Fire, Safety, Security, Marine, Railway, Admin, Store, IT etc).			
4	Ensure that list of Emergency Contact Numbers are displayed.			
5	Ensure that all employees, contractors/vendors/visitors/other customer are aware of emergencies and preparedness.			
6	Ensure that Emergency items contains following items; torches, ropes, wires, tarpaulins, plastic sheets, tool kit, duct tapes, assorted gears, first aid box, sand bags			
7	Ensure proper communication with the POC for further information/ updates/news of respective emergency from disaster authority/Govt agencies.			
8	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			

QHSE&F - Emergency Preparedness				
Emergency Response.				
Cyclone- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Arrange indduction /training program for all personnel on emergency preparedness & its awareness.			Part of Induction/ training program.
2	All concerned employees and contractual staff informed about the assembly point & evacuation locations.			
3	To arrange emergency drill for dealing with such emergency.			Part of Induction/ training program.
4	To arrange necessary training for emergency response team/ CMG/First Aid Team/Medical Team/Fire rescue team to deal with emergency. (Ensure availability of trained rescue team & necessary equipments all the time)			
5	Arrange training for all QHSE&F team member for emergency response & clear cut understanding of their cruisial roles & responsibility during emergency.			
6	To prepare & check effectiveness of Emergency Response Plan/ Disaster Management Plan.			
7	To do proper co-ordination with all concern department for maintaining necessary emergency response kit & necessary aids in required inventory or make identified supply of the same during declaration of such emergency.			
8	To maintain close co-rdination with mutual aid for dealing with emergency.			
During Effective Period				
1	Assist CEO/Executive Director (Corp. Affairs). as instructed.			
2	Co-ordination with respective HOD/HOS with respect to emergency actions.			

3	Ensure necessary action through CMG. Provide necessary assistance to CMG.			
4	Assist in evacuation of all personnel except key personnel.			
5	Provide HSE & F facilities (Assist for Rescue, Evacuation, and other Necessary Arrangement).			
6	Set up casualty collection centre and arrange first aid posts.			
7	Arrange enough stock medicines, antidotes, oxygen, stretchers,			
8	Keeping in mind that Road and Rail connectivity may be cut off for required period of time.			
9	Arranges additional medicine and equipment as required.			
10	Arrange a fully equipped Ambulance in ready state.			
11	Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment.			
12	To do immediate co-ordination to mutual aids for necessary help/ support if required.			
After Effective Period				
1	Assist to CEO/Executive Director (Corp. Affairs).			
2	Assess damage (human) and send for further treatment.			
3	Assess the property damage and prepare report.			
4	Assist all HODs with restoration.			
5	Perform necessary rescue through rescue team where needed.			
6	Check each & every affected area & arrange for necessary HSE& F actions as require.			
7	After completion of all rescue, restoration work. check the effectiveness of executed emergency plan & take necessary require corrective action to update the plan & necessary facilities if required.			
8	To motivate the emergency rescue team, CMG & all concerns , who have perform well during emergency.			

Disaster Management Plan for

Earthquake





Earthquake

Introduction

It is fundamental to effective earthquake preparedness that maximum preventive measures be taken before an earthquake occurs. This includes building and facilities construction, storage planning and practices, and education of PORT personnel of appropriate actions when an earthquake occurs. This document deals with policies and procedures to be followed in the event of an earthquake.

Not all earthquakes are of the same magnitude. Further, the effects of an earthquake (including structural damage) may vary significantly from one area to another. This may be due to differences in distance from the earthquake's epicentre, differences in geology, differences in topography, or differences in building construction. For these reasons, at the occasion of an earthquake, it will be incumbent on responsible parties at each site to determine the level of response, which is appropriate for their site. For our Initial Assessment purposes earthquakes will be categorized at three levels:

Level I

A slight tremor is felt. Window shades swing and perhaps some small objects fall from desks, etc. It appears unlikely that there is significant damage.

Level II

The shaking is quite noticeable. Pictures are askew and things topple from desks and bookshelves. Some windows may crack. Damage, though noticeable, appears to be minor in nature

Note: A Level II earthquake calls for action. Even though there may appear to be little or no damage there may be problems about which you may not be immediately aware (such as broken gas lines, damaged wiring, structural damage, etc.). Therefore, a Level II earthquake calls for an orderly evacuation of the building until inspections indicate it is safe to re-enter. In this case the senior responsible person (one who would be the Site Incident Commander in the event of a Level III earthquake) should conduct an inspection of the building and its systems to confirm a safe environment.

Level III

This is the "big one." It may be difficult to walk. Items fall and some bookcases, etc. topple. Power lines sway violently. There is structural damage to buildings. Most earthquakes will fall in the Level I category. In the event of a Level I quake stay calm and communicate with those around you. The facility manager or supervisor should advise the Port Deputy Conservator of the event and the initial assessment. Please keep in mind, however, that this could be the precursor of a larger quake. The likelihood of this is not great but the possibility should not be dismissed. This would be a good time to search your work area for heavy or dangerous objects that could cause injury should they fall in a greater tremor.

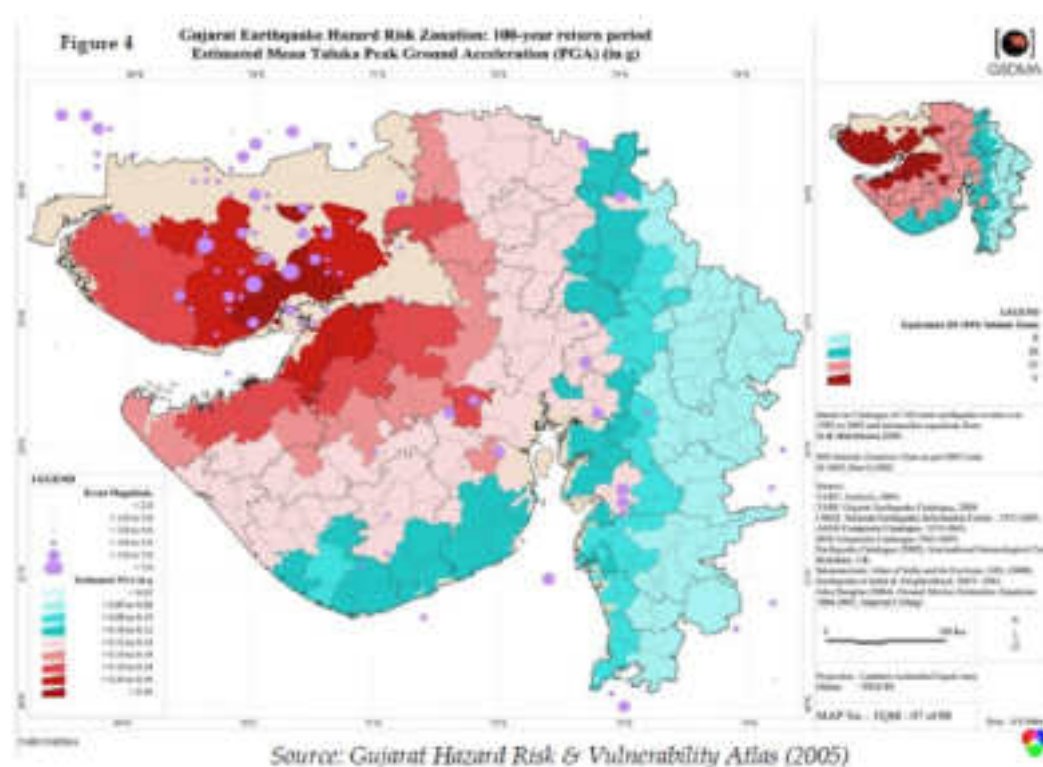
Important Information

Regular power supply may be cut off for a considerable time if the earthquake is severe, due to the failure of transmission line. Both road and railway connectivity may be cut off for some time. Local villagers may try to forcibly enter port and there may not be any local admin/police to help the port authorities. There may be unpredicted fall of buildings, structure, towers, transmission lines, heavy cranes, silos, go down, tanks, chimney etc. at unpredicted location. As Mundra is falling under seismic zone-v, all essential amenities and sustenance for port, like offices, emergency assembly points, etc... needs to be always in place.

Earthquake Zone Classification

The seismic zoning map of India the Gujarat region is divided into three zones. Kutchh region (about 300km x 300km) is assigned zone v where earthquakes of magnitude 8 can be expected. A belt of about 60-70km width around this zone covering areas of North Saurashtra and areas bordering eastern part of Kutchh are assigned zone-iv where intensity viii can be expected mainly due to earthquakes in Kutchh and some local earthquakes along north Kathiawar fault in northern Saurashtra. Rest of Gujarat lies in zone iii where intensity vii can be expected due to moderate local earthquakes or strong Kutchh earthquakes.

Earthquake Zone Classification Map



Useful web sites for earthquake information:

- www.imd.gov.in
- www.gsdma.org
- www.isgn.gov.in
- www.npmoc.navy.mil

Generally port installations & residential township are designed, based on the following criteria

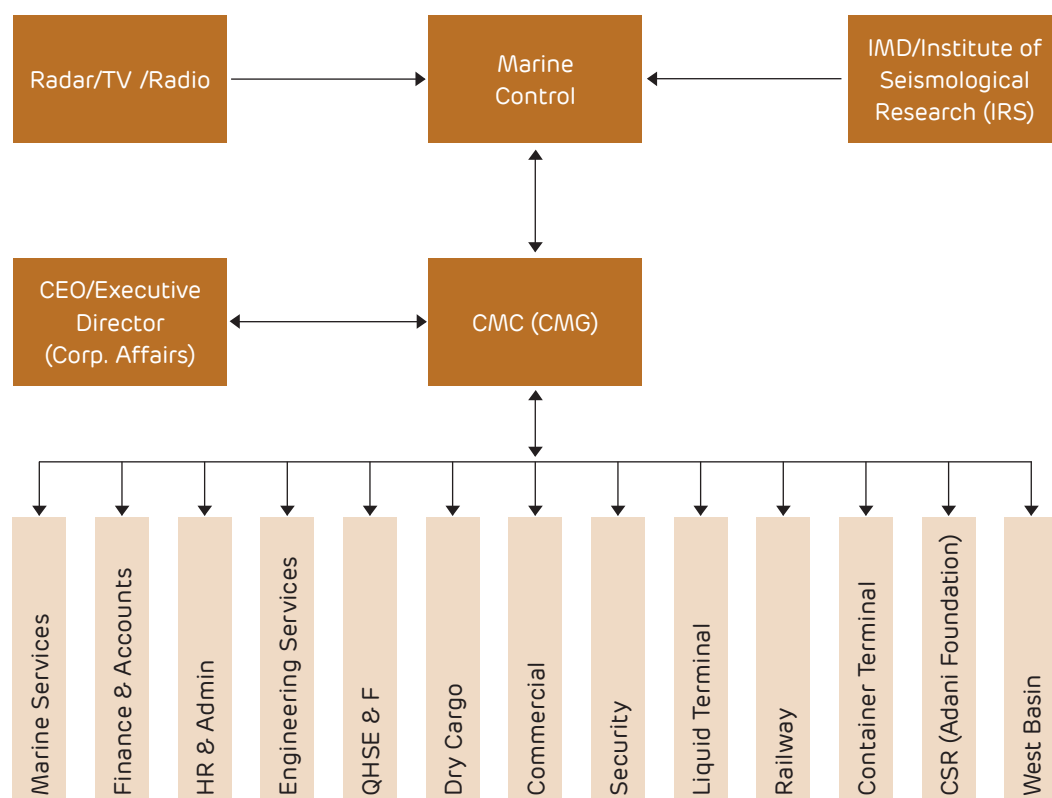
All structures have been constructed as per IS 1893:1984 (Criteria for Earthquake Resistant Design of Structures), IS 13920:1993 Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces – Code of Practice , IS 4326:1993 Earthquake Resistant Design and Construction of Buildings - Code of Practice

Crisis Management Group

- Crisis Management Group (CMG) will be a permanent body to deal with all crisis, will be formed by CEO.
- On feeling heavy tremors of an earthquake (high-richter scale), the Crisis Management Group (CMG) shall meet at the CMC or other convenient place as determined by the CEO.
- CEO Shall appoint departmental HOD/HOS as Coordinator and Convener of the CMG.
- All meetings of the Crisis Management Group (CMG) shall be conducted in the CMC.
- All HODs/HOS shall be members of CMG, in absence of the CEO, Executive Director (Corp. Affairs) shall be the Chairman of CMG and Coordinator shall be the convener.
- CEO may declare emergency so that all emergency staff and officers shall be at their duty stations and congregate at their designated stations for taking review of the situation and for implementing orders received from their respective HODs, who are CMG members.
- No emergency team member shall leave his station during the emergency period.
- CMC shall be manned round the clock and shall be headed by the CEO or someone nominated by CEO. He shall be at least of the rank of HOD.
- All situations of the earthquake and recovery shall be reviewed by the CEO/Executive Director at CMC, with the concerned CMG members.

Crisis Management Group – Responsibilities

All HODs and HOSs shall be members of crisis group for earthquake management and post restoration activities in addition to members nominated by CEO as per the situation. The crisis management group shall be active till the full restoration of port activities.



Commands Structure/Designated Persons

- The following table shows the command structure for each department.
- In case the officer in the first column is not available, the second in command automatically takes over.
- Designation of the first column is the HOD and second column is the successor.
- In case of absence of both, the senior most officers of the dept. to assume charge.

Sr.No.	Head	Successor
1	CEO	Executive Director (Corp. Affairs) (Corporate Affairs)
2	HOD (Marine)	HOS (Marine)
3	HOD Finance	HOS Finance
4	HOD (HR & Admin)	HOS (HR & Admin)
5	HOD (ES)	HOS (ES)
6	HOD (QHSE & F)	HOS (QHSE & F)
7	HOD (Dry Cargo)	HOS (Dry Cargo)
8	HOD (Commercial)	HOS (Commercial)
9	HOD (Security)	HOS (Security)
10	HOD (Liquid)	HOS (Liquid)
11	HOD (Railway)	HOS (Railway)
12	HOD (Container Terminal)	HOS (Container Terminal)
13	HOD (West Basin)	HOS (West Basin)
14	HOD (CSR–Adani Foundation)	HOS (CSR – Adani Foundation)

* Roles of HODs [West basin (ES & DC)] and HODs [MPT (ES & DC)] are same. HODs [West Basin] will assist the Head – West Basin.

Action Plan

- A. Actions – During Earthquake
- B. Actions – Post-Earthquake: Recovery, Insurance, Restoration & Relief
- C. Checklists for Earthquake.

A Actions – During Earthquake

For an event demanding immediate evacuation:

A. Evacuate the vicinity through the nearest safe exit.

1. Use main fire exits if possible.
 - If exits are obstructed, use extreme caution when evacuating through any other means available.
 - Do not use elevators
2. Proceed at a walking pace. Do not run.
3. Those familiar with this evacuation plan are encouraged to see that visitors, vendors, tenants, etc. who may not be familiar with procedures are not left behind.
4. Assist those unable to use stairs (See below.)
5. Personnel are encouraged to take VHF with them as they evacuate.
6. All the people must be assembled at designated assembly points.
7. Follow the emergency exit signage.

B. Evacuation in anticipation of a potential hazard

1. Shut down computers, machinery, etc.
2. Move out in an orderly fashion.
3. Wnsure that everyone has vacated the building.

B Post-Earthquake: Recovery, Insurance, restoration & Relief

The purpose of post earthquake activity is to resume port operation as early as possible.

• Site-main Controller
• CEO/Executive Director (Corp. Affairs)

- a. Collect the details of damages if any from HODs immediately.
- b. Ask all members of the CMG to immediately inspect their area of responsibility, along with their subordinate staff and officers and report their finding within short period of time.
- c. Ask the HODs to submit preliminary estimate immediately, followed by detailed estimate.
- d. HOD - Marine to be asked to complete the survey of berth as quickly as possible, to resume shipping activity.
- e. All required activities to resumePort operations are to be discussed and finalized with HODs.
- f. A department wise detailed programme is to be drawn up to resume normal Port operations.
- g. Regular follow up to complete the work as provided in the checklist is to be done.
- h. Emergency powers for procurement and award of contract must be evoked.
- i. HODs are required to submit the details and programs immediately.
- j. Reports on condition of Tugs and other Port crafts, ship unloader, ship loaders, HMCs and other auxiliary equipment after thoroughly inspection by HOD.
- k. All other cargo handling equipment like container handling equipment if any shall be inspected by HOD and detailed report to be obtained..
- l. MCCs, Stacker Reclaimers, Wagon tippler and Wagon tippler tunnel, Conveyor belts, conveyor galleries, Locomotives, Rail load out system etc. shall also be inspected carefully by HOD and reports to be obtained.
- m. Condition of Liquid berth and equipment and SPM Condition of all civil structures, Roads and water supply system to be checked.
- n. Ask all HODs to submit details to HOD - Finance to process insurance claims.
- o. Coordinate the CSR activities.
- p. Keep contact with District Collector and local state Govt. official and offer all possible help for rehabilitation the same to corporate office.
- q. Inform all stakeholders regarding restoration of the port operation and inform the same to corporate office.

<ul style="list-style-type: none"> • Incident Controller: HOD – Marine (Marine & SPM) 	<ul style="list-style-type: none"> a. Marine – HOD shall immediately arrange for survey of berth and inform the condition to CEO/COO, Who in turn inform the corporate office and stake holders. b. Restoration work if any may be done in association with Head ES. c. Shall check the navigational aid system and take action or rectifications if required d. Mobilise diving personnel and equipment.
<ul style="list-style-type: none"> • Incident Controller: HOD – ES (MPT & WB) 	<ul style="list-style-type: none"> a. Shall immediately depute the electrical engineer to get an update of power supply. b. In case of power outage, coordinate with Electrical supply authorities for restoration of power supply c. If power is available, and MCCs are O.K, charge MCCs one by one after thorough checking. d. Depute the same team which has parked the equipment to release the equipment for operation after removing all blockages. e. If any equipment is found to be damaged report the matter to higher ups and take action for early repair or decommissioning. f. Equipment can also can be charged one-by-one, after charging the MCCs, after obtaining written clearance from the engineer in charge. g. Ensure that the equipment electrical system is perfect before charging. Keep records of all measurements. h. Inspect all electrical and mechanical systems thoroughly before trial run. i. Damaged street lights and damaged internal lighting system to be repaired and re-commissioned. j. Take trial run of conveyors. k. Ensure all DG sets work till normal power supply is resumed. l. Inspect the water supply system and take all action to establish normal water supply immediately. m. In case of any difficulty bring it to the notice of CEO/Executive Director (Corp. Affairs). n. Drainage system if damaged should be repaired immediately. o. Inspect all roof tops and if any roof is broken, take action for replacement. p. Coordinate with Admin/HR for clean-up activities. q. HODs of West Basin will assist the Head – West Basin. r. Initiate restart processes.
<ul style="list-style-type: none"> • Primary Support Team: HOD – HR & Admin 	<ul style="list-style-type: none"> a. Shall take up relief camp work for port colony if required. b. Take all actions necessary to shift the officers and staff of the port. c. Coordinate with civil department to clean up the colony and premises. d. Arrange for provisions till normalcy is established. e. Coordinate food and drinking water arrangements for people on resumption of work to be coordinated. f. Arrange to lift out all the damaged materials generated during earthquake from the site and dispose it at proper place with the help of HSE department.
<ul style="list-style-type: none"> • Primary Support Team: HOD – QHSE & F 	<ul style="list-style-type: none"> a. Assist to CEO/Executive Director (Corp. Affairs). b. Assess the damage (human) and sent for further treatment. c. Assess the property damage and prepare report in consultation with concern department. d. Assist all HODs with restoration. e. Suggest optimal strategies for emergency isolation of damaged equipment, emergency transfer of material etc.

-
- f. Recommends appropriate procedure to isolate damaged units without introducing new hazard.
 - g. Arrange portable lighting arrangement to the accident site in consultation with Admin and Commercial.
 - h. Arrange for environmentally safe disposal of port emergency generated effluent/waste.
 - i. Updating DMP.
-

• **Secondary Support Team: HOD – Commercial**

- a. Shall inspect all stores and estimate loss or damages if any and take immediate action for re-equipping the stores.
 - b. Coordinate with all HODs for requirements of consumables and spares.
 - c. Discuss with CEO/Executive Director (Corp. Affairs) to ease norms of procurement for immediate supply of stores.
-

• **Incident Controller: HOD – Railway**

- a. Shall depute teams of staff to check the condition of all railway track and track electrification and signalling system.
 - b. Contractor shall be instructed to depute adequate numbers of teams to survey the entire railway line and system, and submit feedback within the shortest possible time (fix the time period for feedback)
 - c. Condition shall be reported to CEO/Executive Director (Corp. Affairs) and take action to repair and resume operations.
-
- d. Any help for repair and decommissioning may be taken from HOD - ES.
 - e. He shall also inspect the Locomotives of the Port, and arrange for trial runs before putting them into operation.
-

• **Incident Controller: HOD – Operations [DC (MPT & WB), CT, LT]**

- a. Shall inspect all areas along with concern HODs for estimate loss and damages if any. Prepare report and submit to CEO.
 - b. The condition of stored hazardous/toxic cargo to be inspected along with HSE and immediate action, as advised by HSE to be taken up.
 - c. Discuss with CEO/Executive Director (Corp. Affairs) and HODs for resumption of partial or full operations.
 - d. Take all actions for early resumption of Port activities.
-
- e. Coordinate with HOD – Marine to resume shipping operations.
 - f. Coordinate with HOD - Finance for insurance claims.
-

• **Secondary support team: HOD – Finance & Accounts**

Insurance Claims

- a. All HODs to prepare loss and damage list and estimate the costs of rectification and submit the same to HOD - Finance, who is the nodal officer for claiming insurance, with copies to CEO/ Executive Director (Corp. Affairs). The details shall contain photograph also.
 - b. Shall coordinate with insurance company to arrange the surveyor as quickly as possible, so that rectification work can start immediately.
-
- c. May coordinate with all HODs to prepare additional documents if required.
 - d. May collect the details of claims with supporting documents from HODs in a time frame to be fixed by him for early settlement of all claims.
 - e. Timely submission of insurance claims necessary for claiming losses.

• **Primary Support Team:
HOD – Security**

The road and railway traffic from and to the port may be disrupted due to the earthquake.

- a. Shall be well versed with all road communication of the area.
- b. Shall coordinate with local administration/State administration to clear the roads in consultation with Corporate Affairs.
- c. Port may also be required to engage men and machine to clear the road blockages if any.

• **Secondary Support Team:
CSR HOD – Adani
Foundation [General
Responsibilities]**

The company has a social responsibly to save the life and property of the people living in the peripheral areas. This work involves the following activities. These activities may be done in association with local administration.

- a. Request them to move to safer places.
- b. Moving to earthquake relief centre is the best option. If the same is not available nearby, they may be asked to move to permanent structures available nearby. Provide them all assistance for evacuation.
- c. Provide the villagers adequate dry food (chuda, gudo, biscuits, baby food etc.) items and potable water in adequate quantity.
- d. Services of medical team may be extended to the peripheral villages with necessary medicines and first aids.
- e. Advise them to remain calm.
- f. After the earthquake there may be shortage of food and water. Water has to be provided for their basic needs till normalcy is established.
- g. Start community Kitchens to provide them with food.
- h. Help in rehabilitation and resettlement of all displaced people in coordination with local Govt. agencies and NGOs.

C Checklist:

- Checklist for CEO/Executive Director (Corp. Affairs).
- Following Checklists prepared which shall be used at the time of declaration of Earthquake.

Checklist – 1	CEO/Executive Director (Corp. Affairs)
Checklist – 2	Marine Services
Checklist – 3	Engineering Services
Checklist – 4	Dry Cargo
Checklist – 5	Liquid Terminal
Checklist – 6	Container Terminal
Checklist – 7	HR & Admin
Checklist – 8	Security
Checklist – 9	Railway Services
Checklist – 10	West Basin
Checklist – 11	QHSE

CEO - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
During Effective Period				
1	Alarm to be sounded and announcement to be made on PA system. All operations to be stopped			
2	Personnel to be informed to vacate buildings, godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation. Personnel assembled at nearest assembly point for Earthquake.			
3	All departments told to carry out a head count.			
4	People must be advised to maintain calm and reassure others.			
After Effective Period				
1	Announcement to be made declaring end of emergency on PA system and other means of communication.			
2	Advise emergency teams to carry out on-field assessment and head counts.			
3	Launch search and rescue operations for missing personal.			
4	Personnel to be advised not to enter damaged buildings/structures.			
5	Get reports on casualties and injuries to personnel. Attend to injured persons and give them first aid, if possible, inform the hospital if anyone is injured, stating the type and extent of injury.			
6	Carry out assessment of damage to property and all high value assets within the port including ships.			
7	Reports to be consolidated with photographs from all departments for insurance claims.			
8	Examine cargo pipelines, fire water lines, electrical underground cable & system, building & godown walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
9	Initiate Gradual resumption of port operation.			

Marine Services - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on-roll staff and contractual employees to be given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			
2	Training to be given to employees on how to disconnect electric and water supply in their buildings.			
3	Heavy objects, glasses to be kept in lower levels. To be inspected during safety rounds every quarter.			
4	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel to be informed to vacate buildings, godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			
2	People to be advised to maintain calm and reassure others.			
3	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipments.			

4	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
5	When outside, move away from buildings and utility wires.			
6	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
7	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			
8	DPC, MMPT Marine Control Officer and data entry operator to assemble near jetty barrier with all hand held VHF, UHF, emergency light and mobile phones.			
9	Announcements to be made instructing employees to avoid taking shelter near buildings, godowns, high rise equipments, stacked containers and trees.			
After Effective Period				
1	DPC, MMPT control officer & data entry operator to return back to Marine Control Room.			
2	Take headcount of all the personnel.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipments, building and for any unsafe condition.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			

Engineering Services of MPT - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on duty staff and contractual employees are given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			Training program
2	People are made aware about evacuation plan in case of emergency.			Training program
3	People are made aware of do's and don'ts before, during and after earthquake.			Part of training. List of do's and don'ts enclosed
4	Heavy objects, glasses kept in lower levels. To be inspected during safety rounds every quarter.			
5	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel to be informed to vacate buildings, godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			To be made part of emergency drill.
2	Announcements to be made to avoid taking shelter near buildings, godowns, high rise equipment, stacked containers and trees.			To be made part of emergency drill.

3	People must be advised to maintain calm and reassure others.			
4	All operations to be stopped and personnel moved to a safe location from where they can be evacuated.			To be made part of emergency drill.
5	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipment, electrical lines and trees.			
6	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
7	When outside, move away from buildings and utility wires.			
8	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
9	FCC control room, DG House/Substation & Workshop personal to assemble at the nearest assembly point or rescue point respectively with all hand held VHF, emergency lights and mobile phones.			To be made part of emergency drill.
After Effective Period				
1	FCC control and Coordination desk to return to their respective control rooms.			
2	Take headcount of all the personnel. (FCC, backup, steel yard, jetty & tug berth building)			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipment and building to ensure safe working conditions.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			
8	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
9	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

Dry Cargo - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on duty staff and contractual employees are given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			Training program
2	People are made aware about evacuation plan in case of emergency.			Training program
3	People are made aware of do's and don'ts before, during and after earthquake.			Part of training. List of do's and don'ts enclosed
4	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			To be placed with dry cargo coordination desk and FCC control room
5	Training given to employees on how to disconnect electric supply in their buildings.			

6	Heavy objects, glasses kept in lower levels. To be inspected during safety rounds every quarter.			
7	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel to be informed to vacate buildings, godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			To be made part of emergency drill.
2	Announcements to be made to avoid taking shelter near buildings, godowns, high rise equipment, stacked containers and trees.			To be made part of emergency drill.
3	People must be advised to maintain calm and reassure others.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			To be made part of emergency drill.
5	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipment, electrical lines and trees.			
6	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
7	When outside, move away from buildings and utility wires.			
8	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
9	FCC control and Coordination desk personal to assemble near line and jetty barrier respectively with all hand held VHF, emergency lights and mobile phones.			To be made part of emergency drill.
After Effective Period				
1	FCC control and Coordination desk to return to their respective control rooms.			
2	Take headcount of all the personnel. (FCC, backup, steel yard, jetty & tug berth building)			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipment and building to ensure safe working conditions.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			
8	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
9	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

Liquid Terminal - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on-roll staff and contractual employees to be given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			
2	Training to be given to employees on how to disconnect electric and water supply in their buildings.			

3	Heavy objects, glasses to be kept in lower levels. To be inspected during safety rounds every quarter.			
4	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel informed to vacate Liquid terminal buildings.			
2	People to be advised to maintain calm and reassure others.			
3	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipment.			
4	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
5	When outside, move away from buildings and utility wires.			
6	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
7	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			
8	Liquid Control Officer and data entry operator to assemble near driver canteen with all hand held VHF, UHF, emergency light and mobile phones.			
9	Announcements to be made to avoid taking shelter near buildings, godowns, high rise equipment, stacked containers and trees.			
After Effective Period				
1	Control officer & data entry operator to return back to Liquid Control Room.			
2	Take headcount of all the personnel.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipment, building and for any unsafe condition.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			

Container Terminal - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All onroll staff and contractual employees to be given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			
2	Training to be given to employees on how to disconnect electric and water supply in their buildings.			
3	Heavy objects, glasses to be kept in lower levels. To be inspected during safety rounds every quarter.			
4	Heavy objects must not be kept on the parapet, window, balcony sills.			

During Effective Period				
1	Personnel informed to vacate buildings, workshops , godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			
2	People to be advised to maintain calm and reassure others.			
3	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipments.			
4	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
5	When outside, move away from buildings and utility wires.			
6	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
7	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			
8	Shift superintendent , tower controller, Planners , Operators , engineers, checkers and all ITV drivers to assemble away from operation building at emergency assembly point with all hand held VHF, UHF, emergency light and mobile phones.			
9	Announcements to be made instructing employees to avoid taking shelter near buildings, godowns, high rise equipments, stacked containers and trees.			
After Effective Period				
1	Shift superintendent , tower controller, Planners , Operators , engineers, checkers and all ITV drivers to return back at their respective work place.			
2	Take headcount of all the personnel.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipments and building for any unsafe conditions.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
Administration - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on-roll staff and contractual employees to be given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			
2	Training to be given to employees on how to disconnect electric and water supply in their buildings.			
3	Heavy objects, glasses to be kept in lower levels. To be inspected during safety rounds every quarter.			
4	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel informed to vacate buildings. Lifts not to be used for evacuation.			
2	People to be advised to maintain calm and reassure others.			

3	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipments.			
4	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
5	When outside, move away from buildings and utility wires.			
6	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
After Effective Period				
1	All Admin officer take charge to respective Control Rooms			
2	All the Buses, LMVs moved towards parking near all Assembly Points.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			

Security Services - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspections				
1	All on-roll staff and contractual employees to be given familiarization on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			
2	Training to be given to employees on how to disconnect electric and water supply in their buildings.			
3	Heavy objects, glasses to be kept in lower levels. To be inspected during safety rounds every quarter.			
4	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel to be informed to vacate buildings, godowns, cranes, RTG's and RMQC's. Lifts not to be used for evacuation.			
2	People to be advised to maintain calm and reassure others.			
3	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipments.			
4	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
5	When outside, move away from buildings and utility wires.			
6	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
7	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			
8	DPC, MMPT Marine Control Officer and data entry operator to assemble near jetty barrier with all hand held VHF, UHF, emergency light and mobile phones.			
9	Announcements to be made instructing employees to avoid taking shelter near buildings, godowns, high rise equipments, stacked containers and trees.			

After Effective Period				
1	Security Control Room Officer along with Data Operators to return back to respective Security Control Room.			
2	Take headcount of all the personnel.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipments, building and for any unsafe condition.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			

Railway Services - Emergency Preparedness				
Earthquake - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Part of Regular Training and Inspe				
1	All on duty staff and contractual employees are given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			Training program
2	People are made aware about evacuation plan in case of emergency.			Training program
3	People are made aware of do's and don'ts before, during and after earthquake.			part of training. List of do's and don'ts enclosed
4	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			To be placed with dry cargo coordination desk and FCC control room
5	Training given to employees on how to disconnect electric supply in their buildings.			
6	Heavy objects, glasses kept in lower levels. To be inspected during safety rounds every quarter.			
7	Heavy objects must not be kept on the parapet, window, balcony sills.			
During Effective Period				
1	Personnel informed to vacate railway building control room, Railway Yard, Loco Shed, Railway stations and Railway Maintenance Office. Lifts not to be used for evacuation.			To be made part of emergency drill.
2	Announcements to be made to avoid taking shelter near buildings, godowns, high rise equipment, stacked containers and trees.			To be made part of emergency drill.
3	People must be advised to maintain calm and reassure others.			
4	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			To be made part of emergency drill.
5	During the earthquake, the safest places are open spaces, away from buildings, godowns and high rise equipment, electrical lines and trees.			

6	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
7	When outside, move away from buildings and utility wires.			
8	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
9	FCC control and coordination desk personal to assemble near OO Line and Railway building respectively with all hand held VHF, emergency light and mobile phones..			To be made part of emergency drill.
After Effective Period				
1	Railway Emergency team to return to their control rooms.			
2	Take headcount of all the personnel. (Railway operation building, loco shed, railway stations and railway maintenance Office)			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
5	Assess damage to equipment and building to ensure safe working conditions.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Initiate restart process.			
8	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
9	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

WEST BASIN - EMERGENCY PREPAREDNESS				
Emergency Response				
Earthquake - Checklist				
Part of Regular Training and Inspections				
Sr. No.	Activity	Yes	No	Remarks
1	All on duty staff and contractual employees are given training on emergency response on earthquake, exit routes in various buildings, assembly points and location of Medical Station/Fire Station.			Training program
2	People are made aware about evacuation plan in case of emergency.			Training program
3	People are made aware of do's and don'ts before, during and after earthquake.			Part of training. List of do's and don'ts enclosed
4	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			To be placed at Central Control Room
5	Heavy objects, glasses kept in lower levels. To be inspected during safety rounds every quarter.			
6	Heavy objects must not be kept on the parapet, window, balcony sills.			
7	Wardens of the individual buildings are aware of their duties.			

8	Emergency team prepared for respective emergencies and their roles and responsibility.			
9	Emergency Contact Numbers displayed and circulated to all concern.			
10	Ensure that emergency siren is working.			
11	HODs have a meeting above the impending emergency steps			
During Effective Period				
1	Ensure proper communication with Security for traffic control of dumpers/trucks.			
2	Ensure proper communication with railway department (Govt) for rake movement.			
3	Ensure proper communication with transporters and agents for their role in case of emergency.			
4	Ensure that any information from CCR/higher authority must be passed on to the downstream.			
5	Personnel informed to vacate buildings, cranes, transfer towers, workshops etc. Lifts not to be used for evacuation.			To be made part of emergency drill.
6	Announcements to be made to avoid taking shelter near buildings, godowns, high rise equipment, stacked containers and trees.			To be made part of emergency drill.
7	People must be advised to maintain calm and reassure others.			
8	All operations must be stopped and personnel moved to a safe location from where they can be evacuated.			To be made part of emergency drill.
9	Ensure all the customers/surveyors have been informed regarding emergency and preparedness.			
10	Ensure electrical isolation of machines/equipment before leaving.			
11	During the earthquake, the safest places are open spaces. Stay away from buildings, godowns and high rise equipment, coal piles, electrical lines and trees.			
12	If indoors, take cover under a desk, table, bed or doorways and against inside walls and staircase. Stay away from glass doors, glass panes, windows or outside doors. Do not cause a stampede while evacuating as the buildings in the Port are earthquake resistant.			
13	When outside, move away from buildings and utility wires.			
14	If in a moving vehicle, stop the vehicle and stay in the vehicle away from buildings, towers and trees.			
15	Ensure all person should reach to the assembly point keeping away from the any structures.			
16	Warden has to perform his duty for evacuation of building.			Warden's Duty
After Effective Period				
Sr. No.	Activity	Yes	No	Remarks
1	Staff of Central Control Room and Marine Control will return back to their desk.			
2	Warden has to take head-count of all the personnel (sitting inside building). Individual Incharge has to ensure the head-count of all the workmen and the field staff.			
3	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
4	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			

5	Assess damage to equipment and building to ensure safe working conditions.			
6	Check water pipes, electric lines and fittings. If damaged, shut off the main valves. Do not touch live wires.			
7	Ensure that respective HOD/HOS have inspected areas.			
8	Initiate restart process.			
9	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
10	Ensure that site-round is taken, report prepared and submitted the observations to all concern for compliance.			
11	Communication to be sent to all clients regarding assessed and potential damage to cargo.			
Pre-Assessment Checklist [Preparedness in Early Stage]				
1	Ensure that all the important document are preserved at a proper place.			
2	Enusure that Emergency team has been prepared along with Roles & Responsibility.			
3	Ensure each representative of each department has a substitute (Dry Cargo, E&I, MHS SR, MHS Conv, MHS GSU, MHS WLS TLS, MHS Utility, ES CWS, ES Civil, Fire, Safety, Security, Marine, Railway, Admin, Store, IT etc).			
4	Ensure that list of Emergency Contact Numbers are displayed.			
5	Ensure that all employees, contractors/vendors/visitors/other customer are aware of emergencies and preparedness.			
6	Ensure that Emergency items contains following items; torches, ropes, wires, tarpaulins, plastic sheets, tool kit, duct tapes, assorted gears, first aid box, sand bags.			
7	Ensure proper communication with the POC for further information/ updates/news of respective emergency from disaster authority/ Govt agencies.			
8	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			Click Here

QHSE&F - Emergency Preparedness				
Emergency Response.				
Earthquake- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Arrange induction /training program for all personnel on emergency preparedness & its awareness.			Part of Induction/ training program.
2	All concerned employees and contractual staff informed about the assembly point & evacuation locations.			
3	To arrange emergency drill for dealing with such emergency.			To be made part of emergency drill.
4	To arrange necessary training for emergency response team/CMG/First Aid Team/Medical Team/Fire rescue team to deal with emergency. (Ensure availability of trained rescue team & necessary equipments all the time)			
5	Arrange training for all QHSE&F team member for emergency response & clear cut understanding of their cruisial roles & responsibility during emergency.			

6	To prepare & check effectiveness of Emergency Response Plan/ Disaster Management Plan.			
7	To do proper co-ordination with all concern department for maintaining necessary emergency response kit & necessary aids in required inventory or make identified supply of the same during declaration of such emergency.			
8	To maintain close co-ordination with mutual aid for dealing with emergency.			
During Effective Period				
1	Assist CEO/Executive Director (Corp. Affairs). as instructed.			
2	Co-ordination with respective HOD/HOS with respect to emergency actions.			
3	Ensure necessary action through CMG. Provide necessary assistance to CMG.			
4	Assist in evacuation of all personnel except key personnel.			
5	Provide HSE & F facilities (Assist for Rescue, Evacuation, and other Necessary Arrangement).			
6	Set up casualty collection centre and arrange first aid posts.			
7	Arrange enough stock medicines, antidotes, oxygen, stretchers,			
8	Keeping in mind that Road and Rail connectivity may be cut off for required period of time.			
9	Arranges additional medicine and equipment as required.			
10	Arrange a fully equipped Ambulance in ready state.			
11	Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment.			
12	To do immediate co-ordination to mutual aids for necessary help/support if required.			
After Effective Period				
1	Assist to CEO/Executive Director (Corp. Affairs).			
2	Assess damage (human) and send for further treatment.			
3	Assess the property damage and prepare report.			
4	Assist all HODs with restoration.			
5	Perform necessary rescue through rescue team where needed.			
6	Check each & every effected area & arrange for necessary HSE& F actions as require.			
7	After completion of all rescue, restoration work. check the effectiveness of executed emergency plan & take necessary require corrective action to update the plan & necessary facilities if required.			
8	To motivate the emergency rescue team, CMG & all concerns , who have perform well during emergency.			

Disaster Management Plan for

Heavy Rain/ Flood





Heavy Rain/Flood

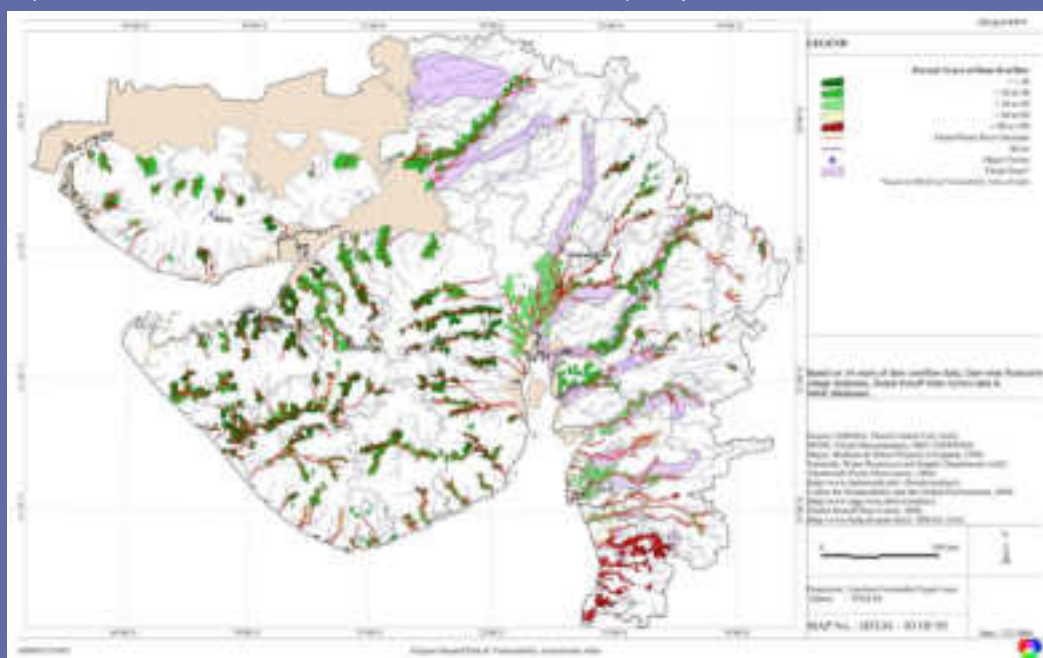
Introduction

During emergency, flood messages are conveyed by the Govt authorized Officer or Collector of the District to All India Radio/Doordarshan Kendra for necessary broadcast.

Heavy continuous rains for long period of time after which the dams are opened at Patri near Mundra.

Probability of damage to port assets is medium, chances of life loss are less as time is available and detailed mitigation procedures can be implemented. Emergency action will be based on preparedness levels achieved during emergency drills. Proper communication channel to be established for dissemination of warnings to the persons working on ground level.

Gujarat flood hazard risk zonations settelment wise flood frequency



Important information

- Power supply may be cut off for a considerable time (days) if the flood is severe.
- Both road and railway connectivity may be cut off for some time.
- There may be unpredicted inundation from unforeseen direction.
- All preparations to face such eventualities should be taken. Drinking water and adequate stock of essentials to be maintained.
- Adequate stock of essential medicines shall be maintained.
- If any other incident (i.e. fire, toxic release, oil spillage) occurs because of natural calamities, actions mentioned in the onsite emergency plan & Oil spill contingency plan needs to be taken.

Useful websites for tracking floods

- <http://www.gsdma.org/>
- www.imd.ernrt.in
- www.npmoc.navy.mil/products
- www.underground.com/tropical

Action plan

- A. Actions – Two days before heavy rain expected as per weather forecast.
- B. Actions – On the day when rainfall starts.
- C. Actions – Heavy Rain/During Flood.
- D. Actions – Post Flood stage: recovery, insurance, Restoration & relief.
- E. Checklists to be used at different stage of Flood.

A 2 days before heavy rain expected as per weather forecast

Actions – Immediate after obtaining receiving information from concern authority:

This Activity starts on intimation of possible Flood hitting the Port. Normally before 3 to 4 days, and at least 48 hrs before the predicted cycle.

Marine Control (Signal Station)

- Prime duty of signal station is to collect the weather condition, give warning to all, by hoisting warning signals and control all marine activities.
- Marine Head of the Port is the controlling authority of Signal Station, who is assisted by 2 DGM Marine Operations.
- Marine Control is the eyes and ears of the port.
- Marine Control station is the Permanent Nodal Agency to gather information about low pressure forming, cyclone formation and all details of cyclone and marine control shall inform to CEO and all HODs.
- The Port's radar system is installed on top of the Marine Operation Building (MPT & WB) station, Vessel Traffic Management System (VTMS) is with the marine control.
- The information is to be collected from Indian Meteorological department, Local radar system/ Local TV networks news/Radio and Web-site.
- All information related to low pressure formation and flood shall be immediately sent to CEO and all HODs by mail, SMS, followed by telephone to ensure the authority has received the message. In case any recipient is out of headquarters, the information shall be passed on to the HOS.
- The Marine Control station shall maintain the contact details of CEO, all HODs and, HOSs, in addition to all installation. (HR department shall supply contact details of all concerned list is to be kept updated every 3 months).
- On confirmation of flood, Marine Head shall make arrangements for food, water and all facilities necessary for the smooth functioning of the marine control, as proposed for Flood Management Centre.

Flood Management Centre

- On receipt of information of approaching flood a Crisis Management Centre (FMC) at Adani house, First floor, Conference room shall be started at least 48hrs prior to the approach of flood.
- FMC formation shall be ordered by the CEO or the Executive Director.
- First and second floor of a permanent building is the ideal choice and hence the first floor of Adani House has been chosen for setting up of the FMC.
- CEO or the Executive Director shall be overall in charge of the FMC and shall take all necessary steps for proper functioning of the control room.
- All information shall be passed over to FMC by the Marine Control, when FMC starts functioning.
- All coordination and control shall be done by the CEO from the FMC.
- The FMC shall have stand-by power supply (Diesel powered Generator) which can last at least 48 hrs, in case of power failure. A diesel bowser shall be kept stand-by at a sheltered/ protected location near Adani House to supplement the existing 1800 ltrs of fuel which is available for the 320 KV Generator. The FMC shall be easily accessible and well connected with at least 3 modes of communication (Telephone, Walkie-talkie with charging facility, Mobile phone) in addition to functional public address system.
- The communication system between Marine control, FMC, CEO and HODs shall not fail at any cost.

Control room shall have the following facility

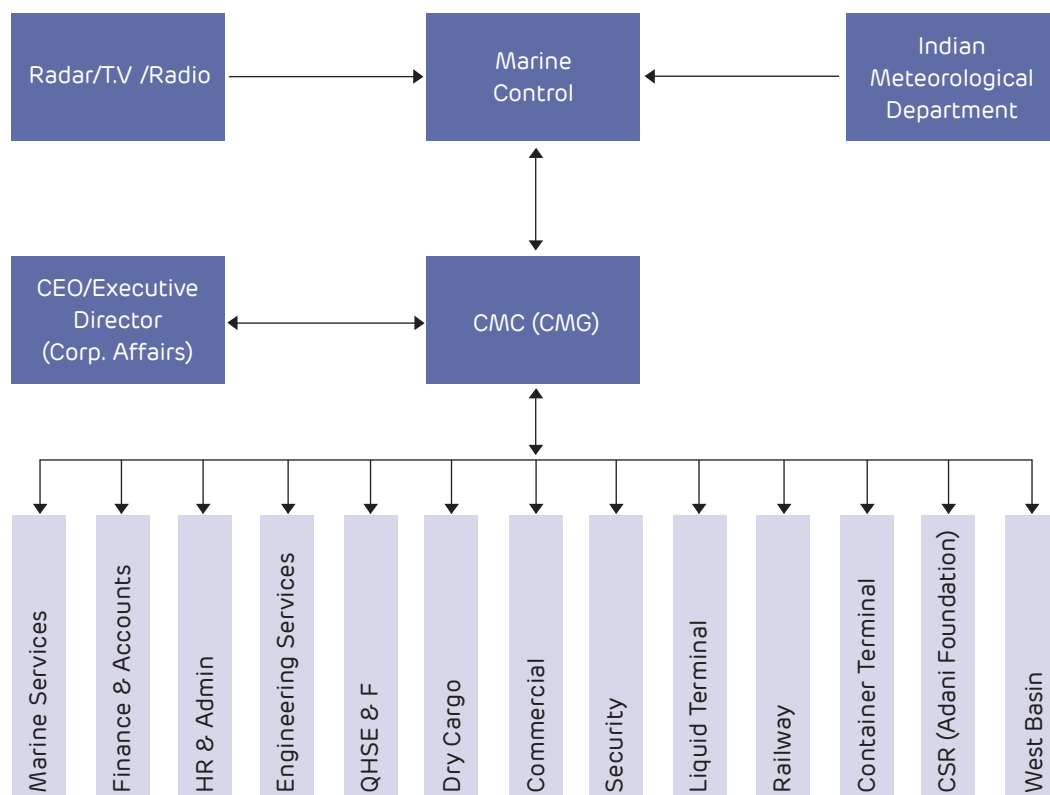
- Two numbers of laptop with internet link.
- Communication systems as described above.
- UPS and stand-by generator with fully charged battery and diesel for 4 days continuous running.
- Toilet facility with at least 2x1000 liters capacity overhead water tank.
- Dry food items and bottled water for 3 people for 4 days.
- One vehicle and one stand-by vehicle with adequate fuel and drivers.
- Adequate chairs, tables and sofas.
- Marine Head shall also arrange food and water for persons working at Marine Control round the clock during cyclone through HR & Admin.

Crisis Management Group

- Crisis Management Group (CMG) will be a permanent body to deal with all crisis and formed by CEO.
- On confirmation of possible flood attack on the port, the Crisis Management Group (CMG) shall meet at the FMC or other convenient place as determined by the CEO.
- CEO Shall appoint departmental HOD/HOS as Coordinator and Convener of the CMG.
- All meetings of the Crisis Management Group (CMG) shall be conducted in the FMC.
- All HODs/HOS shall be members of CMG, in absence of CEO, Executive director shall be the Chairman of CMG and Coordinator shall be the convener.
- CEO may declare emergency so that all staff and officers shall be at their duty stations and congregate at their designated stations for taking review of the situation and for implementing orders received from their respective HODs, who are CMG members.
- No officer shall leave his station during the emergency period.
- FMC shall be manned round the clock and shall be headed by CEO or someone nominated by CEO. He shall be at least of the rank of HOD.
- All advance preparations before the onset of flood, actions during flood and recovery shall be reviewed by CEO/Executive Director at FMC with the concerned CMG members.

Crisis Management Group – Responsibilities

All HOD's and HOS's shall be members of crisis group for flood management and post restoration activities in addition to members nominated by CEO as per the situation. The crisis management group shall be active till the full restoration of port activities.



Commands structure/designated persons:

- The following table shows the command structure for each department.
- In case the officer in the first column is not available, the second in command automatically takes over.
- Designation of the first column is the HOD and second column is the successor.
- In case of absence of both, the senior most officers of the dept. to assume charge.

Sr.No.	Head	Successor
1	CEO	Executive Director (Corporate Affairs)
2	HOD (Marine)	HOS (Marine)
3	HOD Finance	HOS Finance
4	HOD (HR & Admin)	HOS (HR & Admin)
5	HOD (ES)	HOS (ES)
6	HOD (QHSE & F)	HOS (QHSE & F)
7	HOD (Dry Cargo)	HOS (Dry Cargo)
8	HOD (Commercial)	HOS (Commercial)
9	HOD (Security)	HOS (Security)
10	HOD (Liquid)	HOS (Liquid)
11	HOD (Railway)	HOS (Railway)
12	HOD (Container Terminal)	HOS (Container Terminal)
13	HOD (West Basin)	HOS (West Basin)
14	HOD (CSR – Adani Foundation)	HOS (CSR – Adani Foundation)

* Roles of HODs [West basin (ES & DC)] and HODs [MPT (ES & DC)] are same. HODs [West Basin] will assist to Head – West Basin.

Duties and responsibilities of CEO /Executive Director and HODs:

- On receipt of imminent flood, all HODs shall inform their subordinates to take all prescribed precautions as per the checklist and stand-by for further instruction.
- All HODs and officers shall have departmental walkie-talkie and mobile phones with them with fully charged batteries.
- All HODs shall collect sufficient cash from the CFO, with the approval of CEO for contingency expenditure.
- All the members of the crisis group are required to inspect their area of responsibility to make sure all necessary precautions have been taken.
- In addition to the following, if there are any additional requirements. It shall be promptly attended to. Detailed duty and responsibility of the CEO and HODs are listed below

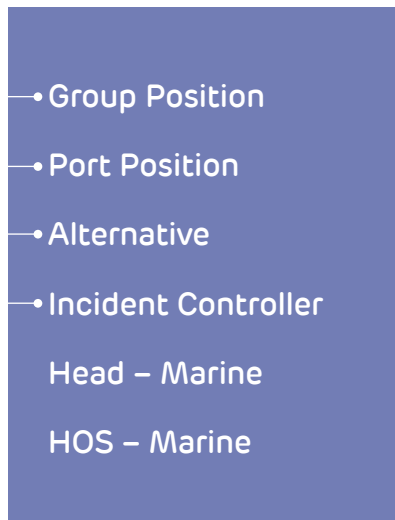
- Group Position
- Port Position
- Alternative
- Site-Main Controller

CEO

Executive Director
(Corp. Affairs)

- Keep a close contact with marine control, CMG/ head marine and get latest update on the flood.
- Call for emergency meeting of the CMG for appraisal.
- Instruct all HOD's to be in readiness.
- Instruct HOD to form groups of officers and distribute the duties and responsibilities of all subordinate officers for their readiness (a group formed).
- Monitor flood management action plan. Check list is prepared.
- Declare and ensure state of emergency and preparedness is maintained all throughout till full recovery and restoration.
- Finalize the program for shutting down operations and evacuation and other operations as deemed necessary.
- CEO shall coordinate with CMG and flood related coordination work. such as :

- Liaison with District Collector, Indian navy, Coast Guard and SP and local administration.
- Instruct the SEZ corporate affairs/Adani foundation to inform local villages the danger arising from the imminent approach of flood and apprise them to move to safer areas and offer all possible assistance.
- Review the condition of stack yard, stock of cargo inside transit shed, cargo safety action plan with all HODs.
- Review safety of dangerous cargo if any on board the ship, shed or nearby.
- Plan for casting off ships with dangerous cargo and dispatch of dangerous cargo from the port by road on priority basis.
- Finalise roster for removal of cargo from ships to roads from the port with head marine and HOD's, marine operations
- Review drainage, evacuation of surge/tidal water with ES-Civil dept. and instruct civil department to complete all related work within short period of time.
- Review action plan for safety of port and port equipment with Marine, Dry Cargo, ES, railway and CT.
- Review the plan for emergency power supply and water supply with MUPL.
- Finalize with Admin/HR and HSE, the action plan for the safety of employees to colony including emergency evacuation in case of water logging at various places.
- Instruct Admin/HR to coordinate all arrangements for food and water.
- Ask all HOD's to be ready with resources to meet unpredicted emergencies
- Issue order to declare HOD finance as the coordinating officer for all works related to insurance.
- Review the insurance position and renew policies if lapsed.
- Sanction cash for emergencies, to be maintained by HOD's.
- Review the preventive arrangements made by HOD's as per checklist.
- Keep the corporate head office informed of all incidence and activities.



- Have close coordination and supervision of the marine control to be fully alert day and night to monitor the flood condition and get the latest input.
- Pass on the latest message to CEO/Executive director and all CMG members for advance planning.
- Take active part in the formation of CMG with the approval of CEO.
- Take action to preserve all vital records and documents.
- Co-ordinate with HSE and take their advice for health, safety and environmental issues particularly if ships with dangerous or toxic cargoes are present in the port.
- Ensures that applicable implementation procedures are reviewed and are in position.
- Inform master of the ships about the flood and

ask them to be prepared to move out on short notice.

- Keep all the tugs and crafts stand-by for emergency evacuation of ships to roads on short notice.
- Prepare a roster for evacuation of ship, in consultation with HOD of various SBU's.
- Discuss and finalize with master of tugs and other officers necessary action to be taken for the protection and safety of tugs, port crafts and navigational aids, during flood.
- Keep all navigational survey equipment in good condition for use after passage of flood situation.
- Control of shipping.
- Obtain approval from CEO for taking all necessary action for the safety of the port and port crafts.
- Considering the condition of the channel depth, marine head shall prepare a chart for evacuation of the ships from the port.
- Marine head shall apprise CEO of all actions being undertaken.
- Action plan for such situation to be planned in advance.
- Increase nos. of mooring ropes etc. if required are to be planned.
- Keep enough wire ropes ready for use in case of emergency.
- Coordinate for proper functioning of FMC.
- Prepare duty roster for manning of Crisis Management Centre by officers of the Administration, Finance & Accounts and Commercial.
- Keep track of the flood and take all necessary action for cargo management with the help of various SBU's Head.
- Visit the Port and coordinate with various SBU's Head to ensure safety of cargo stacked in stack yard and cargo stored in covered areas.
- Management of Hazardous waste may be done with the guidance of HOD QHSE & F.
- Action plan to move Hazardous cargo to safe place to be finalized.
- Liaison with all stake holders to relieve their anxiety if any.
- The roster of all departments may be collected, combined and kept in the FMC for ready reference.
- Mobilizes and monitors vehicles as per the checklist.
- Coordinate with Coast-Guard for patrolling the seafront.
- Liaison with Marine Police and ensure proper patrolling.
- During the course of flood fishing boats may try to berth on the vacant spaces and damage the berth or sink there.

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- Plan in advance to prevent this incidence.
 - Arrange food and water for personnel on roster duty with the help of HOD Admin.
 - Liaises with local administration and communicates inputs from and to the SEZ Corporate affairs/Adani foundation.
 - Liaises with media as spokesman under guidelines of the CEO.
 - Liaison with the District Collector/Tahasildar/Local Police/Marine police as and when directed by CEO.
 - Advance planning to keep audio/video records of all events.
 - Ensure proper storage of valuable documents and equipment.
 - Weather forecast news to be circulated regularly to the industries inside SEZ and surrounding.
-

• Group Position
 • Port Position
 • Alternative
 • Secondary Support Team
 Head F & A
 HOS F & A

- Maintains cash/funds for disbursement to all the dept.
 - Disburses cash/funds to different departments as per requirement.
 - Take over the function as Nodal officer for all Insurance related activity.
 - Keep all valuable records and data in safe custody.
 - Provides Disbursement Statement for processing claims.
 - Depute officer to each dept. to assess the requirement and needs of affected dept.
 - Assist in procurement and process purchasing/leasing of equipments.
 - Prepare to help Admin/HR for hiring of specialist services, food, and shelter and transport arrangements, as the situation demands.
 - Prepare documents for all events, damages and claims.
-

• Position
 • Port Position
 • Alternative
 • Primary Support Team
 HOD HR & Admin
 HOS HR & Admin

- Keep close liaison with FMC/CMG and perform coordination with the concurrence of CEO.
- Attend CMG meetings, as directed by CEO/Executive Director (Corp. Affairs).
- Keep enough staff and vehicle to attend emergencies.
- Provide contact details of all officers and staff to Marine control and FMC.
- Discuss and finalize with HOD QHSE & F, action plan for the safety and shelter of all officers staff and Staff colony.
- Collect the duty roster of all dept. and their posting position to finalize arrangements for provisions, water and other essential for 4 to 5 days.
- Finalize arrangements for safety of colony.
- Advise colony occupants to store drinking water, cooking materials, cooking gas, candles etc. to meet emergencies.
- Ask the canteens to store adequate raw materials,

gas etc for at least a week.

- Coordinate evacuation with Transport in township areas if situation so warranted with the clearance from FMC.
- Finalize in coordination with HOS Admin & HOD Security the plan to ensure safety of Port properties and Colony.
- Coordinate with HSE and Medical officers for attending to emergencies.
- Coordinate with other field group (DC, Marine, ES, Container, CT, Liquid, Railway, Security, and QHSE & F) for food and drinking water for the persons engaged in flood duty and restoration work.
- Make a list of staff who can be evacuated from all departments (DC, Marine, ES, Container, CT, Liquid, Railway, QHSE&F)

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Incident Controller 	<ul style="list-style-type: none"> • Keep up to date about the flood conditions. • Make detailed inspection of all facilities and plan for preventive actions in case of flood conditions. • Make responsibility chart for safe parking of all equipments and advice the implementation system to field groups for on site action. • Plan for checking the condition of all stand-by equipments like DG sets, Diesel engine driven welding sets, De-watering pumps etc. • Plan and advise the procedure for parking and anchoring of all equipments to the field group as detailed below. <ul style="list-style-type: none"> > Plan with HOD Commercial for procurement of essential materials. > Keep all valuable data's and records in proper safe custody. • Finalize a team of engineers and staff for round the clock emergency duty.
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- Plan for adequate dry food and water, with the assistance of HOD Admin for the people who may be required to be on emergency duty.
- Plan for emergency de-watering units, emergency lights etc.
- Draw available resource pool and keep a list of qualified contractors contacts and number. Keep stand-by at least one team for emergency Power transmission line repairs and reconditioning.
- Call the officers and personally apprise them the action to be taken in the next 24 hrs (24 hrs pre flood).
- The last pre-flood period may be curtailed due to unexpected sudden Increase of wind speed.
- The action team should be apprised of such a situation taking place in advance.
- Cargo operation to be stopped early for moving equipment to safety and taking out ships.
- Though the port operation shall continue till the time the wind speed permits, all preparatory arrange must be in place to complete all planned Safety work before the wind speed reaches the threshold limit.
- Plan for parking all non-working equipment prior to the last 24hrs.
- Attend the CMG meeting and apprise CEO/Executive director (Corp Affairs) the action plan to be taken to prevent damage to the port equipment and installation in case the flood hit the port.

Instruction to be given to the designated groups for anchoring the equipment :

- Stop operations in consultation with HOD Dry cargo & Container terminal when the wind speed increases.
- The Loading and unloading booms of Ship loader, Ship unloader and container cranes, HMCs shall be lifted and latched.
- If latching is not functioning, repair it or tie with wire ropes as additional Protection.
- Ship loader and ship unloader, HMC etc. shall be travelled to the designated parking position lower the anchoring pins into hole and lock.
- In case of hydraulic locking, lower the locking jaws and lock it with rails.
- Park and secure the boom of all stacker & reclaimer at the designated place.
- In addition, block all the wheels of all rail mounted equipment mechanically.
- Lock all control rooms and operators cabins.
- Switch of power supply of equipment, after they are parked and secured.
- Check all MCCs and tunnels and ensure there is no possibility of surface water entry inside.
- Inspect all roads, culverts, drainage system and water supply system.
- Take action to rectify defects on war footings to complete within 24/30 hrs.
- Inspect all buildings, roof of temporary buildings, and top of conveyor galleries.

-
- Take action for repair and strengthening.
 - Inspect the seashore of the port and take action for protection if warranted.
 - Plan action group to attend to emergencies, Co-ordinate with MUPL for maintaining water supply.
 - Check all buildings, conveyor gallery and roofs tops and strengthen them to with stand the cyclonic wind.
 - Coordinate with HOD Commercial to procure and store enough sand/cement and other construction material to tackle emergency.
 - An experienced engineer may be attached with commercial to help in arranging civil construction materials.
 - Impart all necessary to seal entry of surface water inside tunnel and MCCs and control rooms.
 - Plan for a group of officers and staff for stand-by duty during flood.
 - Plan to keep adequate diesel operated de-watering pumps.

- Position
- Port Position
- Alternative
- Primary Support Team

HOD – QHSE & F

HOS – QHSE & F

- Assist CEO as instructed.
- Co-ordination with respective HOD/HOS with respect to emergency actions.
- HOS of all sections of QHSE&F will assist to HOD – QHSE&F.
- Assist in evacuation of all personnel except key personnel.
- Provide HSE & F facilities (Assist for Rescue, Evacuation, and other Necessary Arrangement).
- Liaison with mutual-aid partners for assistance.
- Availability of Emergency Kit (torch, PPEs, rope, first-aid, whistle, VHF sets, PA System, Fire Extinguisher etc)
- All Emergency vehicles are to be ready to operate, completely filled with fuel, and stand-by drivers.
- Arrange necessary staff of Fire & Rescue with necessary arrangements.

- Assess the prone areas where there could be chance of major environmental pollution.
- Remove/Securing of Hazardous and toxic cargo.
- Providing necessary arrangement to prevent damage to the environment.
- Suggests optimal strategies for conducting emergency isolation of damaged equipment, the emergency transfer of materials etc.
- Renders assistance for trapped personnel.
- Recommends the appropriate procedures to isolate damaged units without introducing new hazards.
- Coordinate as per plan for all preparations to meet the emergencies.
- Set up casualty collection centre and arrange first aid posts.
- Arrange enough stock medicines, antidotes, oxygen, stretchers, keeping in mind that Road and Rail connectivity may be cut off for required period of time.
- Maintains a list of blood groups of each employee with special reference to rare blood groups.
- Arrange additional medicine and equipment as required.
- Arrange a fully equipped Ambulance in ready state.
- Ensure that the casualty section of Port hospital has specialists round the clock during flood.
- Arrange for extra beds and in emergency contact with the Adani Hospital and Bhuj Hospital for extra medical supplies.
- Make arrangements for mobile casualty unit to reach at incident sites and transportation for further treatment.
- Duty Doctor to be onsite with team who acts as liaison officer for all medical services.
- Advise regular medicine takers to keep adequate stock of medicine with them like BP patients, Diabetics etc.

- Position
- Port position
- Alternative
- Incident Controller

HOD–Dry Cargo
(MPT & WB)

HOS–Dry Cargo
(MPT & WB)

- As soon as getting the information about flood, personally visit all stack yards, plots and other cargo storage area, including transit shed if any and satisfy the condition of stacking.
- Inspect all drainages and if found not clear inform civil engineering to immediately clear the drainages to ensure free follow of drained water.
- Confirm that hazardous and toxic cargoes are properly protected to prevent environmental issues.
- Take action to evacuate all perishable cargo, and ask the owner to arrange for evacuation as quickly as possible.
- Take action to identify all expensive materials and take action to protect them to prevent losses during flood.
- Arrange to segregate and protect cargo in sheds.
- Co-ordinate with HOD Marine in de-berthing vessel to vacate the berth.

- As soon as the wind speed approaches 20mtrs/sec, issue instruction to stop all operation and move the equipment to parking position.
- Discuss with DC team and HOD Marine and operations may have to be stopped early, so that they get time to move out all ships.
- ES also need time to travel the equipment to parking position.
- Take all possible action in coordination with CMC and owners of cargo to ensure no or minimum loss of cargo during flood and possible tidal inundation.
- Have a final inspection of cargo before the onset of heavy wind.
- While inspecting if any drainage system inside the port is still chocked, immediately arrange to clean it with the assistance of (ES-Civil department).
- Coordinate with ship-owners/agents/C & F agents/stevedores and with HR/Admin Officer to arrange and evacuation and safety of all men.
- Liaison with HOD Security for safety of cargo.
- Preserve all records in safe place to save it from wind and possible inundation.
- All cargo handling equipment like, Pay loaders, Front end loaders, Bull dozers, Dumpers, Trailers, cranes, forklifts etc. shall be kept ready with adequate fuel to use them on emergency, during flood and later during restoration. This equipment is to be parked in a safe, protected area.
- Enough operators/workmen also shall be stand-by round the clock to operate these equipment during flood in emergencies and for restoration.
- Mobilization of additional manpower and cargo handling equipment
- Port, Stevedores and C & F agents to meet emergencies and later on to segregate unaffected cargo and make arrangements to protect such cargo, till evacuation.
- Officer of Dry Cargo will coordinate with Security about the local road network in case of road blockage, to clear the blockage in coordination by Corporate Affairs with state government and local administration.
- Corporate Affairs to also explore alternative mode of connectivity, so that some form of connectivity with the main stream is immediately established.

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Secondary Support Team
<p>HOD – Commercial</p> <p>HOS – Commercial</p>

- Collect details of all materials in store and plan for procurement of adequate stock of consumables and construction materials.
- Discuss with all HODs about their possible requirements.
- Make physical verification of the stores for proper stocking to prevent damage during flood.
- Co-ordinate with ES-civil for repair of stores if required.
- During flood, keep sufficient stock of consumables like tarpaulins, gunny bags, ropes and wires for port crafts, diesel oil, kerosene oil, hurricane lantern, candles, petromax lamps, torch lights with batteries and bulbs, electrical items etc. are kept in stock.
- Stock adequate roofing materials and fixtures for emergencies.
- Few sealed packets of bleaching powder shall be available in stores for sanitation.

- Few gas Cutting sets may be kept in stores for emergency the quantity may be decided in consultation with ES.
- All the materials which are likely to get damaged with Rain/water inundation shall be protected by a tarpaulin cover and kept above ground level.
- All electrical and electronic items shall be shifted to safe place fully wrapped.
- Stores which needs to be kept in controlled temperature, like belt splicing materials etc. are to be moved to places where D/G set are available, or arrange one D/G set for emergency supply.
- Spares shall be sealed in polyethylene covers and kept to save it from flood damage.
- Electrical items should be kept in high raised rake to prevent water contamination.
- Cut edge of conveyor belts should be either covered or a coat of rubber solution shall be applied.
- Arrange to keep stand-by staff round the clock to issue these materials any time during the emergency and restoration period.
- All valuable records and computers shall be properly stored to save it.
- Informs HOD-Finance the approximate funds required.

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support Team
<p>HOD – Security</p> <p>HOS –Security</p>

- Plan for effective traffic control and its regulation in port area during and after flood.
- Coordinate with QHSE&F for fire and safety issues.
- Inspect the circumference of the Port and in case of damages to compound wall get them repaired with the help of HOS civil Engg, immediately.
- Close all possible vulnerable points.
- Check the readiness of the fire and safety units.
- Keep clear all internal roads within port area for smooth traffic.
- Plan for posting extra watch and security guard team for intensifying patrolling of stores, substations, berths, transit sheds, warehouses, administrative building, loco sheds, workshops, Water supply installations, etc. in addition to all entry and exit points.
- Issue orders to all gates to effectively control the entry of unauthorized persons or vehicles inside the protected area.
- Plan to intensify the patrolling of periphery and inside

the port, including the Berth area.

- Plan for mobilizing additional manpower and keep to them at stand-by.
- Liaison with police and local aid agencies under intimation to CEO.
- During the flood, flood and recovery period no visitor shall be permitted inside the protected area.
- In case of authorized visitors, they shall be apprised of the flood and its effect. They may be escorted to safe place.
- Liaison with Admin for their accommodation and transport.

<ul style="list-style-type: none">• Position• Port Position• Alternative• Incident Controller <p>HOD – Liquid</p> <p>HOS – Liquid</p>	<ul style="list-style-type: none">• Maintain close contact with Marine Control and CMG.• Inform the masters of the ship about the progress of the flood, and ask them to be prepared to move out on short notice.• Discuss with Marine HOD and finalize the ship movement program in advance.• Keep all officers and staff for emergent action on intimation of flood (Notice of 24 hrs or less only may be given for evacuation)• Plan for a well-prepared emergency group to stand-by during the flood to meet unforeseen emergencies.
<ul style="list-style-type: none">• Position• Port Position• Alternative• Incident Controller <p>HOD – Railway</p> <p>HOS – Railway</p>	<ul style="list-style-type: none">• Maintain close contact with Marine control for the status of the flood.• Ensure that the wagons and locomotives are parked in safe area in case the wind speed increases• All normal operations stopped. Only emergency operations for evacuation of locomotives and wagons to safe places.• Railway emergency team is equipped with VHF sets, emergency torches, rain coats.• Liaison with Indian railway authority.• Co-ordination with Dry Cargo for wagon loading.• Railway team in continuous contact with other emergency services (such as QHSE & F, Security, other services)• Inspect the locomotives of the port, and arrange for trial running to put them into operation.
<ul style="list-style-type: none">• Position• Port Position• Alternative• Incident Controller <p>HOD – CT</p> <p>HOS – CT</p>	<ul style="list-style-type: none">• Maintain close contact with Marine control for the status of the flood.• Arrange for evacuation of all personnel working in CT.• All personnel remaining in the port to be cautioned against venturing out during effective period.• All containers to be stacked only three high (as per possibility)• All hand held UHF/batteries, emergency torch, mobile phone fully charged for use in emergency in case of total power failure.• Wharf supervisor to ensure that no personnel are allowed on the jetty areas.• Should be ready to stop activity in case increase in wind speed.

B On the day when rainfall starts:

- Position
- Port Position
- Alternative
- Site-Main Controller

CEO

Executive Director
(Corp. Affairs)

- Ensure from HODs that all precautionary measures are completed in advance and obtain written feedback.
- To ensure that all documents and Records are kept in safe places by HOD's.
- Hold review meeting of the CMG at regular interval, minimum 3 times daily till full recovery and resumption of port operations.
- Have frequent overall physical verification inside the port area.
- Advise all members of CMG to be present at CMC during flood.
- Authorize release of required funds.
- Appraise The Corporate office, the situation and action taken.
- Coordinate with District collector, Tahasildar, Indian Navy, Coast guard and Marine Police for advance precautionary actions.

- Take all necessary steps to help local authorities with evacuation and sheltering people of nearby villages who may be affected.
- Approve information to the media.
- In case of high tidal prediction, employees and families staying in the Colony needs to be relocated.
- Instruct Admin to look in to the possibility of shifting people of ground floor to first floor or above.
- Instruct Admin/HR department to arrange enough grocery items, dry food and drinking water for emergency requirements.
- Confirms the termination of the emergency after the threat is over.
- Lead the Crisis Management Group for early restoration of facilities and resume port activities.
- Provide timely status reports to the authorities.
- Take active role for corporate social responsibility, depute Adm/HR for Coordinating the activities described below responsibility.

- Group Position
- Port Position
- Alternative
- Incident Controller

HOD – Marine

HOS – Marine

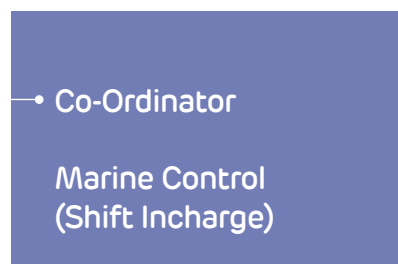
- Keep track of the course of flood/heavy rain and inform all pilots and staff and officers under him about the latest position.
- On information from Marine Control about increasing wind speed and heavy rain, ask HOD of Dry Cargo, Container Terminal and Liquid Terminal to stop all loading, unloading of cargoes, discharging and bunkering operations.
- Discuss with CEO, HOD Dry Cargo, Container, Liquid and Pilot to start evacuation of the ship to the roads as per the Roster finalized earlier.
- Ship on oil berth is to be given priority for evacuation.
- Coordinate with HSE to ensure ship with hazardous and toxic cargo are taken out first.
- Evacuation shall be completed before the wind speed reaches threshold value.
- To ensure this evacuation may have to be started earlier.

- Preserve all records and documents safely.
- Keep all the necessary officers and staff on stand-by for emergency duty.
- In coordination with HOD Security, ensures evacuation of all dock workers and private labour, visitors, shippers, consignees from the port area.

- Ensures implementation of the disaster response plan and coordinating with the Fire Fighting Authorities (Rescue).
- After evacuation of all ships, arranges to protect Tugs and Port crafts by proper docking and tie up to withstand simultaneous flood wind and destructive tides.
- Deploy craft- and mobilize resources to confine and clean up spill if any.
- Keep adequate provision of food and water for men on emergency duty.
- Inform possible time of return to normalcy to all cargo interests, shipping Agents, stevedores.
- If due to any reason a ship could not be taken out, this ship needs to be protected well against breakage of mooring ropes and possible drifting and banging on to the berth.
- Several tie ups, as situation demands, with bollards needs to be done.
- A team of staff along with DC/Pilot needs to be on stand-by duty for the period of flood/heavy rain to take spot decisions.
- Enough good quality ropes, shackles and other required materials necessary shall be kept with the group.
- This matter shall be brought to the notice of the CEO and Corporate Head.

Actions for SPM:

- Stop all pumping operations.
- Flush both floating and subsea hose strings with seawater.
- Disconnection both floating hose strings from SPM buoy, shift and secure at safe location.
- Blind both j-piping arm flanges.
- Disconnect both mooring hawser assemblies and transfer to a safe location or on board of Diving support vessel.
- **Secure all :**
 - > Loose and portable equipment & spares from SPM buoy.
 - > All hatches doors and replace seals if needed.
 - > Doors and latches for tightness.
 - > Deck & central chamber valves.
- Remove Hazardous and Toxic substances.



- The coordinator shall work as the convener of CMG.
- The duty of the coordinator is to coordinate with all CMG members and help to implement all decisions.
- All officers on duty must have walkie-talkie and mobile phone with them with fully charged batteries.
- Keep few extra walkie-talkies ready at CMC for emergency work.
- Keep a record of walkie-talkies to prevent loss.
- He shall work as a convener of the CMG and shall report directly to CEO.
- He shall help all CMG members for the pre-flood arrangements and post flood re-commissioning.
- The extra man power required for all departments shall be arranged by him, by lateral shifting or by hiring for specific purpose and period.
- He shall help HOD Commercial for procuring the items necessary for flood damage repairs.
- A salvage team with a salvage vehicle shall be maintained at the Marine control under the control of the senior pilot, who shall be on duty during flood.
- This salvage team is to be used for attending to emergencies during flood.
- For manning the same, staffs have to be provided in coordination with HOD Marine & ES.
- This vehicle shall be able to move around in port area and shall be provided with, a D/G set, Portable welding machine, Gas cutting sets, wire Ropes, shackles, first aid box, emergency light, necessary tools and tackles etc.
- Liaise with HOD Marine and is responsible for keeping the Fire and rescue Dept. in a state of alertness on a 24 hour basis.
- Keeps CMG, HOD Marine, HSE and HOD Security informed of any crisis & lead team directly to incident site.

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- Initiates de-watering with the help of Fire and ES.
 - Team reaches the incident location with the correct resources.
 - The fire team also shall work as rescue /evacuation and other emergencies.
 - Assists in the evacuation of workers to the assembly points in liaison with HR. Plan with the assistance of HSE, for adequate men to stand-by duty to be engaged in emergencies.
 - Arranges safety equipment e.g. Life Jacket, protective gloves and goggles, breathing apparatus as required.
 - The emergency set should be so arranged that it can start functioning immediately on reaching the emergency point (D/G set is ready with POL and battery, Emergency light sets ready, Gas Cutting set is connected and ready, Welding set ready, Enough welding rods are available.)
 - Men on duty should contain at least, one welder, an electrician, riggers etc.
 - Coordinate with Medical department for maintaining mobile first aid centre.
-

• Support Staff
Senior Pilot
Pilot

- Senior Pilot to be stationed at Marine Control.
- Assist Pilots to take out ships on to the roads.
- Assist Pilots to secure Port craft properly, taking into consideration of severity of the flood.
- Maintains 24 hour vigilance towards the channel / anchorage & port
- On receipt of any incidence inform CEO/HOD Marine refrains from exchanging any information with unauthorized persons unless authorized to do so by the CEO.

- Maintains contact with vessels on VHF.
 - A salvage vehicle with tools and tackles, a portable welding set, portable DG sets, Gas cutting set, ropes of different size, portable lights should be maintained at the Disposal of the Marine control station under the senior Pilot.
 - For manning the same persons from different department shall be arranged by the Coordinator.
-

• Group Position
• Port Position
• Alternative
• Incident Controller
HOD–Dry Cargo
(MPT & WB)
HOS–Dry Cargo
(MPT & WB)

- As soon as getting the information about flood/heavy rain, personally visit all stack yards, plots and other cargo storage area, including transit shed if any and satisfy the condition of stacking.
- Confirm that hazardous and toxic cargoes are properly protected to prevent environmental issues. Take HSE into confidence.
- Expensive materials identified and stored carefully to avoid losses due to wind or water inundation.
- Arranges to segregate and protect cargo in sheds.
- Co-ordinate with Marine control in unberthing vessel to vacate the berth.
- As soon as the wind speed approaches 20mtrs/sec, issue instruction to stop all operation and move the equipment to parking position.
- Discuss with ES and HOD Marine, and stop operations early so that they get time to move out all ships.
- Take all possible action in coordination with CEO and owners of cargo to ensure no or minimum loss of cargo during flood and possible tidal inundation.

- Have a final inspection of cargo before the onset of heavy Wind.
- Inspecting drainage system and immediately arrange to clear drainage system if choked with the assistance of ES-Civil.
- Coordinates with ship-owners/agents/C & F agents/stevedores and with HR/Adm Officer to arrange and evacuation and safety of all men.
- Liaison with HOD Security for safety of cargo.
- Preserve all records in safe place to save it from flood and possible inundation.
- All cargo handling equipment like, pay loaders, front end loaders, bull dozers, cranes, forklifts,

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- dumpers, trailers etc. shall be kept ready with adequate fuel to use them in an emergency, during flood/heavy rain and later during restoration. This equipment is to be parked in safe, protected area.
- Enough operators/workmen also shall be on stand-by round the clock to operate these equipment during flood and for restoration.
 - Mobilization of additional manpower and cargo handling equipment from port, stevedores and C & F agents to meet emergencies and later on to segregate unaffected cargo and make arrangements to protect such cargo, till evacuation.
 - A traffic team under an officer, who knows about the local road network shall be formed and be ready to act in case of road blockage, to clear the blockage in coordination by SEZ Corporate Affairs with state government and local administration.
 - He shall also explore alternative mode of connectivity, so that some form of connectivity with the main stream is immediately established.
 - All the stack yards visited to ensure that the cargo storage is safely done.
 - It is programmed complete all the works immediately.
 - Proper storage of all expensive cargo separately in safe manner.
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| <ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support Team <p>HOD – Security</p> <p>HOS – Security</p> | <ul style="list-style-type: none"> • Maintain adequate men for manning all exit and entry points and to make regular surveillance survey of the port, periphery and vulnerable points. • Ensure security men on all points, during flood also. • Maintain patrols and ensure unsafe practices are eliminated. • Liaise with Site Incident controller (HOD Marine). • Keeps CMG, HOD Marine, HSE and HOD Security informed of any crisis & lead team directly to incident site. • Controls the entry of unauthorized persons and vehicles. • Permits the entry of authorized personnel and outside agencies for • Rescues operations without delay. • Allows the entry of emergency vehicles such as ambulances without hindrances. |
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- Ensure that all people are aware of the assembly points, where the transportation vehicles are available.
 - Ensure that the headcount matches the list of people available with the assembly point section of that area.
 - Help Admin/HR for evacuation as and when asked for.
 - Carry out reconnaissance of evacuated area before declaring the same as evacuated and report to HOD Security/CMG.
 - Keep adequate fuel and vehicles for emergency duty, in Consultation with HOD Security/FMC.
 - Disperses crowd-cordons off restricted areas- prevent looting.
 - During heavy flood there may be instances of local villagers rushing inside the port area, HOD Security may be prepared to meet such emergencies.
 - HOD Security and HOS Security shall frequently take rounds inside the port area to ensure that everything is in order and shall submit compliance to CMG.
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- Position
- Port Position
- Alternative
- Incident Controller

HOD – ES (MPT & WB)

HOS – ES (MPT & WB)

- Maintain roster of officers and staff for duty during flood and restoration period.
- As soon as the flood is confirmed to strike within 24 hrs start preventive Preparations.
- Apprise the team the modus operandi of parking and securing each equipment.
- Form teams for safety and securing of all equipment and vital units.
- With coordination with all department HOD Like Dry Cargo, Container Terminal, Liquid Terminal and HSE etc. pull out equipment one by one from operation and move to safe, designated parking area.
- Instruct the leader of the team to be personally responsible and obtain feed back in writing, which may be submitted to CEO, after physical verification.
- Ship loader and ship unloader shall be parked at the designated area, lower the locking bar into the slot in

the jetty.

- In case of hydraulically operated rail clamp, lower them to hold on to the rail, and block all wheels mechanically.
- Securing of all equipment should be checked before submitting the clearance to higher ups.
- All equipment shall be stopped at the moment upon declaration of flood, raise the booms and latch them, tie up if latch is not reliable.
- Travel and position to the respective earmarked parking position and lock.
- Loading boom of Stacker Reclaimers should be lowered and latched at the parking position.
- In case of any difficulty to travel to the parking position lower the boom to the travelling rail, any one side and tie down with the rail.
- Block the travelling wheels and slew wheels mechanically.
- Additionally the rail mounted equipment may be tied to the rails by wire rope and clamps depending on the severity of the flood.
- Tie down all raised conveyor belt to prevent dismounting, especially belt on the tippers of stacker reclaimer, ship loaders and open conveyor belts at Berth.
- Do not use wire rope to tie down conveyor belt, also ensure to use gunny bags or old belt pieces between the belt and rope to prevent damage to the belts.
- Power supply to all points to be shut off after parking the equipment.
- There shall be 3 level of inspection after the parking of all equipment by the leader of the anchoring team, HOS –ES, HOD- ES.
- Personally inspect all equipment (Ship unloaders, HMCs, ship loaders, Stacker Reclaimers, portliness, transistors etc. and satisfy the safety of the parking done.
- Parking should be done as per the guide line of the manufactures.
- The hoppers at the berth shall be locked with the rails to prevent movements at high wind speed.
- Inspect the Tunnels and ensure the de-watering pumps are in working condition. The motors may be wrapped to ensure that water does not spoil the insulation in case of power failure and inundation. (Ensure to remove the wrappings before switching on)
- Ensure that no surface water make entry into the MCC, tunnels etc., in coordination with Civil.
- All DG sets to be made functional with adequate stock of fuel for at least 4 days of operation.
- The DG Sets should be installed on high pedestal to prevent it from getting submersed in water.
- DG in the guest house, water supply system, Signal station and CMC also need to be maintained.
- Provide all assistance to maintain power supply to colony and water pumping system. Keep adequate drinking water and dry food in the substation for all the staff on emergency duty.
- All important Sub stations have to be manned during flood.
- Monitors the rendering of assistance for rescue of personnel.
- Ensures the dept. group remains alert on duty for electrical isolation of equipment during an emergency.
- Render all assistance for upkeep and restoration of water supply system.
- Lead the group from the front to ensure prevention of damages.
- Inspect the workshops and ensure the equipment are covered properly to save them from

severe wind and water. (Temporary roof may be blown off, hence costly equipment may be wrapped with tarpaulin.)

- Have a personnel inspection of all ES auxiliary equipment.
- Render help to others who request for help, such as Civil and Railways.
- Ensure that all doors of transfer towers are closed and tied to prevent opening due to the gushing wind.

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support Team <p>HOD – QHSE & F</p> <p>HOS – QHS E & F</p>	<ul style="list-style-type: none"> • Maintain adequate men for manning all exit and entry points and to make regular surveillance survey of the port, periphery and vulnerable points. • Maintain patrols and ensure unsafe practices are eliminated. • Liaise with HOD Marine. • Keep CMG informed of any crisis & lead team directly to incident site. • Controls the entry of unauthorized persons and vehicles. • Permits the entry of authorized personnel and outside agencies for Rescues operations without delay. • Allows the entry of emergency vehicles such as ambulances without hindrances. • Help Admin/HR for evacuation as and when asked for.
<ul style="list-style-type: none"> • Carry out reconnaissance of evacuated area before declaring the same as evacuated and report to CEO/CMG. • Keep adequate fuel and vehicles for emergency duty, in consultation with HOS stores/CMC. • HOD Security and HOS Security shall frequently take rounds inside the port are to ensure that everything is in order and shall submit compliance to CMG. 	

<ul style="list-style-type: none"> • Position • Port position • Alternative • Secondary Support Team <p>HOD – Finance</p> <p>HOS – Finance</p>	<ul style="list-style-type: none"> • Action is initiated to keep cash as discussed with CEO. • HODs are intimated the procedure of issuing of cash. • As directed by CEO validity of all insurance verified. • Circular issued to all HODs indicating the procedure to be followed for raising insurance claims. • Separate teams are formed to handle the finance matters of each department so that all cash expenditure and accounts are properly maintained.
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<ul style="list-style-type: none"> • Position • Port Position • Alternative • Secondary Support Team <p>HOD – ES (MPT & WB)</p> <p>HOS – ES (MPT & WB)</p>	<ul style="list-style-type: none"> • Get updates from the all officers and workmen on duty. • Ensure completion of cleaning of all roads culverts and drainages. • If any work is left out take action to complete it within 24 hrs. • Confirm that all rainwater entry points to the sub-stations and tunnels are sealed. • Prepare to tackle inundation due to tidal water. • When flood is confirmed keep contractors on stand-by, for emergency works during and immediately thereafter, men are not available. • Keep a set of engineers and workmen on stand-by duty for such works. • Help Admin co-ordinate evacuation of port areas and mobilize, collect and distribute relief material. • In consultation with CMG keep adequate de-watering
<p>pumps operated with diesel engines.</p> <ul style="list-style-type: none"> • Attend CMG meetings as & when require. 	

<ul style="list-style-type: none"> • Position • Port Position • Alternative • Primary Support <p>HOD – HR & Admin</p> <p>HOS – HR & Admin</p>	<ul style="list-style-type: none"> • Maintain close contact with CMC/CMG/HSE and perform coordination with the concurrence of CEO. • Make circulars/leaflets and circulate among all including colony. • Coordinate evacuation of townships and people staying in low lying areas situation so warranted with the clearance from CEO. • Make announcement to colony and nearby villages with SEZ Corporate Affairs about the severity of the imminent flood and advise local population to move to safer shelters. • Collecting details of evacuated people. This will be necessary to settle claims, if any, at a later date. • Consult Legal Advisor and obtain their advice for legalizing all the port's actions. • Coordinate with other field group (All Departments) for food and drinking water for the persons engaged
<p>in flood duty and restoration work.</p> <ul style="list-style-type: none"> • Document all events and actions in coordination with other HODs for future reference. • Facilities for sanitation and other necessary arrangements. 	

<ul style="list-style-type: none"> • Position • Port position • Alternative • Incident Controller <p>HOD – LT</p> <p>HOS – LT</p>	<ul style="list-style-type: none"> • Shifting of hazardous and toxic waste in consultation with QHSE & F. • Maintain close contact with Marine Control and CMG. • Make plan for shifting of equipment/vehicles. • Inform the masters of the ship, the progress of Flood, and ask them to be prepared to move out on short notice. • Discuss with Marine HOD and finalize the ship movement program in advance. • Keep all officers and staff for emergent action on intimation of flood. • Prepare Emergency group to stand-by during flood to meet unforeseen emergencies. • All concerned employees and contractual staff informed. • Contractor staff evacuated from the port and verified.
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- All personnel remaining in the port cautioned against venturing out during effective period
 - Transportation arranged for evacuation of emergency team if required. (Employees and contractual staff)
 - Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)
 - Liquid Control (CTF and VEG Oil) Co-ordinate with Marine Control for Flood status.
 - Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.
 - Vessels at berth are to be informed to keep Main Engine Standby at short notice for emergency castoff in coordination with marine.
 - All equipment/computers in control to be covered and protected against water ingress due to heavy rain.
 - All storage tanks' shell and roof manholes to be box up.
 - Ensure flange joint connection to be tighten.
 - Ensure roads and pathways are cleaned and not obstruct for any vehicle movement during emergency.
 - Jetty supervisor to ensure that no personnel are allowed on the Jetty areas.
 - Jetty supervisor to brief all workers/Labours to remain alert and nominated shelters. Only minimal mooring member to remain in the port and no Worker/Labour to be on the berth.
 - All Hydra and jetty/technical vehicle to be parked at safe shelter.

<ul style="list-style-type: none"> • Position • Port position • Alternative • Incident Controller <p>HOD – Railway</p> <p>HOS – Railway</p>	<ul style="list-style-type: none"> • Maintain close contact with Marine control regarding the status of the flood. • Ensure that the wagons and locomotives are in a safe area. • Railway emergency team to be equipped with VHF sets, emergency torches, rain coat. • Liaison with Indian railway authority. • Co-ordination with Dry Cargo for wagon loading. • Railway team in continuous contact with other emergency services (such as QHSE & F, Security, other services)
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<ul style="list-style-type: none"> • Position • Port Position • Alternative • Incident Controller <p>HOD – CT</p> <p>HOS – CT</p>	<ul style="list-style-type: none"> • Maintain close contact with Marine control regarding the status of the flood. • All concerned employees and contractual staff informed must be evacuated from the port and verified. • All personnel remaining in the port cautioned against venturing out during effective period. • All hand held UHF/batteries, Emergency torch, Mobile Phone fully charged for use in emergency in case of total power failure. • Operation to be suspended based on information of marine control. • Only emergency team to be available at site. • Power supply to all points to be shut off after parking the equipment. • There shall be 3 level of inspection after the parking of each equipment by the leader of the anchoring
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team, HOS –ES, HOD- ES.

- Personally inspect all equipment (QC, RTG and other equipment and vehicles) and safe parking.

C During Flood

1	Ensure that all emergency teams and mobile first-aid centres are in action for meeting emergencies as planned.
2	Switch off the power supply and ensure all the DG sets are in working condition and enough fuel and operating personnel are working. The DG sets must be installed on high pedestal to prevent it getting submersed in water.
3	Evacuation of personnel who remain/trapped during flood.
4	No one venture out from the office or shelter if the speed of wind is more than 100kmph. Personnel in open may be thrown by force of wind.
5	During flood, no one should open doors or windows, force of wind will force open other doors and windows. Opened windows or doors cannot be closed and chances of roof lifting upwards are high.
6	An emergency team with adequate man power, tools and plants, portable welding sets and gas cutting sets with adequate ropes and other consumables shall be maintained during flood for rescue and salvage operation.
7	Switch of power supply to all installations from the main power supply source. All important and vital installation shall be manned.

D Post flood stage: Recovery, Insurance, Restoration & Relief

The purpose of post flood activity is to resume port operation as early as possible.

If the eye of the flood has passed the port, wait for complete passing of the rear anti clock wise rear flood before inspection. Confirm from the radar station/signal station.

Site-Main Controller – CEO/Executive Director (Corp. Affairs)

- a. Collect the details of damages if any from HODs immediately.
- b. Ask all members of the CMG to immediately inspect their area of responsibility, along with their subordinate staff and officers and report their finding within short period of time.
- c. Ask the HODs to submit preliminary estimate immediately, followed by detailed estimate.
- d. HOD - Marine to be asked to complete the survey of channel and berth as quickly as possible, to resume shipping activity.
- e. All required activities to resume Port operations are to be discussed and finalized with HODs.
- f. A department wise detailed programme is to be drawn up to resume normal Port operations.
- f. Regular follow up to complete the work as programmed is to be done.
- g. Emergency powers for procurement and award of contract are to be evoked.
- h. HODs are required to submit the details and programs immediately.
- i. Reports on condition of Tugs and other Port crafts, ship un loader, ship loaders, HMCs and other auxiliary equipments after thoroughly inspection by HOD.
- j. All other cargo handling equipments like container handling equipment if any shall be inspected by HOD and detailed report to be obtained.
- k. MCCs, Stacker Reclaimers, Wagon tippler and tunnel, Conveyor belts, conveyor galleries, Locomotives, Rail load out system etc shall also be inspected carefully by HOD and reports to be obtained.
- l. Check Condition of all civil structures, Roads, Culverts and drainages and water supply system by HOD and reports to be obtained.
- m. Ask all HODs to submit details to HOD - Finance to process insurance claims.
- n. Coordinate the CSR activities.
- o. Keep contact with District Collector and local state Govt. official and offer all possible help for rehabilitation of displaced villagers.
- p. Inform all stockholders regarding all clear & restoration of the port operation. Also inform the same to the corporate office.

Incident Controller: HOD – Marine [Marine & Spm]

- a. Marine – HOD shall immediately arrange for survey of channel and berth and inform the condition to CEO/Executive Director (Corporate affairs) who in turn informs the corporate office and stake holders.
- b. Restoration work if any may be done in association with head civil.
- c. Shall check the navigational aid system take action for rectifications if required
- d. Check all tugs and mooring crafts and they should be made fully functional as quickly as possible.

SPM

- a. Checking both mooring hawser assemblies and replace the components as required.
- b. Replacements of both 9" PP pick ropes of mooring hawsers.
- c. Inspection of each floating hoses on both floating hose strings.
- d. Underwater inspection of each individual hoses on both subsea hose string and subsea umbilical.
- e. Underwater inspection of all deep sea floats for its integrity.
- f. Checking subsea hose strings configuration at low and high tide.
- g. Verifying chain angle of all six anchor chains to be within limits, at low and high tide.
- h. SPM buoy body inspection – integrity of seal on all hatches and doors.
- i. Operational check of all navigational and safety equipment.
- j. Carryout "Free Span and Lateral displacement" survey of subsea pipeline and provide support wherever necessary i.e. if it is beyond recommended allowable span.

Incident Controller: HOD – ES (MPT & WB)

- a. Shall immediately depute the electrical engineer to have an update of power supply.
- b. In case of power outage, coordinate with Electrical supply authorities for restoration of power supply.
- c. If power is available, and MCCs are O.K, charge MCCs one by one after thorough checking.
- d. Depute the same team which has parked the equipments to release the equipment for operation after removing all blockages.
- e. If any equipment is found to be damaged report the matter to higher ups and take action for early repair or decommissioning.
- f. Do not start operating, until all parking locks & additional tie-ups are removed
- g. Equipments also can be charged one by one after charging the MCCs after obtaining written clearance from the engineer in charge.
- h. Ensure that the equipments electrical system is perfect before charging. Keep records of all measurements.
- i. Inspect the tunnel and dewater the accumulated water.
- j. Inspect all electrical and mechanical system thoroughly before Trial run.
- k. All lighting towers which were lowered to be raised up.
- l. Damaged street lights and damaged internal lighting system to be repaired and recommissioned.
- m. All belt clamping/tie-up must be removed before trial run of conveyors.
- n. Arrange for de watering of tunnel with diesel pump if power supply is not readily available.
- o. Ensure all DG sets works till normal power supply is resumed.
- p. Shall inspect the water supply system and take all action to establish normal water supply immediately.
- q. In case of any difficulty bring it to the notice of CEO/Executive Director (Corp. Affairs).
- r. Drainage system if damaged should be repaired immediately.
- s. Inspect all roof tops and if any roof is blown off, take action for replacement.
- t. Coordinate with Admin/HR for clean-up activities.
- u. HODs of West Basin will assist to Head – West Basin.

Primary Support Team: HOD – HR & Admin

- a. Take all actions necessary to rehabilitate for all personnel.
- b. Coordinate with civil department to clean up the drainage and premises.
- c. Arrange for provisions till normalcy is established.
- d. Food arrangements to people on resumption work to be coordinated.
- e. Shall take over the control of CSR activity with the approval of CEO.
- f. May provide additional hands to HOD Commercial for taking up massive procurement actions as pre-planned.

Primary Support Team: HOD – QHSE & F

- a. Assist the CEO/Executive Director (Corp. Affairs).
- b. Assess damage (human) and send for further treatment.
- c. Assess the property damage and prepare report.
- d. Assist all HODs with restoration.
- e. Arrange for environmentally safe disposal of post emergency generated effluents/waste.
- f. Updating DMP based on faced natural calamities.

Secondary Support Team: HOD – Commercial

- a. Shall inspect all stores and estimate loss or damages if any and take immediate action for reequipping the items.
- b. Coordinate with all HODs for requirements of consumables and spares.
- c. Request HR to post additional hands to take up massive procurement action.
- d. Discuss with CEO/Executive Director (Corp. Affairs) to ease norms of procurement for immediate supply of stores.

Incident Controller: HOD – Railway

- a. Shall depute teams of staff to check the condition of all railway track, Loco and signalling system.
- b. Condition shall be reported to CEO/Executive Director (Corp. Affairs) and take action to repair and resume operations.
- c. Coordinate with Indian Railway for resume the operation.
- d. Any help for repair and decommissioning may be taken from HOD - ES.
- e. He shall also inspect the Locomotives of the Port, and arrange for trial running to put them into operation.

Incident Controller: HOD – Operations [DC (MPT & WB), CT, LT]

- a. Shall inspect all stack yards and cargo sheds and estimate cargo loss and damages if any.
- b. The condition of stored hazardous/toxic cargo to be inspected along with HSE and immediate action as advised by HSE to be taken up.
- c. Deploy men and equipments to segregate and salvage all cargo.
- d. Coordinate with ES HOD, for assistance in de-watering and plot/shed repairs.
- e. Estimate the losses and damages along with BD and inform CEO/Executive Director (Corp. Affairs).
- f. Discuss with CEO/Executive Director (Corp. Affairs) and HODs for resumption of partial or full operations.
- g. Take all actions for early resumption of Port activities.
- h. Coordinate with HOD – Marine to resume shipping operations.
- i. Coordinate with HOD - Finance for insurance claims.
- j. All costly and critical materials are stacked properly to avoid loss due to Wind or water inundation.
- k. Inspect the loading and unloading arms and taken up repairs if any.
- l. Assess the damage, prepare report, and regularize equipment after trial.
- m. Assess damage of cargo and inform clients.
- n. Contaminated cargo to be disposed in consultation with the QHSE & F.

Secondary Support Team: HOD – Finance & Accounts

Insurance Claims

- a. All HODs to prepare loss and damage list and estimate the costs of rectification and submit the same to HOD - Finance, who is the nodal officer for claiming insurance, with copies to CEO/ Executive Director (Corp. Affairs). The details shall contain photographs also.
- b. Shall coordinate with insurance company to arrange the Surveyor as quickly as possible, so that rectification work can start immediately.
- c. May coordinate with all HODs to prepare additional documents if required.
- d. May collect the details of claims with supporting documents from HODs in a time frame to be fixed by him for early settlement of all claims.
- e. Timely submission of insurance claims necessary for claiming losses.

Primary Support Team: HOD – Security

- a. Restoration of road traffic & port entry system from and to the port disrupted due to the flood.
- b. Shall be well versed with all road communication of the area.
- c. Shall coordinate with local administration/State administration to clear the roads in consultation with Corporate Affairs.
- d. Port may also be required to engage men and machine to clear the road blockages.

Secondary Support Team: CSR HOD – Adani Foundation [General Responsibilities]

The company has a social responsibility to save the life and property of the people living in the peripheral areas. This work involves the following activities. These activities may be done in association with local administration.

- a. Inform the public by public announcement the danger level of the flood and its effects and consequences.
- b. Leaflets are to be circulated about the danger level.
- c. If Tidal inundation is expected the villagers may be informed of the consequences.
- d. Request them to move to safer places to escape from heavy wind and tidal actions.
- e. Moving to Flood shelter is the best option. If flood shelter is not nearby, they may be asked to move to permanent structures available nearby. Provide them all assistance for evacuation.
- f. Provide the villagers adequate dry food (Chuda, Gudo, biscuits, baby food etc.) items and potable water in adequate quantity.
- g. Water tankers with potable water may be kept stand-by.
- h. Services of medical team may be extended to the peripheral villages with necessary medicines and first aids.
- i. Advise them to remain indoors during flood.
- j. After the flood there may be shortage of food and water.
- k. Water has to be provided for their basic needs till normalcy is established.
- l. Start community kitchens to provide them with food.
- m. Help in rehabilitation of all displaced people in coordination with local Govt. Agencies and NGOs.

- Position
- Port position
- Alternative
- Secondary support team

In-charge - Telecommunication

- Take charge of all communication systems - fixed and portable.
- Ensure availability of sufficient numbers of electronic communication equipment to the port control station, base control and anywhere else as necessary.

- Position
- Port position
- Alternative
- Secondary support team

In-charge - IT

- Take charge of all necessary communication system.
 - Take all necessary back up of data.
 - Assess damage of assets and restore.
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E Checklist

- Checklist for CEO/Executive Director (Corp. Affairs).
- Following checklists prepared which shall be used at the time of declaration of flood.

Checklist – 1	CEO/Executive Director (Corp. Affairs) (Corp. Affairs)
Checklist – 2	Marine Services
Checklist – 3	Engineering Services
Checklist – 4	Dry Cargo
Checklist – 5	Liquid Terminal
Checklist – 6	Container Terminal
Checklist – 7	HR & Admin
Checklist – 8	Security
Checklist – 9	Railway Services
Checklist – 10	West Basin
Checklist – 11	QHSE & F

CEO - Emergency Preparedness				
On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency Control Room established at suitable location with communication facilities			
2	All teams have reported their readiness for dealing with emergencies.			
3	Testing of communication (PA System, Mega phones, VHF, UHF and Landline) with all on site Emergency Control Rooms.			
4	Assess the situation and declare emergency.			
5	Alarms sounded followed by verbal order by PA system.			
6	Evaluate transportation/evacuation/food arrangements.			
7	Confirm readiness of medical facilities.			
8	Liaise with government bodies, other stake holders and mutual aid, partners for providing support if necessary.			
9	Obtain status of situation from the government Emergency Control Room and disseminate information.			
10	Check level of high tide for the day and whether the drains in the port have been reported to be cleared for easy drainage of water.			
11	All vehicles topped up with fuel.			
12	Walkie Talkie sets fully charged along with spare charged batteries.			
13	Emergency numbers to be kept with all emergency vehicles			
14	List of emergency contacts & suppliers.			
15	All non-essential persons have been evacuated from the port.			
16	Roads and pathways are clear for emergency movement.			
17	All departments must maintain a diary to note down action taken.			
18	Readiness of de-watering pumps.			
During Effective Period				
1	All personnel notified against venturing out during effective period, All personnel to remain indoor, observant and be alert.			
2	Take frequent updates from departments for any damage to property or injury to personnel.			
3	Provide necessary support by on site emergency team.			
4	If required operations to be suspended.			
After Effective Period				
1	Announcement to be made declaring end of emergency or PA system and other means of communication.			
2	Advise emergency teams to carry out on-field assessment.			
3	Personnel to be advised not to enter damaged buildings/structures.			
4	Launch search and rescue operations for missing personal.			
5	Get reports on casualties and injuries to personnel. Arrange for medical assistance.			
6	Carry out assessment of damage to property and all high value assets within the port including ships.			
7	Reports to be consolidated with photographs from all departments for insurance claims.			
8	Gradual resumption of port operation.			

Marine Services - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team to be formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
5	Electric equipment at jetty/tug berth is covered and protected against water ingress.			
6	Electric equipment at jetty/tug berth covered and protected against water ingress.			
7	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Marine Building.			
8	Raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes , life buoys to be kept on stand-by for emergency use.			
9	Diving team and Marine Hydra to be on stand-by to provide assistant when required.			
10	Stop to all permits to work.			
11	Arrangement made for stand-by vehicle.			
12	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
13	List of emergency contacts & suppliers available.			
14	Kept appropriate PPE's.			
Marine Control (MMPT & WB)				
1	WB Marine Control to issue weather bulletins every 6 Hrs.			
2	All vessel at berth and at anchorage are to be informed about weather condition.			
3	All equipments/computers in MMPT control to be covered and protected against water ingress due to heavy rain.			
4	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			
Jetty Supervisor				
1	Jetty supervisor to check and ensure that all lines of vessels at berth are always kept taught. Vessel to be instructed to double up mooring lines, if required.			
2	Jetty Supervisor to brief all mooring crew to remain alert, careful and should move in pairs. No mooring crew to stand close to the berth.			

Marine Services - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
5	All operations must be stopped and personnel moved to a safe location from where they can be evacuated Transportation arranged for evacuation of staff (employees and contractual staff)			
6	Electric equipment at jetty/Tug berth covered and protected against water ingress.			
7	All loose items on jetty are secured.			
8	Adequate drinking water and dry non perishable food at Marine Building.			
9	Adequate no of raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes , life buoys to be kept on stand-by for emergency use.			
10	Diving team and Marine Hydra on stand-by to provide assistant when required.			
11	Stop all work permits.			
12	Arrangement made for stand by vehicle.			
13	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
14	List of emergency contacts & suppliers available.			
15	Raincoats- 6 nos, gumboots- 6 nos, helmets- 6 nos, gantline- 50 meter x 6 nos available.			
Marine Control (MMPT & WB)				
1	Weather bulletins issued by WB Marine Control every 6 Hrs.			
2	Vessel at berth and at anchorage are informed about weather condition.			
3	All equipments/computers in MMPT control covered and protected against water ingress due to heavy rain.			
4	Hand held UHF/batteries, emergency torch, mobile phone fully charged for use in emergency in case of total power failure.			
Jetty Supervisor				
1	Jetty supervisor checked and ensure that all lines of vessels at berth are always kept taught. Vessel to be instructed to double up mooring lines, if required.			
2	Jetty Supervisor to brief all mooring crew to remain alert, careful and should move in pairs. No Mooring Crew to stand close to the berth.			

During Effective Period				
1	All personnel to be notified against venturing out during effective period.			
2	Avoid taking shelter near old or damaged buildings or near tress.			
3	Avoid standing near sea side.			
4	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			

Engineering Services-MPT - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	ES-MPT Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	People are made aware of do's and don'ts before, during and after flood			part of training. List of do's and don'ts enclosed
5	Coordination with labour contractors for making necessary arrangements towards evacuation of labours (Approx. 400 No's) deployed at FCC, Conveyor, Jetty, Steel Yard & Liquid Terminal. Actual evacuation to be done only after port shutdown is declared from CEO office			List of average manpower in port on normal operation day is enclosed
6	All drains are cleared of blockades and sluice gates are kept open.			
7	Portacabins are secured properly and relocation of electronic equipment from various porta cabins to designated location			
8	All existing emergency equipment such de-watering pump , DG set should be properly maintained & ready to use condition as may be required by operation dept. Pump at south basin bund shall be in maintained condition			
9	Drinking water (10 bottles of 20 ltr) and dry non perishable food available for 30 people (2 days) at Tug berth building and FCC control room			
10	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
11	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
12	List and contact details of customers, contractors and port emergency contacts is kept ready with FCC control room and DC coordination desk.			

ES -MPT Coordination desk				
1	To circulate weather bulletins (issue by Martine Control) every 12 Hrs to all external contractor .			
2	To appraise ES-MPT shift Incharges every 12 hrs who in turn will appraise their reportees & colleagues			
3	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency incase of total power failure. All existing emergency equipment such de-watering pump , DG set etc should be properly maintained & ready to use condition as may be required by operation dept .			
4	All clients are intimated against potential flood threat to proceed with their insurance formalities.			
5	Keep pictorial records of the sequence of events and preparedness(For Insurance Purpose)			For insurance purpose

Engineering Services-MPT - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	ES-MPT emergency team representatives deployed at Adani House,FCC Control room and ES-MPT coordination desk as per plan			
2	ES-MPT Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
3	ES-MPT emergency team representatives of FCC control room , DG House /substation , workshop & ES -MPT coordination desk is handy with VHF sets , Emergency Torches, Rain Coat			
4	Central control room (Adani House) issues port closure notice			
5	All normal operations stopped. Only emergency operations (securing of MHC/goliath/LMC/equipment/hoppers/dumpers/trailers) to be continued			
6	Transportation arranged for evacuation of non essential staff (employees and contractual staff)			
7	Only ES-MPT Emergency team members to remain in the port.			
8	2 pilot vehicles stand-by near tug berth building and FCC control room/ES-MPT coordination desk			
9	All existing emergency equipment such de-watering pump, DG set, excavator, hydra etc should be ready for deployment as per requirement			
10	Drinking water (10 bottles of 20 litre) and dry non perishable food available for 30 people (2 days) at Tug berth building and FCC control room			
11	Emergency Kit is ready and checked			
12	Communication mediums like VHF, Mobile phones and PA systems checked and tested			

13	Emergency team in continuous contact with other emergency services (such as QHSE & F, security, other services)			
14	List and contact details of contractors and port emergency contacts to be kept ready with FCC control room, DG houses, sub station, workshop and ES-MPT coordination desk			
ES-MPT Coordination desk				
1	To circulate weather bulletins (issue by Martine Control) every 12 Hrs to all external contractor			
2	To take feedback of evacuation process and highlight progress/issues emergency team.			
3	All computers/peripherals in MPT control to be covered and protected against water ingress due to heavy rain			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employees are present			
2	All personnel to be notified against venturing out during effective period			
3	Do not taking shelter in low lying areas, old or damaged buildings, near tress and temporary structures			
4	Shelter to be taken on higher ground			
5	Avoid standing near sea side			
After Effective Period				
1	Take headcount of all the personnel (FCC, backup, steel yard, jetty & tug berth building)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury			
4	Assess damage to equipment, resources and cargo			
5	Initiate restart process			
6	Photographs to be taken for assessing damages to cargo and property for insurance			

Dry Cargo - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Dry Cargo Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			

4	People are made aware of do's and don'ts before, during and after flood.			part of training. List of do's and don'ts enclosed
5	Coordination with labour contractors for making necessary arrangements towards evacuation of labours (approx. 650 No's) , drivers (150 no's) , surveyors (120 no's) and equipment operators (75 no's) deployed at fcc, maruti, steel yard, stevedoring and backup. Actual evacuation to be done only after port shutdown is declared from ceo office			List of average manpower in port on normal operation day is enclosed
6	All drains are cleared of blockades and sluice gates are kept open.			
7	Cargo is secured inside warehouses and Open Plots. Cargo is covered near gates inside warehouses and potential leakage points.			
8	All non operating godown gates are kept closed and secured with bentonite walls.			
9	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
10	Portacabins are secured properly and relocation of electronic equipment from various porta cabins to designated location			
11	De-watering pumps are placed at all low level areas (steel yard , CG-10 main road, old admin building)			
12	Arrangement of two mobile de-watering pumps to evacuate water from inside closed warehouses.			
13	Drinking water (10 bottles of 20 ltr) and dry non perishable food available for 30 people (2 days) at tug berth building and FCC control room			
14	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
15	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
16	List and contact details of customers ,contractors and port emergency contacts is kept ready with FCC control room and DC Coordination desk..			
Dry Cargo Coordination desk				
1	To circulate Weather Bulletins (issue by Martine Control) every 12 Hrs to all external customers .			
2	To appraise Jetty /Backup and FCC shift Incharges every 12 hrs who in turn will appraise their reportees.			
3	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency incase of total power failure.			
4	All clients are intimated against potential flood threat to proceed with their insurance formalities.			
5	Keep pictorial records of the sequence of events and preparedness(For Insurance Purpose)			For insurance purpose

Dry Cargo - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Dry cargo emergency team representatives deployed at Adani House, Marine Control Room, FCC Control room and Dry Cargo coordination desk.			
2	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
3	FCC control room and DC coordination desk is handy with VHF sets , Emergency Torches, Rain Coat.			
4	Central control room (Adani House) issues Port closure notice			
5	All normal operations stopped. Only emergency operations (securing of MHC/Goliath/LMC/ equipment/Hoppers/dumpers/trailers) to be continued.			
6	Transportation arranged for evacuation of non essential staff (employees and contractual staff)			
7	All godown gates to be kept closed and secured with bentonite walls.			
8	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding.			
9	Only Emergency team members to remain in the port.			
10	2 pilot vehicles stand-by near Tug berth building and FCC control room.			
11	De-watering pumps to be placed at all low level areas (Steel Yard , CG-10 main road, Old admin building)			
12	Arrangement of two mobile de-watering pumps to evacuate water from inside closed warehouses.			
13	Drinking water (10 bottles of 20 litre) and dry non perishable food available for 30 people (2 days) at Tug berth building and FCC control room			
14	Emergency Kit is ready and checked			
15	Communication mediums like VHF, Mobile phones and PA systems checked and tested			
16	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
17	List and contact details of customers ,contractors and port emergency contacts to be kept ready with FCC control room and DC Coordination desk..			
Dry Cargo Coordination desk				
1	To circulate weather bulletins (issue by Martine Control) every 12 hrs to all external customers			
2	To take feedback of evacuation process and highlight progress/ issues emergency team			
3	All computers/peripherals in MPT control to be covered and protected against water ingress due to heavy rain			

During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
2	All personnel to be notified against venturing out during effective period			
3	Do not taking shelter in low lying areas, old or damaged buildings, near tress and temporary structures			
4	Shelter to be taken on higher ground			
5	Avoid standing near sea side			
After Effective Period				
1	Take headcount of all the personnel. (FCC, backup, steel yard, jetty & tug berth building)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury.			
4	Assess damage to equipment, resources and cargo.			
5	Initiate restart process.			
6	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
7	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

Liquid Terminal - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff informed. All personnel notified against venturing out during effective period.			
5	A team is formed to identify and removal of items from jetty which may fall into sea due to strong wind such as life buoy with stand, gangway etc.			
6	Electric equipment at jetty/Tug berth covered and protected against water ingress.			
7	Oil Spill Management Plan is activated.			
8	Drinking water (10 bottles of 20 ltr) and dry non perishable food available at Liquid Building.			

9	11 Nos of raincoats, charged emergency torches, 2 battery operated torches with spare batteries, 6 life jackets, ropes (50 meters x 6), life buoys available for emergency use.			
10	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
11	List of emergency contacts & suppliers available.			
12	Kept appropriate PPE's.			
Liquid Control (CTF and VEG Oil)				
1	Co-ordinate with Marine Control for weather bulletins every 6 hrs			
2	Inform all contractors to remove all their equipment from liquid terminal area and put proper location			
3	Vessel at berth and at anchorage informed about cyclone warning			
4	All hand held UHF/batteries, emergency torch, mobile phones are fully charged for use in emergency incase of total power failure			
5	Check & clean of dyke wall for all tanks. (Ensure valves of dyke wall are in open condition)			
6	Floating roof tank ensure the tank roof draining system valves must be in open condition			
7	All storage tanks shell and roof manholes to be box up			
8	Material (i.e. oil drums, sludge tanks etc.) & equipment that cannot be moved are to be covered			
9	Check earthing of pipelines & tanks with help of ESE & I			
10	Clean the spillage material to prevent slippery surface			
11	All storm water drainage system(sumps and clear passage of line) should be clean and cover properly			
12	Electric machinery is covered and protected against water ingress.			
Jetty Supervisor				
1	Jetty supervisor to ensure all lines of vessels at berth are always kept tight			
2	Jetty Supervisor briefed all workers/labors be alert, careful and to move in pairs. No one to stand close to the berth			
3	All hydra and jetty/technical vehicles parked at safe shelter			
4	Safe guard all loose material including Hose and drums and other loose material			

Liquid Terminal- Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			

4	All concerned employees and contractual staff informed Contractor staff evacuated from the port and verified, Contractor informed to evacuate their staff All personnel notified against venturing out during effective period			
5	All operations must be stopped and personnel moved to a safe location from where they can be evacuated Transportation arranged for evacuation of staff (employees and contractual staff)			
6	Electric equipment at jetty/tug berth covered and protected against water ingress.			
7	All loose items on jetty are secured.			
8	Adequate drinking water and dry non perishable food at Liquid Building.			
9	Adequate no of raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes , life buoys to be kept on stand-by for emergency use.			
10	Stop all work permits.			
11	Arrangement made for stand-by vehicle.			
12	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
13	List of emergency contacts & suppliers available.			
14	Raincoats-11 nos, gumboots- 11 nos, helmets- 11 nos			
15	List of emergency contacts & suppliers available.			
16	Kept appropriate PPE's.			
Liquid Control (CTF and VEG Oil)				
1	Co-ordinate with Marine Control for weather bulletins every 6 hrs.			
2	Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.			
3	All vessel at berth informed about weather warning in coordination with Marine.			
4	Vessels at berth are to be informed to keep Main Engine on stand-by for emergency castoff at short notice			
5	All equipment/computers in control to be covered and protected against water ingress due to heavy rain			
6	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure			
7	All storage tanks shell and roof manholes to be box up			
8	Ensure flange joint connections are tightened			
9	Check foundation of all tank & pumps			
10	Remove all employees from operational activities			
11	Ensure Oil Spill Management Plan is activated in case of flood			
12	Adequate drinking water and dry non perishable food at jetty area			
13	All electrical and diesel driven pumps should be ready in all respects for immediate use			
14	Ensure roads and pathways are cleaned and not obstruct for any vehicle movement during emergency			
15	Safe guard surface heat tracing system of pipeline			
Jetty Supervisor				
1	Jetty supervisor to ensure all lines of vessels at berth are always kept tight			
2	Jetty supervisor briefed all workers/labors be alert, careful and to move in pairs. No one to stand close to the berth			
3	All hydra and jetty/technical vehicles parked at safe shelter			
4	Safe guard all loose material including hose and drums and other loose material			

During Effective Period				
1	All personnel to be notified against venturing out during effective period			
2	Avoid taking shelter near old or damaged buildings or near tress			
3	Avoid standing near sea side			
4	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			

Container Terminal - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff to be informed Contractor staff to be evacuated from the port and verified All personnel to be notified against venturing out during effective period			
5	Electric equipment is covered and protected against water ingress			
6	adequate Drinking water and dry non perishable food available at CT operation buildings			
7	Raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes, life buoys to be kept ready for emergency use.			
8	Stop all work.			
9	Arrange for stand-by vehicle.			
10	Emergency team to be in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
11	List of emergency contacts & suppliers available.			
12	Kept appropriate PPE's.			
CT2 and CT3 Control Room				
1	CT2 and CT3 Control communicate Weather Bulletins every 6 Hrs.			
2	All hand held UHF/batteries, emergency torch, mobile phone to be fully charged for use in emergency incase of total power failure.			
Wharf Supervisor				
1	Wharf supervisor to check and ensure that all lines of vessels at berth are always kept taught. Vessel to be instructed to double up mooring lines, if required.			
2	Jetty supervisor to brief all mooring crew to remain alert, careful and should move in pairs. No mooring crew to stand close to the berth.			

Container Terminals - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	All concerned employees and contractual staff to be informed Contractor staff to be evacuated from the port and verified All personnel to be notified against venturing out during effective period			
5	All operations must be stopped and personnel moved to a safe location from where they can be evacuated Transportation arranged for evacuation of staff (employees and contractual staff)			
6	Electric equipment covered and protected against water ingress.			
7	All loose items in terminals are secured.			
8	Adequate drinking water and dry non perishable food at CT Operation Buildings.			
9	Adequate no of raincoats, charged emergency torches, battery operated torches with spare batteries, life jackets, ropes, life buoys to be kept on stand-by for emergency use.			
10	Stop all work permits.			
11	Arrangement made for stand-by vehicle.			
12	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
13	List of emergency contacts & suppliers available.			
14	Raincoats- 6 Nos, Gumboots- 6 Nos, Helmets- 6 Nos, Gantline- 50 meter x 6 Nos available.			
CT2 and CT3 Tower Control				
1	Weather Bulletins Communicated by CT Control every 3 Hrs.			
2	All equipments/computers in CT control covered and protected against water ingress due to heavy rain.			
3	Hand held UHF/batteries, emergency torch, mobile phone fully charged for use in emergency in case of total power failure.			
Wharf Supervisor				
1	Wharf supervisor checked and ensure that all lines of vessels at berth are always kept taught. Vessel to be instructed to double up mooring lines, if required.			
2	Wharf Supervisor to brief all to remain alert, careful and should move in pairs. No Mooring Crew to stand close to the berth.			

During Effective Period				
1	All personnel to be notified against venturing out during effective period.			
2	Avoid taking shelter near old or damaged buildings or near tress.			
3	Avoid standing near sea side.			
4	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			

Administration - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of Head Administration to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources;			
4	All concerned employees and contractual staff informed Contractor staff to be evacuated from the port and verified All personnel to be notified against venturing out during effective period			
5	Drinking water (50 bottles of 20 ltr) and dry non perishable food available at all Canteens			
6	10 Nos of raincoats, 06 nos. charged emergency torches, 06 battery operated torches with spare batteries in each control room, ropes (50 meters) in each buses available for emergency use			
7	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			

Administration - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Emergency team formed for dealing with the emergency			
2	Whether emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			

4	Drinking water (50 bottles of 20 ltr) and dry non perishable food available at all Canteens			
5	All concerned employees and contractual staff informed. Contractor staff evacuated from the port and verified, Contractor informed to evacuate their staff. All personnel notified against venturing out during effective period.			
6	All operations must be stopped and personnel moved to a safe location from where they can be evacuated Transportation arranged for evacuation of staff (employees and contractual staff)			

Security Services - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Check List				
Sr. No.	Activity	Yes	No	Remarks
General Points				
1	Obtain status of flood at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Establishment of Emergency Control Room at suitable location with communication facilities			
3	A team is to be formed for emergency.			
4	All vehicles to be topped up with fuel – prior to effective period and top up on daily basis.			
5	Walkie talkie sets to be fully charged along with stand-by batteries			
6	Keep mobiles (personal/official) fully charged			
7	Ensure emergency lights are functioning			
8	Ensure mega phones are functioning (change old batteries)			
9	Ensure public announcement (PA system) on ERT vehicle is functioning			
10	Ensure Digital Cameras and Handy Cam fully charged.(ERT, PSC, MSB, MWB)			
11	Ensure security guards in possession of all PPEs and whistle			
12	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), At respective gate & 01 at ISCR,			
13	Traffic Cone to be removed and kept in closed room, it may float and hit with some object			
14	Frontier from roads to be removed and kept in Covered Godown in stacking mode.			
15	Search lights to be kept ready dully functional.			
16	Hammer and cutting tools (available with Fire Dept).			
17	Bottled drinking water to kept in all emergency vehicles			
18	First Aid Box to be kept with all emergency vehicles dully updated from medical wing.			
19	Emergency numbers to be kept with all emergency vehicles			
20	Security Reinforcement to be kept ready at Guards colony with due provision of transport (whichever transport mode is available).			
21	Alternate route for Hospital and other locations to be checked and available with all emergency teams.			

22	Detailed briefing of security guards to be carried out			
23	Communication to be done as per requirement (to save battery of mobile & VHF)			
24	Removal of security guard from remote and isolated location as per instruction of ISCR.			
25	Ensure rain coat available with all Security personnel on duty			
26	List of emergency contacts & suppliers.			
27	Material & equipment that cannot be moved are to be covered.			
28	Hoist appropriate storm warning Signal.			
29	Remove all loose materials and equipment from jetty & other area.			
30	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).			
31	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
32	Ensure roads and pathways are cleaned			
33	Air filled tubes, bamboos & air filled boats to be kept ready for evacuation.			To be kept centrally

Security Services - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
General Points				
1	Obtain status of flood at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Establishment of Emergency Control Room at suitable location with communication facilities			
3	A team is to be formed for emergency.			
4	All vehicles to be topped up with fuel – prior to effective period and top up on daily basis.			
5	Walkie talkie sets to be fully charged along with stand-by batteries			
6	Keep mobiles (personal/official) fully charged			
7	Ensure emergency lights are functioning			
8	Ensure mega phones are functioning (change old batteries)			
9	Ensure public announcement (PA system) on ERT vehicle is functioning			
10	Ensure Digital Cameras and Handy Cam fully charged.(ERT, PSC, MSB, MWB)			
11	Ensure security guards in possession of all PPEs and whistle			
12	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), At respective gate & 01 at ISCR,			
13	Traffic Cone to be removed and kept in closed room, it may float and hit with some object			
14	Frontier from roads to be removed and kept in Covered Godown in stacking mode.			
15	Search lights to be kept ready dully functional.			
16	Hammer and cutting tools (available with Fire Dept).			
17	Bottled drinking water to kept in all emergency vehicles			

18	First Aid Box to be kept with all emergency vehicles dully updated from medical wing.			
19	Emergency numbers to be kept with all emergency vehicles			
20	Security Reinforcement to be kept ready at Guards colony with due provision of transport (whichever transport mode is available).			
21	Alternate route for Hospital and other locations to be checked and available with all emergency teams.			
22	Detailed briefing of security guards to be carried out			
23	Communication to be done as per requirement (to save battery of mobile & VHF)			
24	Removal of security guard from remote and isolated location as per instruction of ISCR.			
25	Ensure rain coat available with all Security personnel on duty			
26	List of emergency contacts & suppliers.			
27	Material & equipment that cannot be moved are to be covered.			
28	Hoist appropriate storm warning Signal.			
29	Remove all loose materials and equipment from jetty & other area.			
30	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings).			
31	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
32	Ensure roads and pathways are cleaned			
33	Air filled tubes, bamboos & air filled boats to be kept ready for evacuation			To be kept centrally
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
2	All personnel to be notified against venturing out during effective period			
3	All personnel to remain indoor, observant and be alert			
4	Avoid taking shelter near old or damaged buildings or near tress			
5	All doors and windows to be shut			
6	Avoid the top floor of buildings. Stay close to ground floor			
7	Close the visitors' gate			
8	Occupy pre-determined post for controlling security of installation			
9	Call up additional help from Barracks			
10	Ensure that unauthorized persons/vehicles do not enter the gate			
11	Provide security men for firefighting & rescue			
12	Arrange for transport of higher authorities to the terminal			
13	Transport vehicles would be provided near emergency control center			
14	Depute security guards for controlling traffic at scene of disaster			
15	Produce a list of port staff on duty in co-ordination with time office			
16	Ensure availability of security men at gates so that they can lead authorities to disaster site			
17	Ensure that non-essential persons do not crowd affected area			
18	Instruct all drivers to take shelter at canteens (concrete buildings)			
19	Ensure vehicles are parked at designated parking areas, with wheels blocked			
20	Close the gate and stop allowing visitors and transport trucks either inward or outward.			
21	If caught in open areas during flood find a safe shelter immediately			

After Effective Period				
1	Assess damage to equipment, building and unsafe condition.			
2	Do not enter in damaged buildings			
3	Use Mobile Phones only for emergency calls			
4	Start search operation for Living Things			
5	Do not use any damaged electronic goods			
6	Drink boiled water			
7	Confirm with concerned about situation of flood before you move out.			
8	Start restorative measures & repairs.			

Railway Services - Emergency Preparedness				
Level - 1 :- Two Days before heavy rain expected as per weather forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
1	Railway Emergency team formed for dealing with the emergency			
2	Emergency team is in contact with Central Control Room for necessary preparedness.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
4	People are made aware of do's and don'ts before, during and after flood.			part of training. List of do's and don'ts enclosed
5	Coordination with labour contractors for making necessary arrangements towards evacuation of labours (Approx. 250 No's) , Employees and Indian Railway Personnel . Actual evacuation to be done only after port shutdown is declared from CEO office			List of average manpower in port on normal operation day is enclosed
6	All drains are cleared of blockades and sluice gates are kept open			
7	Portacabins are secured properly and relocation of electronic equipment from various porta cabins to designated location			
8	De-watering pumps are placed at all low level areas (Railway yard of west Basin and MDCC MPT)			
9	Arrangement of two mobile de-watering pumps to evacuate water from inside closed warehouses.			
10	Drinking water (10 bottles of 20 ltr) and dry non perishable food available for 30 people (2 days) at Railway control Room at MDCC MPT and all Railway Stations are Likely to be affected			
11	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
12	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
13	List and contact details of customers ,contractors and port emergency contacts is kept ready with Railway control Room			

Railway Services - Emergency team Coordinator				
1	To circulate weather bulletins (issue by Martine Control) every 12 hrs to all external customers			
2	To appraise Railway yard and Loco Shed every 12 hrs who in turn will appraise their reportees			
3	All hand held VHF/batteries, Emergency torch, Mobile Phones are fully charged for use in emergency incase of total power failure			
4	All clients are intimated against potential flood threat to proceed with their insurance formalities			
5	Keep pictorial records of the sequence of events and preparedness(For Insurance Purpose)			For insurance purpose

Railway Services - Emergency Preparedness				
Level - 2 :- On the day when rainfall starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	Railway emergency team representatives deployed at Adani House, Marine Control Room, FCC Control room			
2	Emergency team, at the direction of CEO, to carry out the following tasks: develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
3	Railway control Room at MDCC MPT is handy with VHF sets, emergency torches, rain coat			
4	Central control room (Adani House) must issue Port closure notice			
5	All normal operations stopped. Only emergency operations to evacuate Locomotive and wagons at safe places in Railway Yard.			
6	Transportation arranged for evacuation of non essential staff (employees and contractual staff)			
7	Only Emergency team members to remain in the port.			
8	2 Vehicles stand-by near railway building and FCC control room.			
9	De-watering pumps are placed at all low level areas (Railway yard of west Basin and MDCC MPT)			
10	Arrangement of two mobile de-watering pumps to evacuate water from inside rail track areas.			
11	Drinking water (10 bottles of 20 litre) and dry non perishable food available for 30 people (2 days) at Railway control room of MDCC MPT and West Basin.			
12	Emergency kit is ready and checked			
13	Communication mediums like VHF, mobile phones and PA systems checked and tested			
14	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services).			
15	List and contact details of customers, contractors and port emergency contacts to be kept ready with FCC control room and DC coordination desk.			

Railway Services - Emergency team Coordinator				
1	To circulate weather bulletins (issue by Martine Control) every 12 hrs to all external customers.			
2	To take feedback of evacuation process and highlight progress/ issues emergency team.			
3	All computers/peripherals in MPT and West Basin control Room to be covered and protected against water ingress due to heavy rain.			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			
2	All personnel to be notified against venturing out during effective period.			
3	Do not taking shelter in low lying areas, old or damaged buildings, near tress and temporary structures.			
4	Shelter to be taken on higher ground			
5	Avoid standing near sea side.			
After Effective Period				
1	Take headcount of all the personnel (Railway Control Room of MDCC MPT and West Basin)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury			
4	Assess damage to equipment, resources and cargo			
5	Initiate restart process			
6	Photographs to be taken for assessing damages to cargo and property for insurance			For insurance purpose
7	Communication to be sent to all clients regarding assessed and potential damage to cargo			

WEST BASIN - EMERGENCY PREPAREDNESS				
Level 1: Two Days Before Heavy Rain Expected As Per Weather Forecast				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
General				
1	HODs have a meeting above the impending emergency steps			
2	Emergency team is in contact with Central Control Room. Also the team should assist to all concen department as per instructions from concern HODs and Head- West Basin.			
3	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations all visitors will be stopped.			

4	People are made aware of do's and don'ts before, during and after flood			part of training. List of do's and don'ts enclosed
5	Coordination with labour contractors for making necessary arrangements towards evacuation of labours, drivers, surveyors and equipment operators deployed at vessel, yard, back-up area, silo. Actual evacuation to be done only after port shutdown which will be declared from CEO office			
6	All drains are cleared and outlets are opened			part of training. List of do's and don'ts enclosed
7	Cargo is secured inside warehouses and open Plots. Cargo is covered near gates inside warehouses and potential leakage points			
8	All non operating godown gates are kept closed and secured with bentonite walls			
9	Steel cargo is properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding			
10	Portacabins are secured properly and relocation of electronic equipment from various porta cabins to designated location			
11	De-watering pumps are placed at certain areas (Workshops, Fire pump-house etc)			
12	Minimum number of operators and drivers to be remain in a shift; A) Crane Operators - 3 Nos B) Loader Operators - 4 Nos C) Excavator Operators - 4 Nos D) Forklift Operators - 1 Nos E) Hydra Operator - 2 Nos F) Trailer Driver - 1 Nos G) Utility Drivers - 4 Nos H) Bus Drivers - 3 Nos I) JLG Operator - 1 Nos			
13	Drinking water (20 bottles of 20 litre) and dry non perishable food available for minimum 60 people (2 days). However the quantity shall be changed with respect to the staff to be deputed at West Basin during emergency after finalization with respective HODs and Head - West Basin.			
14	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc.			
15	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
16	List and contact details of customers, contractors and port emergency contacts is kept ready with with Central Control Room, Key staff of Operation and ES Department.			
Central Control Room/Marine Control Room				
1	To circulate weather bulletins (issue by Martine Control) every 12 hrs to all external customers .			
2	To appraise shift incharges operation, engineering and emergency services of (jetty/backup) every 12 hrs who in turn will appraise their reportees.			
3	All hand held UHF/batteries, emergency torch, mobile phones are fully charged for use in emergency incase of total power failure.			
4	All clients are intimated against potential flood threat to proceed with their insurance formalities.			
5	Keep pictorial records of the sequence of events and preparedness (For Insurance Purpose)			For insurance purpose

Pre-Assessment Checklist [Preparedness in Early Stage]				
1	Ensure that all the important document are preserved at a proper place.			
2	Enusure that emergency team has been prepared along with roles & responsibility.			
3	Ensure each representative of each department has a substitute (Dry Cargo, E&I, MHS SR, MHS Conv, MHS GSU, MHS WLS TLS, MHS Utility, ES CWS, ES Civil, Fire, Safety, Security, Marine, Railway, Admin, Store, IT etc).			
4	Ensure that the list of Emergency Contact Numbers are displayed.			
5	Ensure that all employees, contractors/vendors/visitors/other customer are aware of emergencies procedures.			For insurance purpose
6	Ensure that Emergency Items contains following items; torches, ropes, wires, tarpaulins, plastic sheets, tool kit, duct tapes, assorted gears, first aid box, sand bags			
7	Ensure proper communication with the POC for further information/ updates/news of respective emergency from disaster authority/ Govt agencies			
8	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			

WEST BASIN - EMERGENCY PREPAREDNESS				
Level 2: On the Day When Rainfall Starts				
Heavy Rain - Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	All Emergency Team members and Individual Shift Incharge to be on-site for actions as per instructions from Head - West Basin/CCR.			
2	Emergency team, at the direction of CEO, to carry out the following tasks: Develop an overview of the situation; identify tasks to be undertaken; identify resources available for tasking; determine gaps in information and resources; access expert advice as required; develop and implement tactical plans for response and recovery operations			
3	All the emergency team members and shift incharge must have VHF sets, emergency torches, rain coat, life-jackets and other required protective gears.			
4	Central control room (Adani House) issues Port closure notice			
5	All normal operations stopped. Only emergency operations (securing of MHC/goliath/LMC/ equipment/hoppers/dumpers/trailers) to be continued			
6	Transportation arranged for evacuation of non-essential staff (employees and contractual staff)			
7	All electrically powered equipment/machines are to be isolated			
8	Loose material/items to be properly stored and lashed. In case of rain or heavy storm sand to be reinforced with sand bags for securing of cargo from sliding			

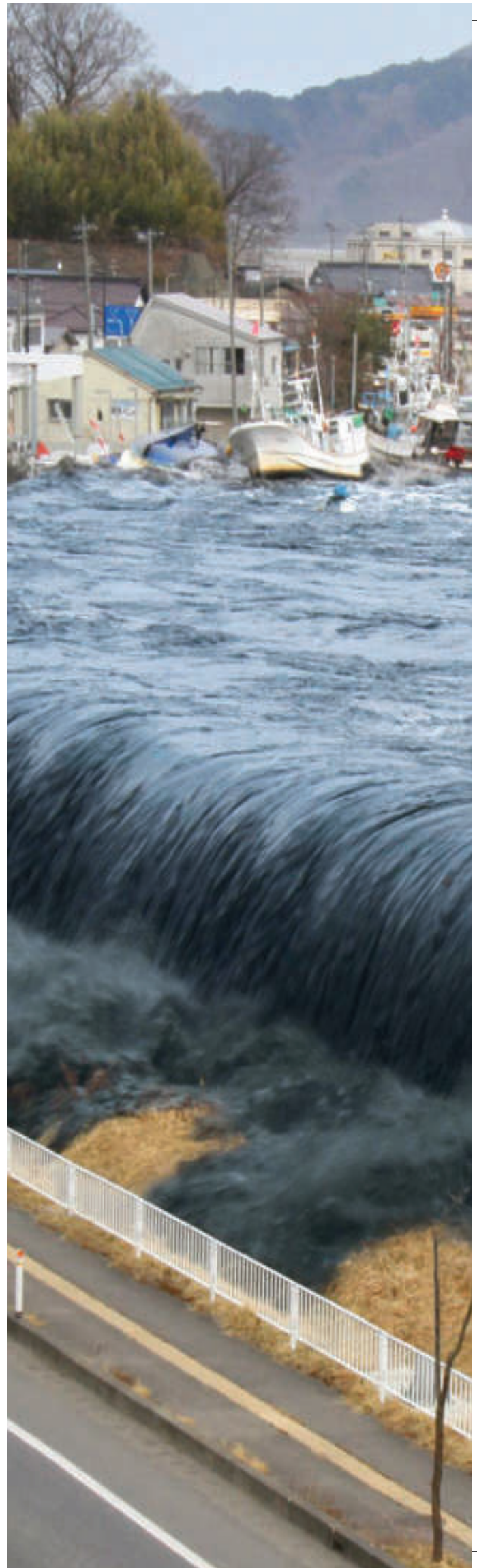
9	Only emergency team members to remain in the port			
10	Nomination of Emergency response vehicles [5 No's (ERT-1, 2 Adani Utilities-2, FLS Utility-2)]			
11	De-watering pumps to be placed at all low level areas (steel yard, CG-10 main road, old admin building)			
12	Arrangement of two mobile de-watering pumps to evacuate water from inside closed warehouses			
13	Drinking water (20 bottles of 20 litre) and dry non perishable food available for minimum 60 people (2 days). However the quantity shall be changed with respect to the staff to be deputed at West Basin during emergency after finalization with respective HODs and Head- West Basin			
14	Emergency kit is ready and checked			
15	Communication mediums like VHF, mobile phones and PA systems checked and tested			
16	Emergency team in continuous contact with other emergency services (such as QHSE & F, Security, other services)			
17	List and contact details of customers ,contractors and port emergency contacts is kept ready with Central Control Room, Key staff of operation and ES department			
18	All visitors will be stopped			
Central Control Room & Marine Control Room				
1	To circulate weather bulletins (issue by Martine Control) every 12 hrs to all external customers			
2	To take feedback of evacuation process and highlight progress/ issues emergency team			
3	All computers/peripherals in MPT control to be covered and protected against water ingress due to heavy rain.			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			
2	All personnel to be notified against venturing out during effective period.			
3	Do not taking shelter in low lying areas, old or damaged buildings, near tress and temporary structures.			
4	Shelter to be taken on higher ground			
5	Avoid standing near sea side.			
After Effective Period				
1	Take headcount of all the personnel. (Respective Incharge/ Contract Supervisor)			
2	Examine walls, floors, doors, staircases and windows to make sure that the building is not in danger of collapsing			
3	Attend to injured persons and give them first aid, if possible. Also inform the hospital if anyone is injured, stating the type and extent of injury			
4	Assess damage to equipment, resources and cargo			
5	Initiate restart process			
6	Photographs to be taken for assessing damages to cargo and property for insurance			For insurance purpose
7	Communication to be sent to all clients regarding assessed and potential damage to cargo			

Pre-Assessment Checklist [Preparedness in Early Stage]				
1	Ensure that emergency team has been prepared along with roles & responsibility			
2	Ensure each representative of each department has a substitute (Dry Cargo, E&I, MHS SR, MHS Conv, MHS GSU, MHS WLS TLS, MHS Utility, ES CWS, ES Civil, Fire, Safety, Security, Marine, Railway, Admin, Store, IT etc)			
3	Ensure that all employees, contractors/vendors/visitors/other customer are aware of emergencies and preparedness			
4	Ensure that emergency items contains following items; torches, ropes, wires, tarpaulins, plastic sheets, tool kit, duct tapes, assorted gears, first aid box, sand bags			
5	Ensure proper communication with the POC for further information/ updates/news of respective emergency from disaster authority/ Govt agencies			
6	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			For insurance purpose

QHSE&F - Emergency Preparedness				
Emergency Response.				
Flood - Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program				
1	Arrange induction /training program for all personnel on emergency preparedness & its awareness			Part of Induction/training program.
2	All concerned employees and contractual staff informed about the assembly point & evacuation locations			
3	To arrange emergency drill for dealing with such emergency.			To be made part of emergency drill.
4	To arrange necessary training for emergency response team/ CMG/First Aid Team/Medical Team/Fire rescue team to deal with emergency. (Ensure availability of trained rescue team & necessary equipments all the time)			
5	Arrange training for all QHSE&F team member for emergency response & clear cut understanding of their crucial roles & responsibility during emergency			
6	To prepare & check effectiveness of Emergency Response Plan/ Disaster Management Plan			
7	To do proper co-ordination with all concern department for maintaining necessary emergency response kit & necessary aids in required inventory or make identified supply of the same during declaration of such emergency			
8	To maintain close co-ordination with mutual aid for dealing with emergency.			
During Effective Period				
1	Assist CEO/Executive Director (Corp. Affairs). as instructed.			
2	Co-ordination with respective HOD/HOS with respect to emergency actions.			
3	Ensure necessary action through CMG. Provide necessary assistance to CMG			

4	Assist in evacuation of all personnel except key personnel.			
5	Provide HSE & F facilities (Assist for Rescue, Evacuation, and other Necessary Arrangement).			
6	Set up casualty collection centre and arrange first aid posts.			
7	Arrange enough stock medicines, antidotes, oxygen, stretchers,			
8	Keeping in mind that Road and Rail connectivity may be cut off for required period of time.			
9	Arranges additional medicine and equipment as required.			
10	Arrange a fully equipped Ambulance in ready state.			
11	Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment.			
12	To do immediate co-ordination to mutual aids for necessary help/ support if required.			
After Effective Period				
1	Assist to CEO/Executive Director (Corp. Affairs).			
2	Assess damage (human) and send for further treatment.			
3	Assess the property damage and prepare report.			
4	Assist all HODs with restoration.			
5	Perform necessary rescue through rescue team where needed.			
6	Check each & every effected area & arrange for necessary HSE& F actions as require.			
7	After completion of all rescue, restoration work. Check the effectiveness of executed emergency plan & take necessary require corrective action to update the plan & necessaary facilities if required.			
8	To motivate the emergency rescue team, CMG & all concerns, who have perform well during emergency.			

Disaster Management Plan for Tsunami

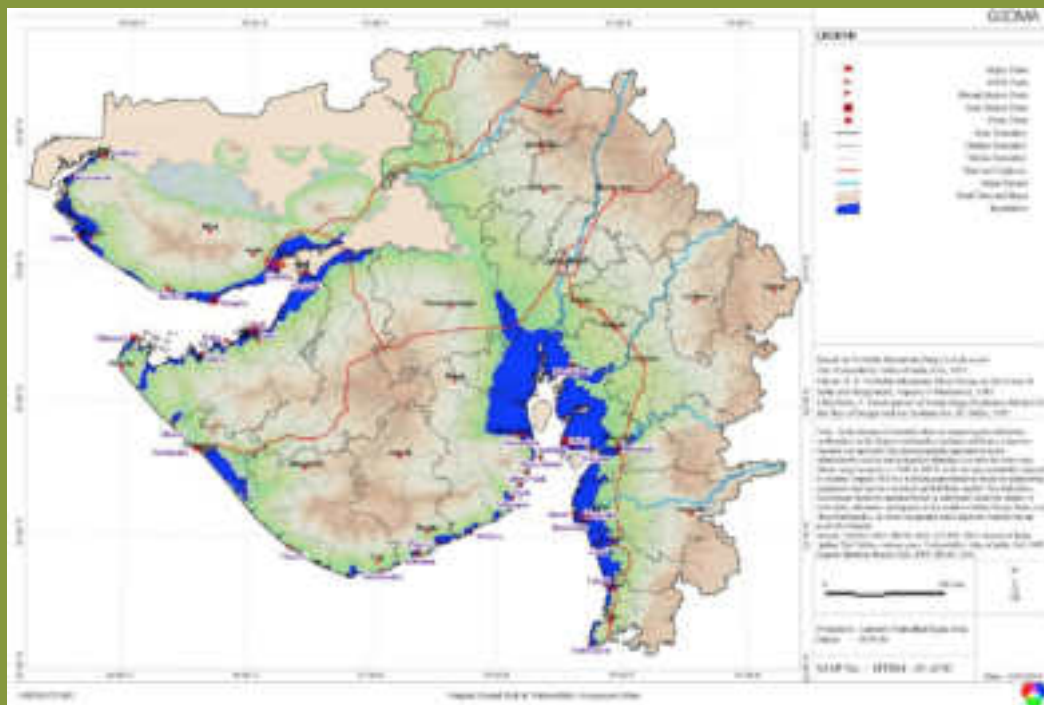




Tsunami

Important Information

Tsunami is Japanese word for “harbor wave which is a huge ocean wave that can travel at speeds up to 600 mi/hr (965 km/hr) can have heights of up to 30 m (98 ft), wavelengths of up to 200 km (124 mi) and long periods, usually between 10 and 60 minutes. Sometimes incorrectly called a tidal wave, a tsunami is usually caused by an underwater earthquake or volcanic eruption and often causes extreme destruction when it strikes land. It is a series of waves which travel outward on the ocean surface in all directions in a kind of ripple effect. Since the waves can start out hundreds of miles long and only a few feet high, they would not necessarily be noticeable to a passing ship or a plane flying overhead. The tsunami warning is issued on earthquake having intensity of more than 6.5 on richter scale.



Note: tsunamis are extremely rare events in Gujarat. However, Gujarat state in general is prone to tsunami risk due to its longest coastline and probability of occurrence of submarine earthquakes near the offshore in arabian sea. In past, kandla coast was hit by a tsunami of 12m height in 1945, due to an earthquake in makran fault line.

Tsunami can cause huge loss of life and damage to port assets due to minimum response time available for saving lives, property and environment. Both road and railway connectivity may be cut off for some time. There may be unpredicted rush-off of sea water, heavy current which may damage buildings, structures, towers, transmission lines, heavy cranes, silos, godowns, tanks, chimney etc. at unpredicted location. Adequate stock of essential medicine shall be maintained.

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1. <http://www.incois.gov.in/>
 2. <http://www.nio.org/>
 3. <http://www.imd.gov.in/>
 4. <http://www.imdahm.gov.in/>

Action Plan

- A. Actions – Before tsunami (Maximum Before 30 Mins)
- B. Actions – During tsunami
- C. Actions – Post tsunami stage: recovery, insurance, restoration & relief
Looking to the scenario of tsunami (short-time span), actions – before tsunami (maximum 30 mins)/during tsunami has been merged.

Marine Control (Signal Station)

- Prime duty of signal station is to collect the weather condition and inform Control.
- Marine Head of the Port is the controlling authority of Signal Station, who is assisted by 2 DGM Marine Operations.
- Marine Control station is the Permanent Nodal Agency to gather information about Tsunami, and marine control shall inform the CEO and all HODs.
- The port radar system is installed on top of the Marine Operation Building (MPT & WB) station, Vessel Traffic Management System (VTMS) is with the marine control.
- The information is to be collected from Indian Meteorological department, Institute of Seismological Research (ISR) and Indian National Centre for Ocean Information Services (INCOIS).
- All information related to tsunami shall be instantly sent to CEO and all HODs by mail, SMS, followed by Telephone to ensure the authority has received the message. In case any recipient is out of headquarters, the information shall be passed on to the HOS.
- The Marine Control station shall maintain the contact details of CEO, all HODs and, HOSs, in addition to all installation (HR department shall supply contact details of all concerned list is to be kept updated every 3 months).

Tsunami Management Centre

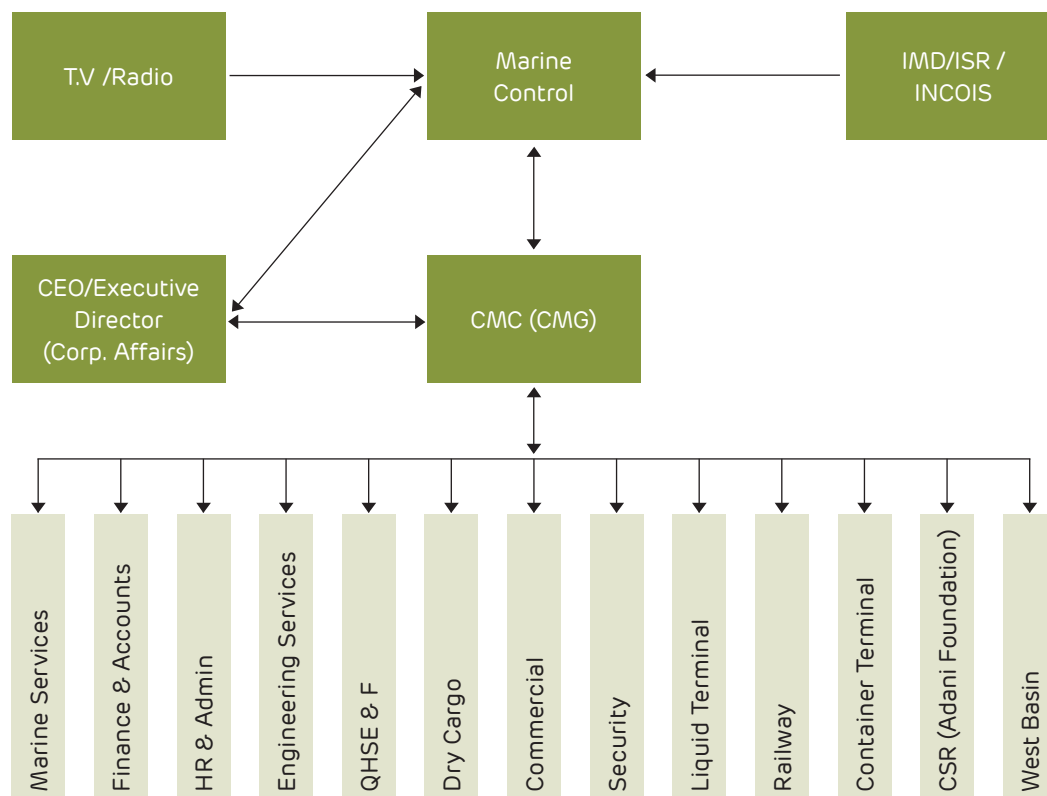
- On receipt of information of approaching tsunami a Crisis Management Centre (CMC) at Shantivan Colony.
- CMC formation shall be ordered by the CEO or the Executive Director (Corp. Affairs).
- CEO or the Executive Director (Corp. Affairs) shall be overall in charge of the CMC and shall take all necessary steps for proper functioning of the control room.
- All information shall be passed over to CMC by the Marine Control, when CMC starts functioning.
- All coordination and control shall be done by the CEO from the CMC.

Crisis Management Group

- Crisis Management Group (CMG) will be a permanent body to deal with all crisis and it is formed by CEO.
- On confirmation of possible tsunami attack on the port, the Crisis Management Group (CMG) shall meet at the CMC or other convenient place as determined by the CEO.
- CEO Shall appoint departmental HOD/HOS as Coordinator and Convener of the CMG.
- All meetings of the Crisis Management Group (CMG) shall be conducted in the CMC.
- All HODs/HOS shall be members of CMG, in absence of CEO, Executive Director (Corp. Affairs) shall be the Chairman of CMG and Coordinator shall be the convener.
- CEO may declare emergency so that all staff and officers shall be at their duty stations and congregate at their designated stations for taking review of the situation and for implementing orders received from their respective HODs, who are CMG members.
- CMC shall be manned round the clock and shall be headed by CEO or someone nominated by CEO. He shall be at least of the rank of HOD.

Crisis Management Group – Responsibilities

All HOD's and HOS's shall be members of crisis group for tsunami management and post restoration activities in addition to members nominated by CEO as per the situation. The crisis management group shall be active till the full restoration of port activities.



Commands Structure/Designated Persons

- The following table shows the command structure for each department.
- In case the officer in the first column is not available, the second in command automatically takes over.
- Designation of the first column is the HOD and second column is the successor.
- In case of absence of both, the senior most officers of the dept. to assume charge.

Sr.No.	Head	Successor
1	CEO	Executive Director (Corporate Affairs)
2	HOD (Marine)	HOS (Marine)
3	HOD Finance	HOS Finance
4	HOD (HR & Admin)	HOS (HR & Admin)
5	HOD (ES)	HOS (ES)
6	HOD (QHSE & F)	HOS (QHSE & F)
7	HOD (Dry Cargo)	HOS (Dry Cargo)
8	HOD (Commercial)	HOS (Commercial)
9	HOD (Security)	HOS (Security)
10	HOD (Liquid)	HOS (Liquid)
11	HOD (Railway)	HOS (Railway)
12	HOD (Container Terminal)	HOS (Container Terminal)
13	HOD (West Basin)	HOS (West Basin)
14	HOD (CSR – ADANI FOUNDATION)	HOS (CSR – ADANI FOUNDATION)

* Roles of HODs [West basin (ES & DC)] and HODs [MPT (ES & DC)] are same. HODs [West Basin] will assist to Head – West Basin.

A & B Actions – Before tsunami (Maximum before 30 Mins) and Actions – During tsunami:

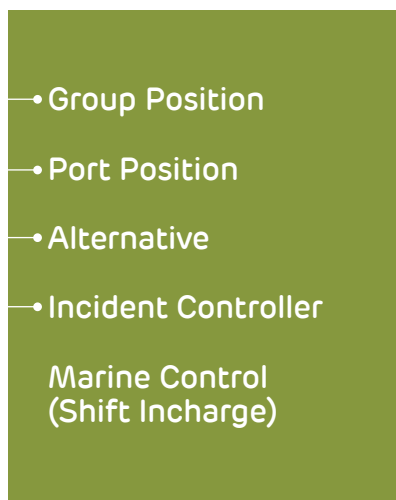
Marine Control will receive the information from IMD/ISR/INCOIS. Thereafter they will inform to the CEO/Executive Director (Corp. Affairs).

- Group Position
- Port Position
- Alternative
- Site Main Controller

CEO

Exec. Director
(Corp. Affairs)

- Stop all operations.
- Inform to all HODs of evacuation of personnel from the port.
- Continuous updates on tsunami.
- Inform to HR & Admin for providing facilities of transportation.
- To establish Emergency Control Centre.
- Contact Government authority for further more information about tsunami.
- Power supply is to be cut-off in consultation with MUPL and ES.



- Assist CEO as instructed.
- Marine Control will inform to all the Vessel Chiefs for evacuation as per direction of CEO

General Responsibilities

- Each individual coming out to speak with loud "PLEASE EVACUATE" and reach a safe place.
 - Immediate evacuation with readily available vehicles.
 - Upon getting information, Admin shall send the vehicles immediately for evacuation from port.
 - Security is to maintain the traffic control for fast turn-around of vehicles.
 - Security shall allow only to the vehicles (for evacuation) and rescue team.
-

C Actions – Post tsunami Stage (Recovery, Insurance, Restoration & Relief):

The purpose of post tsunami activity is to resume port operation as early as possible.

Site-main Controller – CEO/Executive Director (Corp. Affairs) Corp. Affairs)

- a. Collect the details of damages if any from HODs immediately.
- b. Ask all members of the CMG to immediately inspect their area of responsibility, along with their subordinate staff and officers and report their finding.
- c. Ask the HODs to submit preliminary estimate immediately, followed by detailed estimate.
- d. HOD - Marine to be asked to complete the survey of channel and berth as quickly as possible, to resume shipping activity.
- e. All required activities to resume port operations are to be discussed and finalized with HODs.
- f. A department wise detailed programme is to be drawn up to resume normal Port operations.
- g. After ensuring the situation, inform to MUPL to start the power in consultation with ES.
- h. Regular follow up to complete the work as programmed is to be done.
- i. Emergency powers for procurement and award of contract are to be evoked.
- j. HODs are required to submit the details and programs immediately.
- k. Reports on condition of tugs and other port crafts, ship unloader, ship loaders, HMCs and other auxiliary equipment after thoroughly inspection by HOD.
- l. All other cargo handling equipment like container handling equipment if any shall be inspected by HOD and detailed report to be obtained.
- m. MCCs, stacker reclaimers, wagon tippler and wagon tippler tunnel,
- n. Ask all HODs to submit details to HOD - Finance to process insurance claims.
- o. Coordinate the CSR activities.
- p. Keep contact with District Collector and local state Govt. official and offer all possible help for rehabilitation of displaced villagers.
- q. Inform all stockholders regarding all clear & restoration of the port operation. Also inform the same to the corporate office.
- r. Confirms the termination of the emergency after the threat is over.
- s. Lead the Crisis Management Group for early restoration of facilities and resume port activities.

Incident Controller: HOD – Marine [Marine & Spm]

- a. Marine – HOD shall immediately arrange for survey of channel and berth and inform the condition to CEO/COO, Who in turn inform to the corporate office and stake holders.
- b. Restoration work if any may be done in association with Head ES.
- c. Shall check the navigational aid system take action for rectifications if required
- d. Check all tugs and mooring crafts and they should be made fully functional as quickly as possible.

SPM

- a. Checking both mooring hawser assemblies and replace the components as required.
- b. Replacements of both 9" PP pick ropes of mooring hawsers.
- c. Inspection of each floating hoses on both floating hose strings.
- d. Underwater inspection of each individual hoses on both subsea hose string and subsea umbilical.
- e. Underwater inspection of all deep sea floats for its integrity.
- f. Checking subsea hose strings configuration at low and high tide.
- g. Verifying chain angle of all six anchor chains to be within limits, at low and high tide.
- h. SPM buoy body inspection – integrity of seal on all hatches and doors.
- i. Operational check of all navigational and safety equipment.
- j. Carry out the system pressure test from floating hose string end to PLEM valve upto 15 bars and hold for 03 hours. Visual check by divers for any abnormalities on floating hoses and subsea hoses.
- k. Carryout "Free Span and Lateral displacement" survey of subsea pipeline and provide support wherever necessary i.e. if it is beyond recommended allowable span.

Incident Controller: HOD – ES (MPT & WB)

- a. Shall immediately depute the electrical engineer to have an update of power supply.
- b. In case of power outage, coordinate with Electrical supply authorities for restoration of power supply
- c. If power is available, and MCCs are O.K, charge MCCs one by one after thorough checking.
- d. Depute the same team which has parked the equipment to release the equipment for operation after removing all blockages.
- e. If any equipment is found to be damaged report the matter to higher ups and take action for early repair or decommissioning.
- f. Do not start operating, until all parking locks & additional tie-ups are removed
- g. Equipment also can be charged one by one after charging the MCCs after obtaining written clearance from the engineer in charge.
- h. Ensure that the equipment electrical system is perfect before charging. Keep records of all measurements.
- i. Inspect the tunnel and dewater the accumulated water.
- j. Inspect all electrical and mechanical system thoroughly before Trial run.
- k. All lighting towers which were lowered to be raised up.
- l. Damaged street lights and damaged internal lighting system to be repaired and recommissioned.
- m. All belt clamping/tie-up must be removed before trial run of conveyors.
- n. Arrange for de watering of tunnel with diesel pump if power supply is not readily available.
- o. Ensure all DG sets works till normal power supply is resumed.
- p. Shall inspect the water supply system and take all action to establish normal water supply immediately.
- q. In case of any difficulty bring it to the notice of CEO/Executive Director (Corp. Affairs) (Corp. Affairs).
- r. In case of water logging, arrange diesel pumps and pump out water.
- s. Drainage system if damaged should be repaired immediately.
- t. Inspect all roof tops and if any roof is blown off, take action for replacement.
- u. Coordinate with Admin/HR for clean-up activities.
- v. HODs of West Basin will assist to Head – West Basin.

Primary Support Team: HOD – HR & Admin

- a. Shall take up rehabilitation work of port colony.
 - b. Take all actions necessary to rehabilitate the officers and staff of the port.
 - c. Coordinate with civil department to clean up the colony and premises.
 - d. Arrange for provisions till normalcy is established.
 - e. Food arrangements to people on resumption work to be coordinated.
-

Primary Support Team: HOD – QHSE&F

- a. Assist to CEO/Executive Director (Corp. Affairs)
 - b. Assess damage (human) and send for further treatment.
 - c. Assess the property damage and prepare report in consultation with concern department.
 - d. Assist all HODs with restoration.
 - e. Arrange for environmentally safe disposal of post emergency generated effluents/waste.
 - f. Updating DMP based on faced natural calamities.
-

Secondary Support Team: HOD – Commercial

- a. Shall inspect all stores and estimate loss or damages if any and take immediate action for reequipping the items.
 - b. Coordinate with all HODs for requirements of consumables and spares.
 - c. Discuss with CEO/Executive Director (Corp. Affairs) to ease norms of procurement for immediate supply of stores.
 - d. He shall help HOD Commercial for procuring the items necessary for tsunami damage repairs.
-

Incident Controller: HOD – Railway

- a. Shall depute teams of staff to check the condition of all railway track and track electrification and signalling system.
 - b. Contractor shall be instructed to depute adequate numbers of teams to survey the entire railway lines and system and submit feedback within the shortest possible time (fix the time period for feedback)
 - c. Condition shall be reported to CEO/Executive Director (Corp. Affairs) (Corp. Affairs) and take action to repair and resume operations.
 - d. If track electrification is damaged, coordinate with Indian Railways to press in Diesel locos till the electric line is repaired, and resume operation with conventional signalling.
 - e. Any help for repair and decommissioning may be taken from HOD - ES.
 - f. He shall also inspect the Locomotives of the Port, and arrange for trial running to put them into operation.
 - g. Inspect the locomotives of the port, and arrange for trial running to put them into operation.
-

Incident Controller: HOD – Operations [DC (MPT & WB), CT, LT]

- a. Shall inspect all areas along with concerned HODs for estimate loss and damages if any. prepare report and submit to CEO.
- b. The condition of stored hazardous/toxic cargo to be inspected along with HSE and immediate action, as advised by HSE, to be taken up.
- c. Deploy men and equipment to segregate and salvage all cargo.
- d. Coordinate with ES HOD, for assistance in de-watering and plot/shed repairs.
- e. Discuss with CEO/Executive Director (Corp. Affairs) and HODs for resumption of partial or full operations.
- f. Take all actions for early resumption of port activities.
- g. Coordinate with HOD – Marine to resume shipping operations.

-
- h. Coordinate with HOD - Finance for insurance claims.
 - i. All costly and critical materials are stacked properly to avoid loss due to wind or water inundation.
 - j. Estimate the losses and damages along with BD and inform CEO/Executive Director (Corp. Affairs).
-

Secondary Support Team: HOD – Finance & Accounts

Insurance Claims

- a. All HODs to prepare loss and damage list and estimate the costs of rectification and submit the same to HOD - Finance, who is the nodal officer for claiming insurance, with copies to CEO/Executive Director (Corp. Affairs) (Corp. Affairs). The details shall contain photograph also immediately
 - b. Shall coordinate with insurance company to arrange the surveyor as quickly as possible, so that rectification work can start immediately.
 - c. May coordinate with all HODs to prepare additional documents if required.
 - d. May collect the details of claims with supporting documents from HODs in a time frame to be fixed by him for early settlement of all claims.
 - e. Timely submission of insurance claims necessary for claiming losses.
-

Primary Support Team: HOD – Security

- a. Restoration of road traffic & port entry system from and to the port disrupted due to the Tsunami.
 - b. Shall be well versed with all road communication of the area.
 - c. Shall coordinate with local administration/State administration to clear the roads in consultation with Corporate Affairs.
 - d. Port may also be required to engage men and machine to clear the road blockages.
-

Secondary Support Team: CSR HOD – Adani Foundation [General Responsibilities]

The company has a social responsibility to save the life and property of the people living in the peripheral areas. This work involves the following activities. These activities may be done in association with local administration.

- a. Inform the public by public announcement the danger level of the tsunami and its effects and consequences.
- b. Leaflets are to be circulated about the danger level.
- c. If Tidal inundation is expected the villagers may be informed of the consequences.
- d. Request them to move to safer places to escape from heavy wind and tidal actions.
- e. Moving to tsunami shelter is the best option. If tsunami shelter is not nearby, they may be asked to move to permanent structures available nearby. Provide them all assistance for evacuation.
- f. Provide the villagers adequate dry food (chuda, gudo, biscuits, baby food etc.) items and potable water in adequate quantity.
- g. Water tankers with potable water may be kept stand-by.
- h. Services of medical team may be extended to the peripheral villages with necessary medicines and first aids.
- i. Advise them to remain indoors during tsunami.
- j. After the tsunami there may be shortage of food and water.
- k. Water has to be provided for their basic needs till normalcy is established.
- l. Start community Kitchens to provide them with food.
- m. Help in rehabilitation of all displaced people in coordination with local Govt. Agencies and NGOs.

- Position
- Port position
- Alternative
- Secondary support team

in-charge - telecommunication

- Take charge of all communication systems of fixed and portable.
- Ensure availability of sufficient numbers of electronic communication equipment to the port control station, Base Control and anywhere else as necessary.

- Position
- Port position
- Alternative
- Secondary support team

in-charge - IT

- Take charge of all necessary communication system.
- Take all necessary back up of data.
- Assess damage of assets and restore

A Checklist

- Checklist for CEO/Executive Director (Corp. Affairs) (Corp. Affairs).
- Following Checklists prepared which shall be used at the time of declaration of tsunami.

Checklist – 1	CEO/Executive Director (Corp. Affairs) (Corp. Affairs)
Checklist – 2	Marine Services
Checklist – 3	Engineering Services
Checklist – 4	Dry Cargo
Checklist – 5	Liquid Terminal
Checklist – 6	Container Terminal
Checklist – 7	HR & Admin
Checklist – 8	Security
Checklist – 9	Railway Services
Checklist – 10	West Basin
Checklist – 11	QHSE&F

CEO- Emergency Preparedness				
Tsunami - Check List				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
1	On receipt of tsunami warning, emergency Control Room to be established on the fourth floor of Adani house. (In the conference room).			
2	Alarms sounded followed by verbal order on PA system instructing personnel to stop all operations and initiate tsunami action plan.			
3	All teams have reported initiation of emergency action plan.			
4	Inform government agencies, other stake holders and mutual aid partners for initiating emergency action.			
5	Obtain status of situation from the government Emergency Control Room and disseminate information.			
6	Emergency numbers to be kept with all emergency vehicles (Provide copy of emergency numbers list in all vehicles)			
After Effective Period				
1	Announcement to be made declaring end of emergency or PA system and other means of communication.			
2	Head count to be taken to certain missing personnel.			
3	Get reports on casualties and injuries to personnel. Arrange for medical assistance.			
4	Launch search and rescue operations for missing personnel.			
5	Personnel to be advised not to enter damaged buildings/structures.			
6	Carry out assessment of damage to property and all high value assets within the port including ships.			
7	Reports to be consolidated with photographs from all departments for insurance claims.			
8	Gradual resumption of port operation.			

Marine Services - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station, Fire Station.			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points.			
3	All Crafts, Tugs, Fishing boats, and ships to be notified immediately and to move into deep waters away from shore line			To be made part of emergency drill.
4	Make arrangement of transportation of employees and contractors			
During Effective Period				
1	Avoid standing near sea side. Move as far away from the sea shore as is possible.			
2	During the event, the safest place is a terrace of structured building.			
3	If possible, evacuate the port and move as fast as possible away from the shore line			

4	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
5	Take head count of personnel			
After Effective Period				
1	Take head count of personnel			
2	Assess damage to equipments, building and unsafe condition			
3	Initiate restart/repair process			

Engineering Services of MPT - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station and Fire Station			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points			Part of safety tool talk
3	People made aware about tsunami warning signals(earthquake, sudden rise and fall in coastal water level)			Training program
4	People are made aware about evacuation plan in case of emergency			Training program
5	People are made aware of do's and don'ts before, during and after tsunami			part of training. List of do's and don'ts enclosed
6	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc. to be placed at FCC control room , DG houses & substation & workshop			Emergency Kit as per annexure
During Warning Period (appx 30 Min)				
1	Cargo operations stopped and all prerequisite for vessel to cast off undertaken.			To be made part of emergency drill.
2	Mobile Harbour Cranes in boom down position & properly lashed as per SOP & crane to be parked at designated area. 2.1 Mobile harbour cranes at jetty 2.2 Steel yards crane e.g goliath cranes & LMC			To be made part of emergency drill.
3	Dumpers and mobile equipment moved away from berth (designated open plots)			
4	Arrangements to be made for transportation of employees and contractors and labourers			
5	Emergency Kit, Food supplies and drinking water checked and tested.			
6	Communication mediums like VHF, Mobile phones and PA systems checked			Numbers mentioned in Annexure
7	Visitors' evacuation is ensured Note: At the time of cyclone & tsunami warning, priority to be given to worker, technician working on jetty or below jetty			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
2	If possible, evacuate the port and move as fast as possible away from the shore line. Follow the evacuation plan			

3	During the event, the safest place is a terrace of structured building. Backup and ES team to rush to new CT building, Steel yard and jetty staff to tug berth building terrace			
After Effective Period				
1	Assess damage to equipment and buildings, and record the conditions.			
2	Take head count of personnel			
3	Initiate restart/repair process			
4	Photographs to be taken for assessing damages to cargo and property for insurance			
5	Communication to be sent to all clients regarding assessed and potential damage to cargo			For insurance purpose

Dry Cargo - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station and Fire Station.			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points.			Part of safety tool talk
3	People made aware about tsunami warning signals(earthquake, sudden rise and fall in coastal water level)			Training program
4	People are made aware about evacuation plan in case of emergency.			Training program
5	People are made aware of do's and don'ts before, during and after tsunami.			part of training. List of do's and don'ts enclosed
6	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc. to be placed at FCC control room, DG houses & substation & workshop			Emergency Kit as per annexure
During Warning Period (appx 30 Min)				
1	Cargo operations stopped and all prerequisite for vessel to cast off undertaken			To be made part of emergency drill.
2	Mobile Harbour Cranes in boom down position & properly lashed as per SOP & crane to be parked at designated area. 2.1 Mobile Harbour Cranes at jetty 2.2. Steel yards crane e.g Goliath Cranes & LMC			To be made part of emergency drill.
3	Dumpers and mobile equipment moved away from berth (designated open plots)			
4	Arrangements made for transportation of employees and contractors and labour			
5	Emergency kit, food supplies and drinking water checked and tested.			
6	Communication mediums like VHF, mobile phones and PA systems checked			Numbers mentioned in Annexure
7	Visitors' evacuation is ensured. Note : At the time of cyclone & tsunami warning , priority to be given to worker, technician working on jetty or below jetty.			

During Effective Period				
1	During the event, the safest place is a terrace of structured building. Backup and FCC team to rush to new CT building, Steel yard and jetty staff to tug berth building terrace.			
2	If possible, evacuate the port and move as fast as possible away from the shore line. Follow the evacuation plan.			
3	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present.			
After Effective Period				
1	Assess damage to equipment and buildings, and record the conditions.			
2	Take head count of personnel.			
3	Initiate restart/repair process			
4	Photographs to be taken for assessing damages to cargo and property for insurance.			For insurance purpose
5	Communication to be sent to all clients regarding assessed and potential damage to cargo.			

Liquid Terminal - Emergency Preparedness				
Emergency Response.				
Tsunami Check List				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station, Fire Station.			
2	All concerned employees and contractual staff informed about the assembly points.			
3	All crafts, tugs, fishing boats, and ships to be notified immediately and to move into deep waters away from shore line			
4	Make arrangement of transportation of employees and contractors			
During Effective Period				
1	Avoid standing near sea side. Move as far away from the sea shore as is possible			
2	During the event, the safest place is a terrace of structured building			
3	If possible, evacuate the port and move as fast as possible away from the shore line			
4	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
5	Take head count of personnel			
After Effective Period				
1	Take head count of personnel			
2	Assess damage to equipment, building and unsafe condition			
3	Initiate restart process			

Container Terminal - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station, Fire Station			Part of Induction program.
2	All employees concerned and contractual staff informed about the assembly points			
3	Park all machines/cranes and secure them as appropriate			To be made part of emergency drill.
4	Make arrangement of transportation of employees and contractors			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
2	Take head count of personnel			
3	Avoid standing near sea side. Move as far away from the sea shore as possible			
4	During the event, the safest place is a terrace of structured building.			
5	If possible, evacuate the port and move as fast as possible away from the shore line			
After Effective Period				
1	Take head count of personnel			Numbers mentioned in Annexure
2	Assess damage to equipments, building and unsafe condition			
3	Initiate restart/repair process			

Administration - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station, Fire Station			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points			
3	Evacuation route to be intimated to all drivers			
During Effective Period				
1	All buses and LMVs immediately moved towards parking near each Assembly points			
2	Evacuation route to be cleared with the help of security			
3	All Controll rooms will be manned			
After Effective Period				
1	Assess damage to equipments, building and unsafe condition			
2	Initiate restart/repair process			

Security Services - Emergency Preparedness				
Tsunami - Check List				
Sr. No.	Activity	Yes	No	Remarks
Before Effective Period				
General Points				
1	Obtain status of tsunami at regular interval from Emergency Control Room and disseminate to others for their information and appropriate safety measures			
2	Establishment of Emergency Control Room at suitable location with communication facilities			
3	A team is to be formed for emergency.			
4	All vehicles to be topped up with fuel – prior to effective period, and topped up on daily basis.			
5	Walkie talkie sets to be fully charged along with stand-by batteries			
6	Keep mobiles (personal/official) fully charged			
7	Ensure emergency lights are functioning			
8	Ensure mega phones are functioning (change old batteries)			
9	Ensure public announcement (PA system) on ERT vehicle is functioning			
10	Ensure digital cameras and handy cam are fully charged.(ERT, PSC, MSB, MWB)			
11	Ensure security guards in possession of all PPEs and whistle			
12	Ensure availability of rope (30 Mtr), life jacket & tarpaulin (If available), at respective gate & 01 at ISCR,			
13	Traffic cone to be removed and kept in closed room (may be affected by high wind)			
14	Frontier from roads to be removed and kept in covered godown in stacking mode.			
15	Search lights to be kept ready dully functional.			
16	Hammer and cutting tools (available with Fire Dept).			
17	Bottled drinking water to kept in all emergency vehicles			
18	First Aid Box to be kept with all emergency vehicles duly updated from medical wing.			
19	Emergency numbers to be kept with all emergency vehicles			
20	Security reinforcement to be kept ready at guards colony with due provision of transport (whichever transport mode is available).			
21	Alternate route for hospital and other locations to be checked and available with all emergency teams.			
22	Detailed briefing of security guards to be carried out			
23	Communication to be done as per requirement (to save battery of mobile & VHF)			
24	Remove security guards from remote and isolated location as per instruction of ISCR.			
25	Ensure rain coat available with all Security personnel on duty			
26	List of emergency contacts & suppliers.			
27	Material & equipment that cannot be moved are to be covered.			
28	Hoist appropriate storm warning Signal.			
29	A team is to be formed for emergency.			
30	Remove all loose materials and equipment from jetty & other areas			
31	Ensure all workmen are sheltered at safe locations like canteens (concrete buildings)			

32	Stop all vehicle movement and ensure the vehicles are parked at safe location with blocked wheels			
33	Ensure roads and pathways are cleaned			
34	Air filled tubes, bamboos & air filled boats to be kept ready for evacuation			
During Effective Period				
1	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employee are present			
2	All personnel to be notified against venturing out during effective period			
3	All personnel to remain indoor, observant and be alert			
4	Avoid taking shelter near old or damaged buildings or near tress			
5	All doors and windows to be shut			
6	Avoid the top floor of buildings. Stay close to ground floor			
7	Close the visitors' gate			
8	Occupy pre-determined post for controlling security of installation			
9	Call up additional help from barracks			
10	Ensure that unauthorized persons/vehicles do not enter the gate			
11	Provide security men for firefighting & rescue			
12	Arrange for transport of higher authorities to the terminal			
13	Transport vehicles would be provided near emergency control center			
14	Depute security guards for controlling traffic at scene of disaster			
15	Produce a list of port staff on duty in co-ordination with time office			
16	Ensure availability of security men at gates so that they can lead authorities to disaster site			
17	Ensure that non-essential persons do not crowd affected area			
18	Instruct all drivers to take shelter at canteens (concrete buildings)			
19	Ensure vehicles are parked at designed parking areas, with wheels are blocked			
20	Close the gate ant stop allowing visitors and transport trucks either inward or out ward			
21	If caught in open areas during tsunami find a safe shelter immediately			
After Effective Period				
1	Assess damage to equipment, building and unsafe condition.			
2	Do not enter in damaged buildings			
3	Use mobile phones only for emergency calls			
4	Start search operation for living things			
5	Do not use any damaged electronic goods			
6	Drink boiled water			
7	Confirm with concerned about situation of tsunami before you move out			
8	Start restorative measures & repairs			

Railway Services - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Induction to employees about the emergency location of Medical Station and Fire Station			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points			Part of safety tool talk
3	People made aware about tsunami warning signals(earthquake, sudden rise and fall in coastal water level)			Training program
4	People are made aware about evacuation plan in case of emergency			Training program
5	People are made aware of do's and don'ts before, during and after tsunami			Part of training. List of do's and don'ts enclosed
6	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc. to be placed at FCC control room, DG houses & substation & workshop			Emergency Kit as per annexure
During Warning Period (appx 30 Min)				
1	Railway operations stopped			To be made part of emergency drill.
2	Locomotive to be sent at safe places			To be made part of emergency drill.
3	Electrical supply to the signalling panel to be switched off			
4	Arrangements to be made for transportation of employees and contractors and labourers			Numbers mentioned in Annexure
5	Emergency kit, food supplies and drinking water checked and tested			
6	Communication mediums like VHF, mobile phones and PA systems checked			
7	Visitors' evacuation is ensured			
During Effective Period				
1	During the event, the safest place is a terrace of structured building. Railway Operation team to rush to new CT building, Railway control room MDCC MPT. MICT Building			
2	If possible, evacuate the port and move as fast as possible away from the shore line. Follow the evacuation plan			
3	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employees are present			
After Effective Period				
1	Assess damage to equipment and buildings, and record the conditions			
2	Take head count of personnel			
3	Initiate restart/repair process			
4	Photographs to be taken for assessing damages to cargo and property for insurance			For insurance purpose
5	Communication to be sent to all clients regarding assessed and potential damage to cargo			

WEST BASIN - EMERGENCY PREPAREDNESS				
Emergency Response				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program				
1	Induction to employees about the emergency location of medical station and fire station			Part of Induction program.
2	All concerned employees and contractual staff informed about the assembly points			Part of safety tool talk
3	People to be made aware about tsunami warning signals(earthquake, sudden rise and fall in coastal water level)			Training program
4	People to be made aware about evacuation plan in case of emergency			Training program
5	People to be made aware of do's and don'ts before, during and after tsunami			part of training. List of do's and don'ts enclosed
6	Emergency kit is prepared beforehand. The emergency kit contains flashlight and extra batteries, battery-operated radio and extra batteries, first aid kit emergency food and water, essential medicines, whistle, etc. to be placed at Central Control Room			Emergency Kit as per annexure
7	Ensure that no elevator or lift to be used in case of emergency			
8	Wardens of the individual buildings must be aware of their duties			Duties of Warden
9	Ensure all personnel working inside port are aware of the various siren codes (emergency, evacuation, all clear)			
During Warning Period (Approx. 30 Min)				
1	Cargo operations stopped and all prerequisite for vessel to cast off undertaken			To be made part of emergency drill.
2	All GSU cranes are secured with storm storm-lock pin			To be made part of emergency drill.
3	All stackers and reclaimer machines are locked and kept at the end			To be made part of emergency drill.
4	Dumpers and mobile equipment moved away from berth (to be kept in yards without obstruction)			
5	Arrangements to be made for transportation of employees and contractors and labourers			Numbers mentioned in Annexure
6	Emergency kit, food supplies and drinking water checked and tested.			
7	Communication mediums like UHF, mobile phones and PA systems checked			
8	All the personnel working on jetty or nearby seaside are to be moved.			
9	Ensure emergency teams [Fire, Safety, Security, Marine, Operation, Engineering, Stores, Admin, Railway] are ready.			
10	Residential area of labors inside the port needs to be shifted until the situation gets controlled			
11	Visitors' evacuation is ensured			
12	Ensure that no personnel should be inside the hatch and hatches are to be closed			
13	Ensure that details of contract workforce [head-count] at the time of evacuation or shifting			

During Effective Period				
1	During the event, the safest place is a terrace of structured building. Move away from seaside as far as much you can			
2	If possible, evacuate the port and move as fast as possible away from the shore line. Follow the evacuation plan			
3	Assemble at emergency assembly point and evacuate the area, when announced. Ensure all company and contract employees are present			
4	Emergency team to coordinate and act as per the guidance			
After Effective Period				
1	Assess damage to equipment and buildings, and record the conditions			
2	Take head count of personnel			
3	Initiate restart/repair process			
4	Photographs to be taken for assessing damages to cargo and property for insurance			For insurance purpose
5	Ensure that site-round is taken, report prepared and submitted the observations to all concern for compliance			
6	Communication to be sent to all clients regarding assessed and potential damage to cargo			
Pre-Assessment Checklist [Preparedness in Early Stage]				
1	Ensure that emergency team has been prepared along with roles & responsibility			
2	HODs have a meeting above the impending emergency steps			
3	Ensure each representative of each department has a substitute (Dry Cargo, E&I, MHS SR, MHS Conv, MHS GSU, MHS WLS TLS, MHS Utility, ES CWS, ES Civil, Fire, Safety, Security, Marine, Railway, Admin, Store, IT etc)			
4	Ensure that emergency siren is working			
5	Ensure that PA System/VHF/Base station are working			
6	Ensure that list of Emergency Contact Numbers are displayed			
7	Ensure that all employees, contractors/vendors/visitors/other customer are aware of emergencies and preparedness			
8	Ensure that site-round is taken, report prepared and submitted the observations to all concern for compliance			
9	Ensure all jobs carrying out on height work (or jobs which require scaffolding) to be monitored and controlled			
10	Ensure that Emergency kit contains following items; torches, ropes, wires, tarpaulins, plastic sheets, tool kit, duct tapes, assorted gears, first aid box, sand bags			
11	Ensure that respective HOD/HOS have inspected areas			
12	Ensure that all the important document are preserved at a proper place			
13	Ensure all the customers/surveyors have been informed regarding emergency situation and preparedness			
14	Ensure proper communication with Security for traffic control of dumpers/trucks			
15	Ensure proper communication with railway department (Govt) for rake movement with respect to emergency			
16	Ensure proper communication with transporters and agents for their role in case of emergency			
17	Ensure electrical isolation of machines/equipment			
18	Ensure that wind anemometer is working in all equipment (i.e. stacker-reclaimer, GSU)			

19	Ensure that any information from CCR/higher authority must be passed on to the downstream			
20	Ensure that all drains, sock-pits etc are cleaned off			
21	Ensure proper communication with the vessels and tugs for actions required			
22	Ensure proper communication with the emergency boats			
23	Ensure proper communication with the POC for further information/ updates/news of respective emergency from disaster authority/ Govt agencies			
24	Refer to the General DMP Checklist of West Basin [Departmentwise/Sectionwise]			

QHSE&F - Emergency Preparedness				
Emergency Response.				
Tsunami- Checklist				
Sr. No.	Activity	Yes	No	Remarks
Induction and Training Program.				
1	Arrange induction /training program for all personnel on emergency preparedness & its awareness			Part of Induction/ training program.
2	All concerned employees and contractual staff informed about the assembly point & evacuation locations			
3	To arrange emergency drill for dealing with such emergency			To be made part of emergency drill.
4	To arrange necessary training for emergency response team/ CMG/First Aid Team/Medical Team/Fire rescue team to deal with emergency. (Ensure availability of trained rescue team & necessary equipments all the time)			
5	Arrange training for all QHSE&F team member for emergency response & clear cut understanding of their crucial roles & responsibility during emergency			
6	To prepare & check effectiveness of Emergency Response Plan/ Disaster Management Plan			
7	To do proper co-ordination with all concern department for maintaining necessary emergency response kit & necessary aids in required inventory or make identified supply of the same during declaration of such emergency			
8	To maintain close co-ordination with mutual aid for dealing with emergency			
During Effective Period				
1	Assist CEO/Executive Director (Corp. Affairs). as instructed			
2	Co-ordination with respective HOD/HOS with respect to emergency actions			
3	Ensure necessary action through CMG. Provide necessary assistance to CMG			
4	Assist in evacuation of all personnel except key personnel			
5	Provide HSE & F facilities (Assist for rescue, evacuation, and other necessary arrangement)			
6	Set up casualty collection centre and arrange first aid posts			

7	Arrange enough stock medicines, antidotes, oxygen and stretchers			
8	Arranges additional medicine and equipment as required			
9	Arrange a fully equipped Ambulance in ready state			
10	Make arrangements for mobile casualty to reach at incident sites and transporting for further treatment			
12	To do immediate co-ordination to mutual aids for necessary help/ support if required			
After Effective Period				
1	Assist to CEO/Executive Director (Corp. Affairs)			
2	Assess damage (human) and send for further treatment			
3	Assess the property damage and prepare report			
4	Assist all HODs with restoration			
5	Perform necessary rescue through rescue team where needed			
6	Check each & every effected area & arrange for necessary HSE& F actions as require			
7	After completion of all rescue, restoration work. Check the effectiveness of executed emergency plan & take necessary require corrective action to update the plan & necessaary facilities if required			
8	To motivate the emergency rescue team, CMG & all concerned, who have perform well during emergency			



Resources

Logistics

Energy

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Annexure – 10

ON SITE EMERGENCY PLAN

JANUARY 2022

— ■ PRODUCER ■ —



ADANI PORTS AND SEZ LTD

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

:: COMPILED BY ::

M.J.PATEL & ASSOCIATES

HAPPY ASSOCIATES

DISH approved Comp.Persons & Safety Professionals

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

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INDEX
SECTIONS: 1 CHAPTERS - I TO VI

CHAPTER	TITLE	PAGE
	Preface	
1.0	1.0 Introduction of Emergency Plan	5
	1.1 Identification of the factory	6
	1.2 Map of the area	8
	1.3 Some important definitions	9
	1.4 About objectives of emergency plan	
2.0	2.0 Introduction of risk & environmental impact assessment	13
	2.1 Factory Lay-out	
	2.2 Identification of hazards in storage & control measures	14
	2.3 Identification of hazards in process	17
	2.4 Process description	18
	2.5 Other hazards and controls	19
	2.6 Trade waste disposal	20
	2.7 Records of past incidents	20
	2.8 Gas dispersion concentration	20
	2.9 Risk assessment	21
	2.10 Environmental impact assessment	
3.0	3.0 Emergency organization	73
	3.1 Scope & Purpose	74
	3.2 The Need of Disaster Planning at APSEZ	75
	3.3 Emergencies : Classification of Emergencies	76
	3.4 Emergency Response Organization	77
	3.5 Emergency Reporting Line	79
	3.6 Assembly Points	81
	3.7 Categories Of Emergencies	82
	3.8 Duties & Responsibilities	85
	3.9 External Aid	89
	3.10 Mutual Aid Members	89
	3.11 Government Authorities	90
	3.12 Reporting & Investigation	91
	3.13 Communication & Public Affairs	91
	3.14 Public Affairs	92
4.00	4.00 Emergency Planning	93
	4.1 Drills & Training	94
	4.2 Training	94

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY – 2022</p>
---	---	---

4.00	4.3 Emergency Plans 4.3.1 Cyclonic Storms / Hurricanes 4.3.2 Earthquakes 4.3.3 Tsunami 4.3.4 Flood 4.3.5 Industrial Unrest 4.3.6 Bomb Threat 4.3.7 War 4.3.8 Flood / Water Poisoning 4.3.9 Fire 4.3.10 Major Release of Toxic / Flammable Chemicals 4.3.11 Major Release Of Toxic Gas 4.3.12 Transportation Incidents Involving Hazardous Materials 4.3.13 Marine Emergency	94 94 99 100 101 102 103 104 105 105 106 110 112
5.00	5.0 Emergency Preparedness 5.1 Fire Fighting Facilities with APSEZ, Mundra 5.1.1 Fire Fighting Systems At Jetty 5.1.2 Liquid Terminal 5.1.3 Dry Cargo Area 5.1.4 Terminal - 2 5.1.5 Container Terminal - 2 5.1.6 Container Terminal - 3 5.1.7 Terminal - 1 5.1.8 West Basin 5.1.9 Adani House & Pub 5.2 Safety Equipments & PPE's At APSEZ 5.3 About On Site Emergency Plan 5.4 About Post Emergency Activities 5.6 Medical Emergency Preparedness	113 114 114 115 116 117 117 118 119 120 121 124 124
6.00	6.0 Off Site Emergency Plan 6.1 About Off Site Emergency Plan 6.2 Structure of Off Site Emergency 6.3 Role Of Management 6.4 Role Of Police & Evacuation Authority 6.3 Role Of Mutual Aid Units	126 126 130 131 131 131

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY – 2022</p>
---	---	---

SECTION – II : ANNEXURES 1 TO 33

<u>ANNEXURES</u>	<u>PAGE NO.</u>
1. Identification of the Factory ...	132
2. Map of area ...	133
3. Plant Layout ...	134
4. Storage Hazards & Controls ...	135
5. Material Safety Data Sheets ...	136
6. Process and Vessel Hazards and controls ...	137
7. Other Hazards and Controls ...	138
8. Trade Waste Disposals ...	139
9. Records of Past Incidents ...	140
10. Gas Dispersion Concentration ...	141
11. Evacuation Table ...	142
12. Environmental Impact Assessment ...	143
13. Weather Conditions ...	144
14. Incident Controllers ...	145
15. Deputy Incident Controllers ...	147
16. Site Main Controllers ...	149
17. Key Personnel ...	149
18. Essential Workers ...	150
19. Safe Assembly Points ...	152
20. Emergency Control Center ...	154
21. Fire & Toxicity Control & Mutual Aid ...	155
22. Medical Arrangement ...	160
23. Transportation & evacuation Arrangements ...	162
24. Pollution Control Arrangements ...	165

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY – 2022</p>
---	---	---

<u>ANNEXURES</u>	<u>PAGE NO.</u>
25. Other Arrangements ...	167
26. Alarms & Sirens ...	168
27. Internal Phones ...	170
28. External Telephone Numbers ...	172
29. Nominated Persons to declare Major Emergency ...	173

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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PREFACE

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

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

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

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

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

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

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

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

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

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

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

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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In view of presence of various materials handled, hazardous nature of liquids, due to situation of the port, various types of hazards exist in handling, storage and logistic activities. Hence, it is desirable and also statutory to prepare an emergency action plan for any emergency which may affect plant personnel, property as well as neighbouring areas and population.

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

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

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

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

(Auth.Sign)

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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CHAPTER-1

PRELIMINARY

CONTENTS

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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1.0 INTRODUCTION OF THE PLAN

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

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

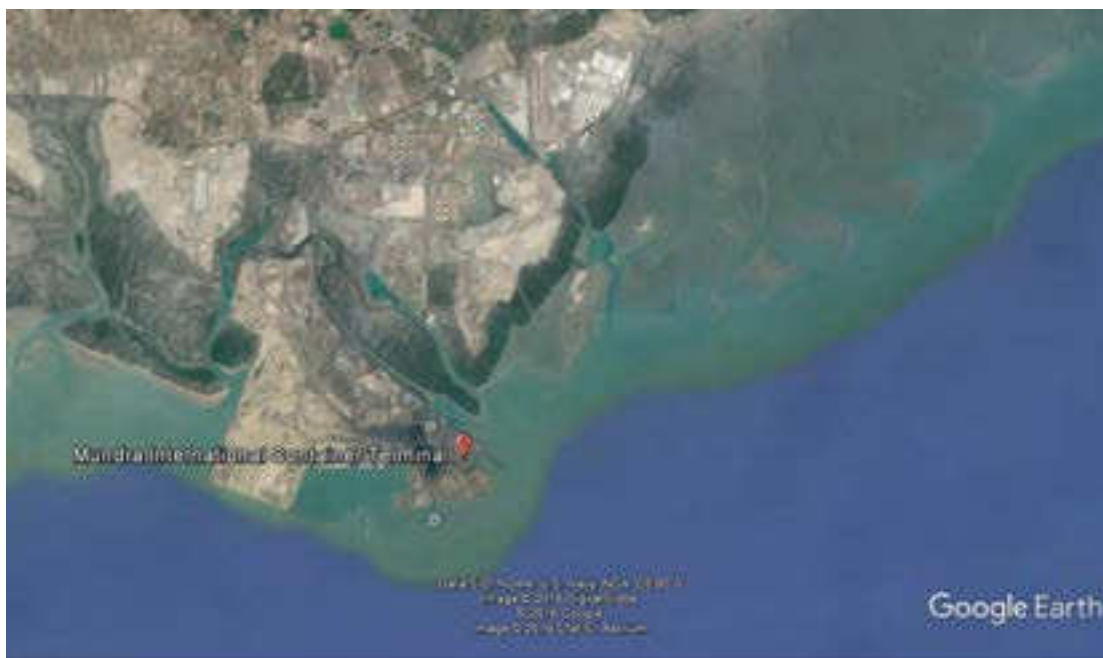
- A – Definitions
- B – Objectives
- C – Hazard identification
- D – Risk analysis and environmental impact
- E – Organizational set-up
- F – Communication system
- G – Action on-site
- H – Off-site emergency plan
- I – Training, rehearsal and record aspect

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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1.1 IDENTIFICATION OF THE FACTORY

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



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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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IDENTIFICATION

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

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

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

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

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

1.2 MAP OF THE AREA

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

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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1.3 IMPORTANT DEFINITIONS

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

1.4 ABOUT OBJECTIVES OF THE EMERGENCY PLAN

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

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

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

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

OBJECTIVES OF THE PLAN

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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7. To restore normalcy.

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

EMERGENCY

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

NATURE OF EMERGENCY

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

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

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

	<p align="center">ADANI PORTS AND SEZ LTD</p> <p align="center">MUNDRA</p> <hr/> <p align="center">ON SITE EMERGENCY PLAN (Port Area)</p>	<p align="center">JANUARY - 2022</p>
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CONTACT IN EMERGENCY (Intercom Numbers):

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

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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CHAPTER NO. II

INTRODUCTION OF RISK AND ENVIRONMENTAL IMPACT ASSESSMENT

CONTENTS

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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2.00 INTRODUCTION OF RISK & ENVIRONMENTAL IMPACT ASSESSMENT

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

2.01 FACTORY LAYOUT

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

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

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

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2.02 IDENTIFICATION OF HAZARDS IN STORAGE & CONTROL MEASURES

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

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

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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Methanol	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	18000
Toluene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	3000
Acetic acid	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2960
P- Xylene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	6460
Vinyl Acetate Monomer	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion, toxic gas	Liquid	1458

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

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

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

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

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

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

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

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

FIRE HAZARD

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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TOXIC HAZARD

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

EXPLOSION HAZARD

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

2.4 PROCESS DESCRIPTION

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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quartz, phosphate rock, fertilizers, sulphur, scrap, and similar cargo. They can be recognized by the large box-like hatches on their deck, designed to slide outboard for loading. Bulk carrier's discharge at terminals provided with proper cranes; ore and coal can be stored in heaps. Tankers are usually large ships which carries petroleum products or chemicals in bulk. Apart from pipeline transport, tankers are the only method of transporting large quantities of vegetable oils around the world . Among the chemicals transported by sea, the most important are methanol, ethanol, toluene, acetic acid, caustic soda lye, naphtha, gasoil, motor spirit etc. Land transport activities, which are carried out by lorry, train and pipelines. - Storage, warehouses, container terminals, car parks, bulk solid wharves, etc. Chemical releases from tank farms on site are the most probable. It includes highly flammable and toxic chemicals. The latter is at approximately atmospheric pressure so that even a catastrophic failure should not result in the formation of a large flammable vapor cloud . The causes for overpressure may be overheating due to a neighboring fire, overfilling or rollover. Overfilling is a common phenomenon in storage installations and has one of the highest probabilities of occurrence values. Another possibility is the liquid catching fire due to a local incident or operation, which may lead to stress rupture of the tanks. Severe mechanical damage may occur from impacts from projectiles from disintegration of nearby vessels, aircraft impacts or nearby railway accident due to derailment. The tank farm storing of non-boiling liquids can be affected by pool fires and unconfined vapor cloud explosions. These spills may also result in the direct formation of a flammable vapor cloud. The latent heat required for evaporation has to be provided by the surroundings and the ground. The rate of evaporation will be initially high but decreases rapidly as the available heat from the surroundings is exhausted.

Liquid Terminal ::

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

2.5 OTHER HAZARDS AND CONTROLS

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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- Health hazards & Physical injuries
- Failure of electrical Installations
- Natural calamities (Earthquake, fall of lightening, floods, Tsunami, cyclones, storms) or manmade hazards. Causes of such other hazards, their effects on plant and the surrounding area, their preventive measures etc. are stated in ANNEXURE - 7

2.6 TRADE WASTE DISPOSAL

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

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

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

2.7 RECORD OF PAST INCIDENTS

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

2.8 GAS DISPERSION CONCENTRATION

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

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2.9 RISK ASSESSMENT

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

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

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

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

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

Jet fire:

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

Pool fire

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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UCVE

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

BLEVE

BLEVE (Boiling Liquid Expanding Vapor Explosion) is a phenomenon resulting from the failure of a vessel containing a liquid at a temperature significantly above its boiling point at normal atmospheric pressure. The main hazard posed by BLEVE of a container filled with a flammable volatile liquid is a fireball and the resulting radiation, due to instantaneous ignition of the flammable vapor cloud. Release and dispersion of toxic gases and vapors. During the combustion of a flammable material a lot of chemical compounds are produced and travel large distances downwind, forming a combustion gas cloud. Some of them (CO, NO_x) are toxic and even fatal to humans at sufficiently high doses. In this way the particles are carried away by these gases traveling some distance into the heavy gas cloud and affect inhabitants before they meet the ground.

Consequence Analysis Results Summary

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

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

Naphtha transfer pump discharge line rupture scenario which results into jet fire flame radiation intensity of 37.5 kW/m² to the distance of 127 meter impinges directly to the adjacent pumps in the pump house and associated pipelines carrying hydrocarbons to the loading bays.

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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Vinyl Acetate Monomer discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m² to the distance of 75 meters, impinges directly to pipelines carrying to the loading bays

Gasoil pump discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m² to the distance of 41 meters, impinges directly to pipelines carrying to the loading bays

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

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (Port Area)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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Vapor cloud explosion:

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

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

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

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

	ADANI PORTS AND SEZ LTD MUNDRA	JANUARY - 2022
	ON SITE EMERGENCY PLAN (Port Area)	

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

Toxic Gas Release :

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

- Positively buoyant
- Neutrally buoyant
- Negatively buoyant.

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These classifications are based on the density difference between the released material and its surrounding medium (air). The classifications are influenced by release temperature, molecular weight, presence of aerosols, ambient temperature at release, and relative humidity.

Ignition Sources :

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

Meteorology :

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

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Pasquill Stability Classes :

Pasquill has defined 6 stability classes.

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

Three prime factors that defines Stability

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

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

Results For Different Weather Conditions:

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

Ambient temperature:

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

Relative humidity%: 65% to 90%

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CLIMATOLOGICAL TABLE:

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

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

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

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3D	5 C/D		2F	3D	5 C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	UFL	264	223	189	0.02068	2380	2004	1803
		LFL	757	617	549	0.1379	1312	1045	896
		LFL-50%	1001	837	765	0.2068	1235	980	844
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	845	838	807	0.02068	182	156	134
		LFL	57.79	50.84	40.7	0.1379	99	92	79
		LFL-50%	75	71	60	0.2068	92	87	74
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	457	434	362	0.02068	73	63	46
		LFL	28	21	12	0.1379	41	38	26
		LFL-50%	39	33	26	0.2068	38	36	25
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	UFL	688	688	688	0.02068	NH	NH	NH
		LFL	69	69	7.57	0.1379	NH	NH	NH
		LFL-50%	15.6	15.7	18.2	0.2068	NH	NH	NH
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	UFL	545	545	539	0.02068	-	-	-
		LFL	5.53	5.53	5.52	0.1379	-	-	-
		LFL-50%	5.55	5.56	5.55	0.2068	-	-	-

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances- Flash Fire					Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters			
			2F	3 D	5 C/D		2F	3D	5 C/D	
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	UFL	3.43	3.27	3.03	0.02068	-	-	-	-
		LFL	4.10	4.05	3.96	0.1379	-	-	-	-
		LFL-50%	4.27	4.26	4.22	0.2068	-	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	UFL	28	28	30	0.02068	459	448	453	
		LFL	44	36	47	0.1379	148	140	146	
		LFL-50%	130	62	90	0.2068	124	117	122	
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.24	0.23	0.28	0.02068	-	36	-	
		LFL	3.46	3.16	3.03	0.1379	-	16	-	
		LFL-50%	9.85	10.16	7.88	0.2068	-	15	-	
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.13	0.09	0.11	0.02068	-	-	-	
		LFL	1.38	1.27	1.25	0.1379	-	-	-	
		LFL-50%	3.27	3.38	2.83	0.2068	-	-	-	
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	UFL	29	29	31	0.02068	272	268	263	
		LFL	52	49	48	0.1379	130	118	112	
		LFL-50%	118	110	113	0.2068	121	111	106	
11.	Major leak (25 mm) in P-Xylene storage tank T-39 (1460kl)	UFL	4.91	4.95	4.86	0.02068	-	-	-	
		LFL	4.94	5.04	4.93	0.1379	-	-	-	

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3D	5 C/D		2F	3D	5 C/D
		LFL-50%	5.21	5.05	4.94	0.2068	-	-	-
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	UFL	3.35	3.39	3.08	0.02068	-	-	-
		LFL	3.51	3.97	4.04	0.1379	-	-	-
		LFL-50%	3.53	4.02	4.09	0.2068	-	-	-
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	UFL	33	33	36	0.02068	898	828	802
		LFL	240	212	195	0.1379	463	400	384
		LFL-50%	347	307	295	0.2068	433	372	337
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	UFL	4.77	4.68	4.71	0.02068	32	21	23
		LFL	9.23	7.45	5.53	0.1379	23	13	13
		LFL-50%	23.8	19.5	15.03	0.2068	22	12	12
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	UFL	3.11	2.92	2.69	0.02068	-	-	-
		LFL	4.29	3.94	4.21	0.1379	-	-	-
		LFL-50%	11.8	6.91	4.67	0.2068	-	-	-
16.	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	UFL	60	75	88	0.02068	857	857	937
		LFL	83	78	97	0.1379	290	284	309
		LFL-50%	153	145	261	0.2068	247	240	259

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances-Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3 D	5 C/D
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	UFL	6.07	5.56	4.91	0.02068	-	-	-
		LFL	6.93	7.06	6.95	0.1379	-	-	-
		LFL-50%	9.35	8.20	7.03	0.2068	-	-	-
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	UFL	2.56	2.47	2.36	0.02068	-	-	-
		LFL	4.81	4.78	4.89	0.1379	-	-	-
		LFL-50%	5.32	5.08	5.14	0.2068	-	-	-
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	UFL	57	55	59	0.02068	531	521	575
		LFL	101	87	107	0.1379	232	204	231
		LFL-50%	252	217	224	0.2068	225	193	226
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	UFL	6.31	6.30	6.34	0.02068	-	-	-
		LFL	6.39	6.38	6.58	0.1379	-	-	-
		LFL-50%	6.40	6.40	6.61	0.2068	-	-	-
21.	Minor leak (10 mm) in P-Xylene storage tank T-115 (5000 kl)	UFL	3.7	4.02	3.58	0.02068	-	-	-
		LFL	4.3	4.9	4.8	0.1379	-	-	-
		LFL-50%	4.4	5.03	4.93	0.2068	-	-	-
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	UFL	45	44	48	0.02068	929	855	819
		LFL	260	230	220	0.1379	495	425	387

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances-Flash Fire					Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters			
			2F	3-D	5 C/D		2F	3D	5 C/D	
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	UFL	245	232	198	0.02068	1830	1960	1542	
		LFL	780	712	708	0.1379	1421	1034	900	
		LFL-50%	980	825	812	0.2068	1123	1025	985	
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	856	912	901	0.02068	210	195	165	
		LFL	63	58	42	0.1379	184	162	114	
		LFL-50%	95	92	90	0.2068	94	83	62	
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	523	512	498	0.02068	150	148	132	
		LFL	38	41	34	0.1379	60	51	38	
		LFL-50%	28	24	20	0.2068	38	30	24	
31.	Loss of containment from Naphtia tanker 30 MT	UFL	31	28	25	0.02068	363	344	335	
		LFL	82	83	86	0.1379	161	152	147	
		LFL-50%	101	111	121	0.2068	147	140	136	
32.	Loss of containment from Acetic acid tanker 30MT	UFL	4.65	4.71	4.86	0.02068	-	-	-	
		LFL	4.69	4.76	4.92	0.1379	-	-	-	
		LFL-50%	4.71	4.77	4.94	0.2068	-	-	-	
33.	Loss of containment from methanol tanker 30MT	UFL	4.52	4.57	4.74	0.02068	93	90	88	
		LFL	55.5	53.3	55.9	0.1379	81	65	74	

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances-Flash Fire				Explosion Results					
		Concentration	Distance in meters			Over pressure in bar	Distance in meters				
			2F	3 D	5 C/D		2F	3D	5 C/D		
		LFL-50%	190	134	159	0.2068	81	64	73		
34.	Loss of containment from P-Xylene tanker 30 MT	UFL	3.54	3.59	3.71	0.02068	122	40	NH		
		LFL	76	22	3.75	0.1379	96	32	NH		
		LFL-50%	131	54	58	0.2068	94	32	NH		
35.	Loss of containment from toluene tanker 30 MT	UFL	3.30	3.34	3.46	0.02068	1029	46	76		
		LFL	28	29	27	0.1379	56	47	43		
		LFL-50%	42	46	52	0.2068	52	46	42		
36.	Loss of containment from VAM tanker 30 MT	UFL	4.11	4.16	4.3	0.02068	150	127	121		
		LFL	33	32	29	0.1379	68	59	54		
		LFL-50%	50	51	51	0.2068	62	55	51		
37.	Loss of containment from Naphtia tanker 20 MT	UFL	26	24	22	0.02068	315	301	292		
		LFL	70	72	74	0.1379	139	132	127		
		LFL-50%	87	97	108	0.2068	126	120	117		
38.	Loss of containment from acetic acid tanker 20 MT	UFL	3.99	4.04	4.17	0.02068	-	-	-		
		LFL	4.02	4.06	4.20	0.1379	-	-	-		
		LFL-50%	4.04	4.09	4.22	0.2068	-	-	-		

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
39.	Loss of containment from methanol tanker 20 MT	UFL	3.87	3.92	4.05	0.02068	79	83	84
		LFL	48.9	54	54	0.1379	64	65	73
		LFL-50%	161	165	128	0.2068	63	64	72
40.	Loss of containment from P- Xylene tanker 20 MT	UFL	3.03	3.07	3.16	0.02068	87	NH	NH
		LFL	58	3.10	14.02	0.1379	74	NH	NH
		LFL-50%	110	45	48	0.2068	73	NH	NH
41.	Loss of containment from Toluene tanker 20 MT	UFL	2.82	2.85	2.94	0.02068	91	72	65
		LFL	23	24	22	0.1379	45	40	34
		LFL-50%	37	37	46	0.2068	42	38	33
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	UFL	3.52	3.57	3.67	0.02068	133	116	104
		LFL	28	27	24	0.1379	59	52	46
		LFL-50%	43	47	44	0.2068	54	47	42
43.	Acetic acid pump P-40 discharge line full bore rupture	UFL	8.12	7.92	7.3	0.02068		15.3	15.4
		LFL	8.2	8.02	7.35	0.1379		11.3	11.4
		LFL-50%	9.83	10.0	10.2	0.2068		11.07	11.4
44.	Gasoil pump P-101 discharge line full bore rupture	UFL	9.2	8.8	9.3	0.02068	111	84	122
		LFL	36	28	40	0.1379	80	51	83

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Hazard Distances-Flash Fire					Explosion Results				
		Concentration	Distance in meters			Over pressure in bar	Distance in meters				
			2F	3 D	5 C/D		2F	3D	5 C/D		
		LFL-50%	77	47	75	0.2068	78	49	80		
45.	Methanol pump P-119 discharge line full bore rupture	UFL	9.12	10.38	10.9	0.02068	80	78	99		
		LFL	24.4	24.3	29.4	0.1379	50	49	70		
		LFL-50%	43.5	40.3	70.9	0.2068	48	47	67		
46.	Naphtna pump P-01 discharge line full bore rupture	UFL	31	30	32	0.02068	484	480	429		
		LFL	172	158	129	0.1379	238	271	237		
		LFL-50%	221	214	179	0.2068	233	257	222		
47.	P-Xylene pump P-39 discharge line full bore rupture	UFL	8.4	8.2	8.2	0.02068	39	62	48		
		LFL	14	15	13	0.1379	25	45	34		
		LFL-50%	27	45	38	0.2068	23	44	33		
48.	Toluene pump P-122 discharge line full bore rupture	UFL	8.12	8.74	8.07	0.02068	118	148	134		
		LFL	37	46	43	0.1379	87	97	86		
		LFL-50%	58	80	73	0.2068	63	93	82		
49.	VAM pump P-24 discharge line full bore rupture	UFL	8.88	8.74	9.29	0.02068	212	175	158		
		LFL	70	57	50	0.1379	116	104	92		
		LFL-50%	102	87	74	0.2068	110	99	87		

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m ²)		Distance in meters		Radiation Levels (kW/m ²)		Distance in meters	
		2F	3D	5C/D		2F	3D	5C/D	
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	4	289	290	296	4	-	-	-
		12.5	211	209	214	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	4	29	29	29	4	65	62	59
		12.5	22	23	23	12.5	49	46	43
		37.5	NR	NR	NR	37.5	40	37	34
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	4	20.6	20.6	20.9	4	28	27	25
		12.5	15.7	16	16.9	12.5	21	20	19
		37.5	11.4	12	13.8	37.5	17	16	15
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	4	26	26	29	4	-	-	-
		12.5	15	16	19	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	4	26	27	27	4	17	17	16
		12.5	16	16	17	12.5	14	13	13
		37.5	NR	NR	NR	37.5	NR	NR	NR

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m ²)	Distance in meters			Radiation Levels (kW/m ²)	Distance in meters		
			2F	3D	SC/D		2F	3D	SC/D
11.	Major leak (25 mm) in P-Xylene storage tank T-39 (1460 kl)	4	55	55	55	4	17	16	16
		12.5	36	37	38	12.5	13	13	12
		37.5	22	24	26	37.5	11	10	10
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	4	54	55	55	4	8.78	8.52	8.17
		12.5	35	36	37	12.5	6.74	6.46	6.12
		37.5	20	23	25	37.5	6.23	5.82	4.54
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	4	637	639	646	4	-	-	-
		12.5	406	414	424	12.5	-	-	-
		37.5	250	263	285	37.5	-	-	-
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24 (1458 kl)	4	33	33	34	4	33	32	30
		12.5	22	23	24	12.5	26	25	24
		37.5	10	11	11	37.5	21	20	19
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	4	31	32	33	4	16	15	14
		12.5	20	22	24	12.5	13	12	11
		37.5	9.8	10.1	11	37.5	NR	NR	NR
16.	Catastrophic rupture of methanol storage tank T-	4	602	598	610	4	-	-	-

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m ²)	Distance in meters			Radiation Levels (kW/m ²)	Distance in meters		
			2F	3D	SCID		2F	3D	SCID
	(3000 kl)	12.5	23	24.8	26.8	12.5	18	18	17
		37.5	NR	NR	NR	37.5	15	14	13
27.	Minor leak (10 mm) in gasoil storage tank T-101 (3000 kl)	4	36	36	38	4	11.8	11.5	11.12
		12.5	22	23	26	12.5	9.16	8.8	8.32
		37.5	12	12	12	37.5	7.4	7	6.5
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	4	255	291	269	4	-	-	-
		12.5	204	201	215	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	4	31	34	30	4	72	68	61
		12.5	26	24	23	12.5	48	43	48
		37.5	NR	NR	NR	37.5	38	37	31
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	4	24	22	19	4	41	43	38
		12.5	18	13	17	12.5	28	26	21
		37.5	NR	NR	NR	37.5	17	19	21
31.	Loss of containment from Naphtha tanker 30 MT	4	20	21	21	4	-	-	-

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

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

ON SITE EMERGENCY PLAN (Port Area)

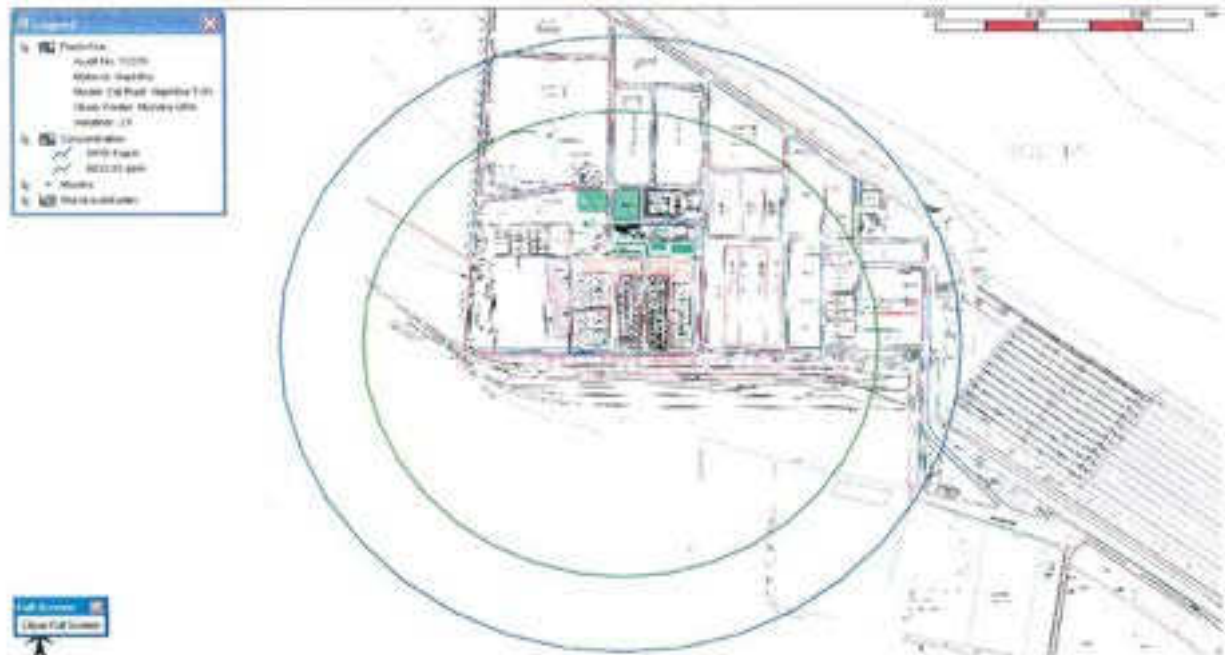
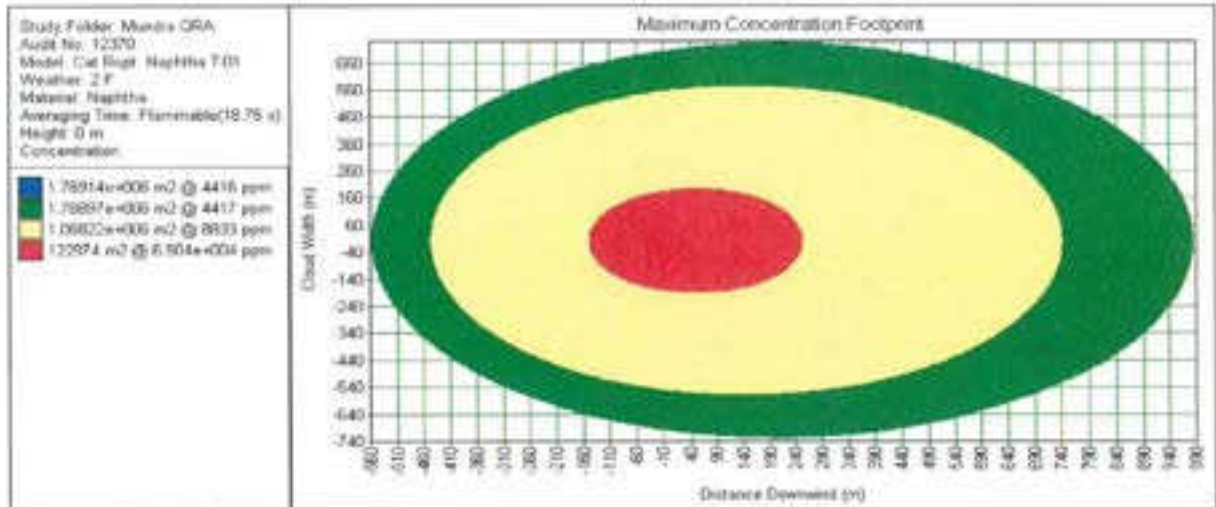
Scenario No.	Scenario Description	Pool Fire Results					Jet Fire Results				
		Radiation Levels (kW/m ²)	Distance in meters			Radiation Levels (kW/m ²)	Distance in meters	2F	3D	5C/D	
			2F	3D	5C/D						
		12.5	39	40	41	12.5	-	-	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-	-	-
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	4	178	179	181	4	-	-	-	-	-
		12.5	111	115	118	12.5	-	-	-	-	-
		37.5	80	85	73	37.5	-	-	-	-	-
43.	Acetic acid pump P-40 discharge line full bore rupture	4	93	94	95	4	41	39	40		
		12.5	61	64	67	12.5	33	32	32		
		37.5	NR	NR	NR	37.5	NR	NR	NR		
44.	Gas oil pump P-101 discharge line full bore rupture	4	93	98	104	4	66	64	66		
		12.5	45	45	47	12.5	51	48	50		
		37.5	NR	NR	NR	37.5	41	38	40		
45.	Methanol pump P-119 discharge line full bore rupture	4	100	101	103	4	103	104	99		
		12.5	69	72	75	12.5	84	86	81		
		37.5	45	46	46	37.5	NR	NR	NR		
46.	Naphtha pump P-01 discharge line full bore	4	65	67	66	4	211	213	208		

ON SITE EMERGENCY PLAN (Port Area)

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m ²)	Distance in meters			Radiation Levels (kW/m ²)	Distance in meters		
			2F	3D	5CD		2F	3D	5CD
	rupture	12.5	43	45	46	12.5	158	158	151
		37.5	NR	NR	NR	37.5	127	125	118
47.	P-Xylene pump P-39 discharge line full bore rupture	4	263	265	264	4	49	51	47
		12.5	166	169	172	12.5	38	39	35
		37.5	105	110	117	37.5	31	32	28
48.	Toluene pump P-122 discharge line full bore rupture	4	97	105	112	4	72	77	75
		12.5	44	45	46	12.5	56	59	56
		37.5	NR	NR	NR	37.5	46	48	45
49.	VAM pump P-24 discharge line full bore rupture	4	177	179	180	4	116	112	112
		12.5	113	117	120	12.5	91	87	86
		37.5	65	70	77	37.5	75	72	71

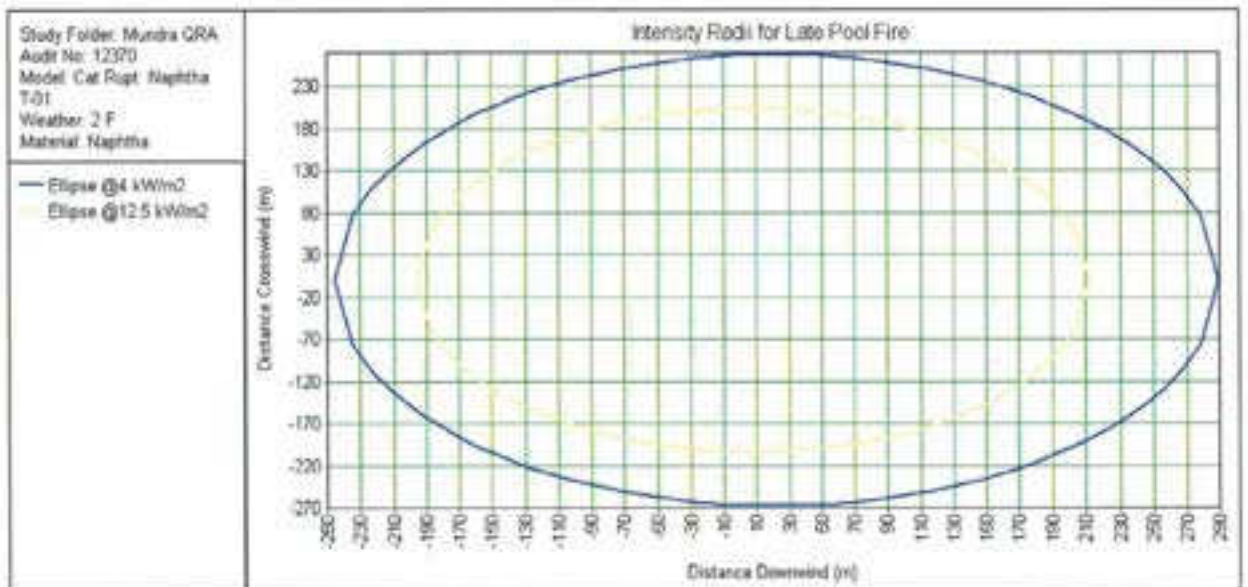
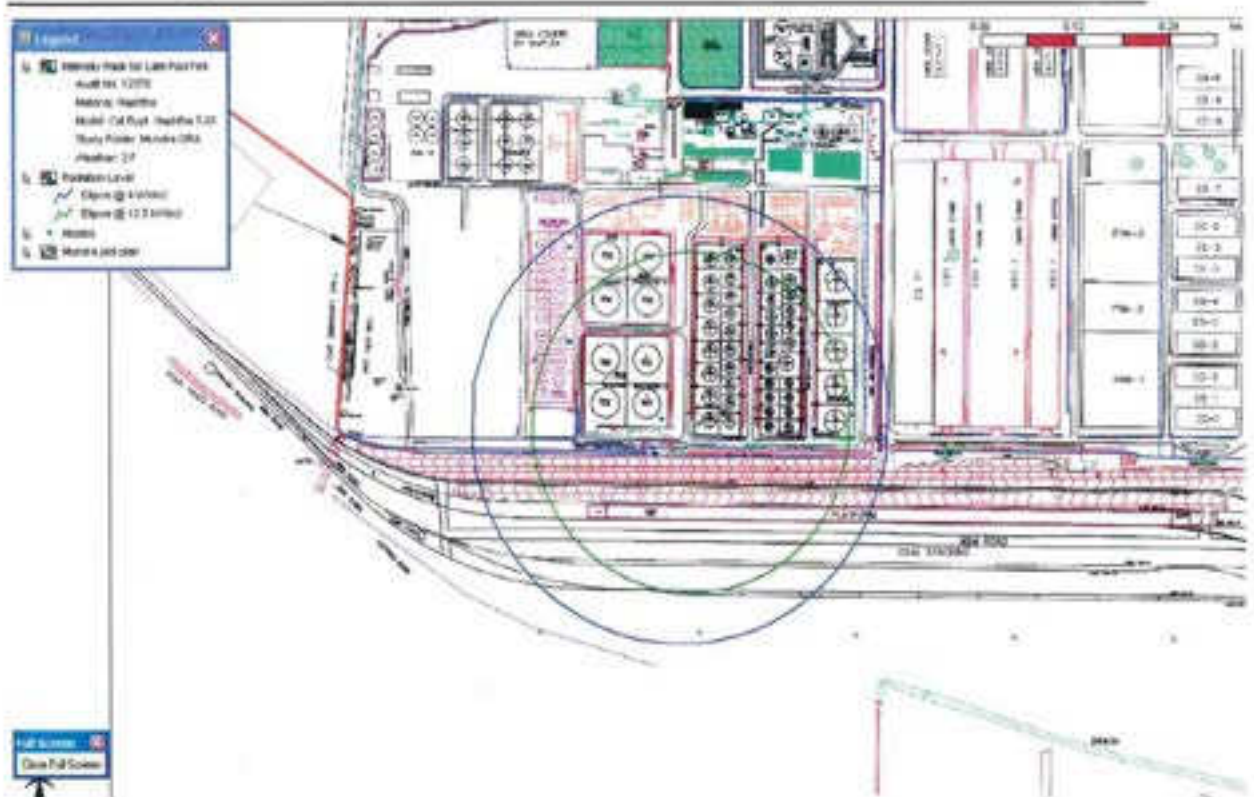
ON SITE EMERGENCY PLAN (Port Area)

Scenario No.:1

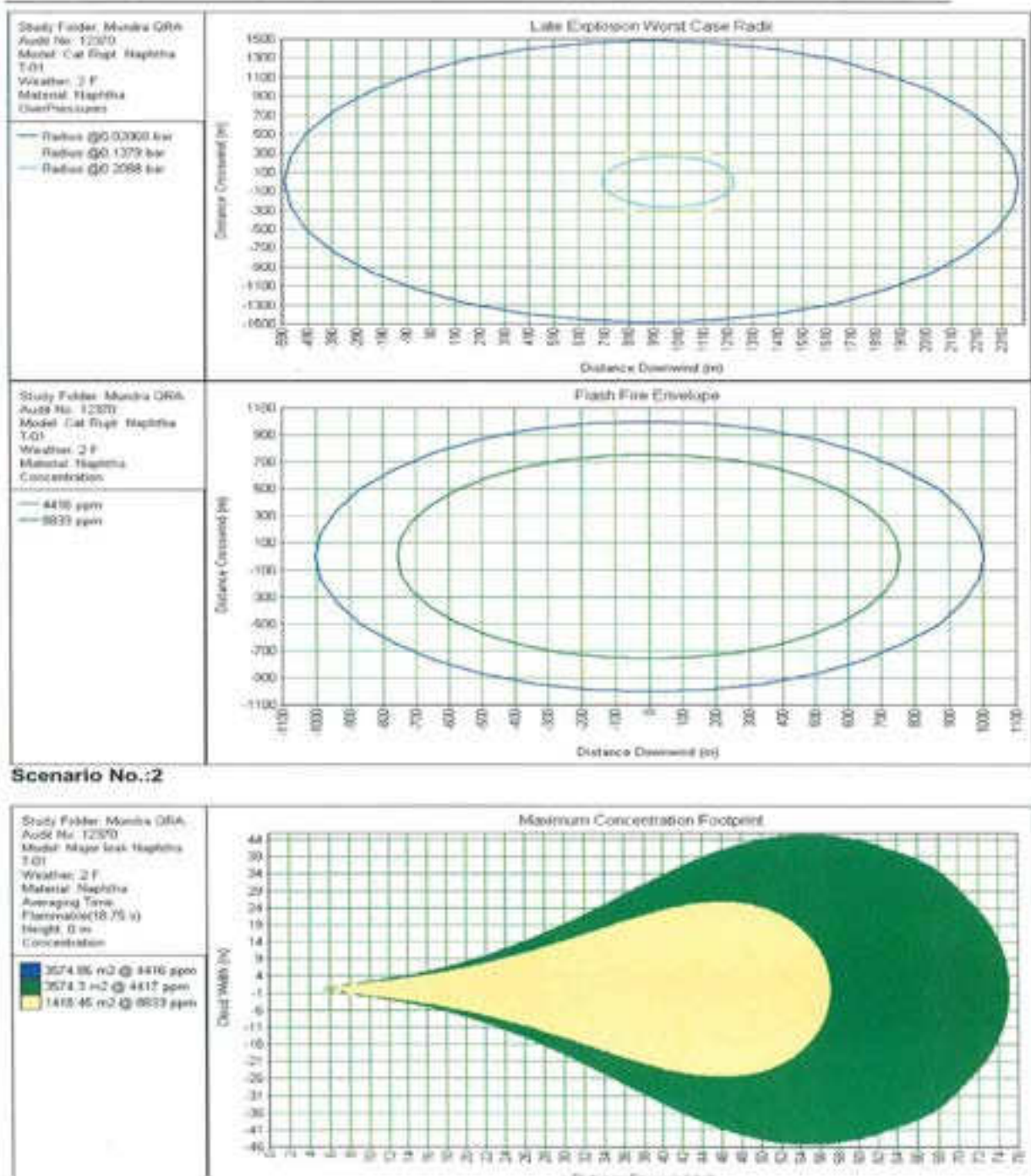


ON SITE EMERGENCY PLAN (Port Area)

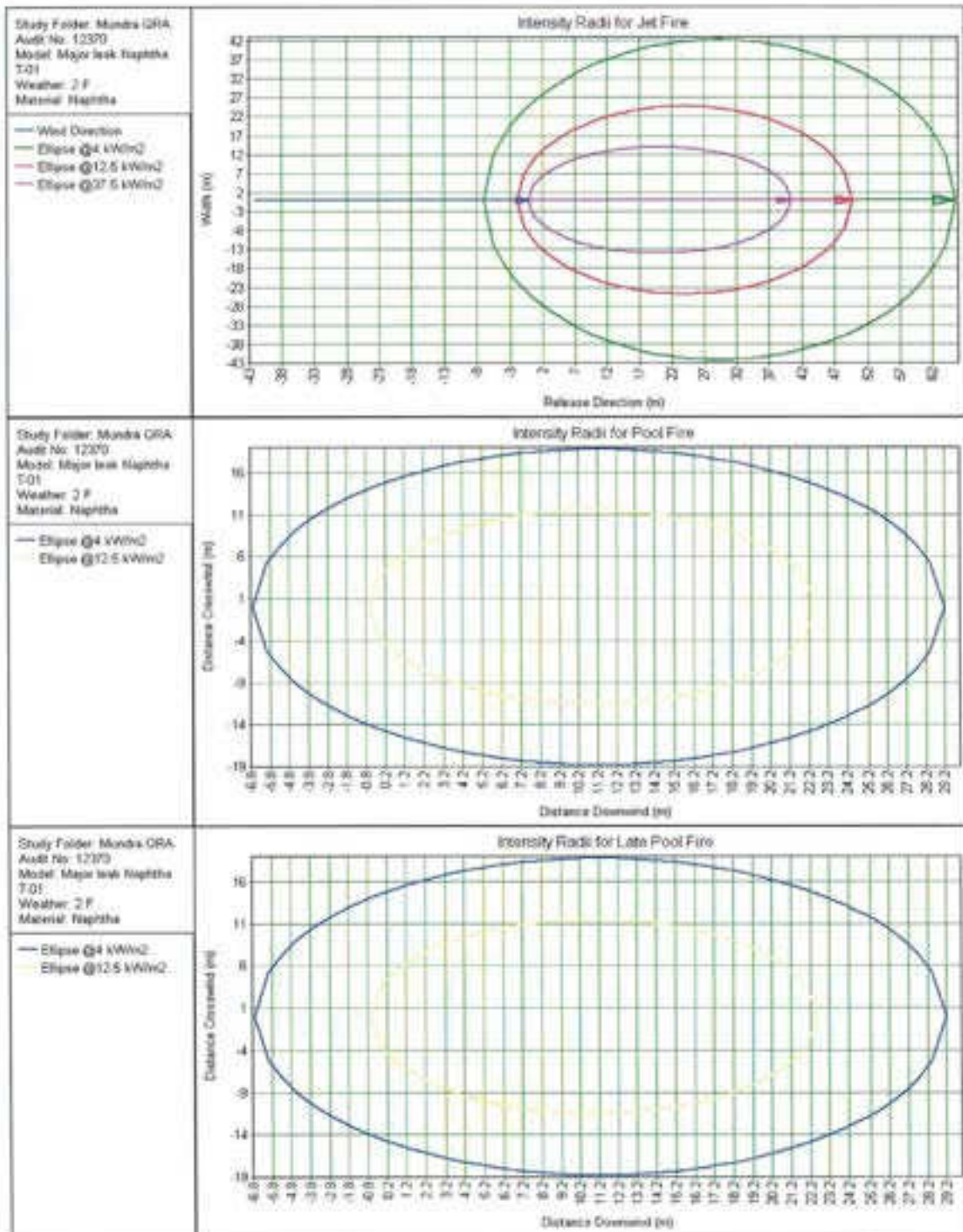
Mundra QRA Study



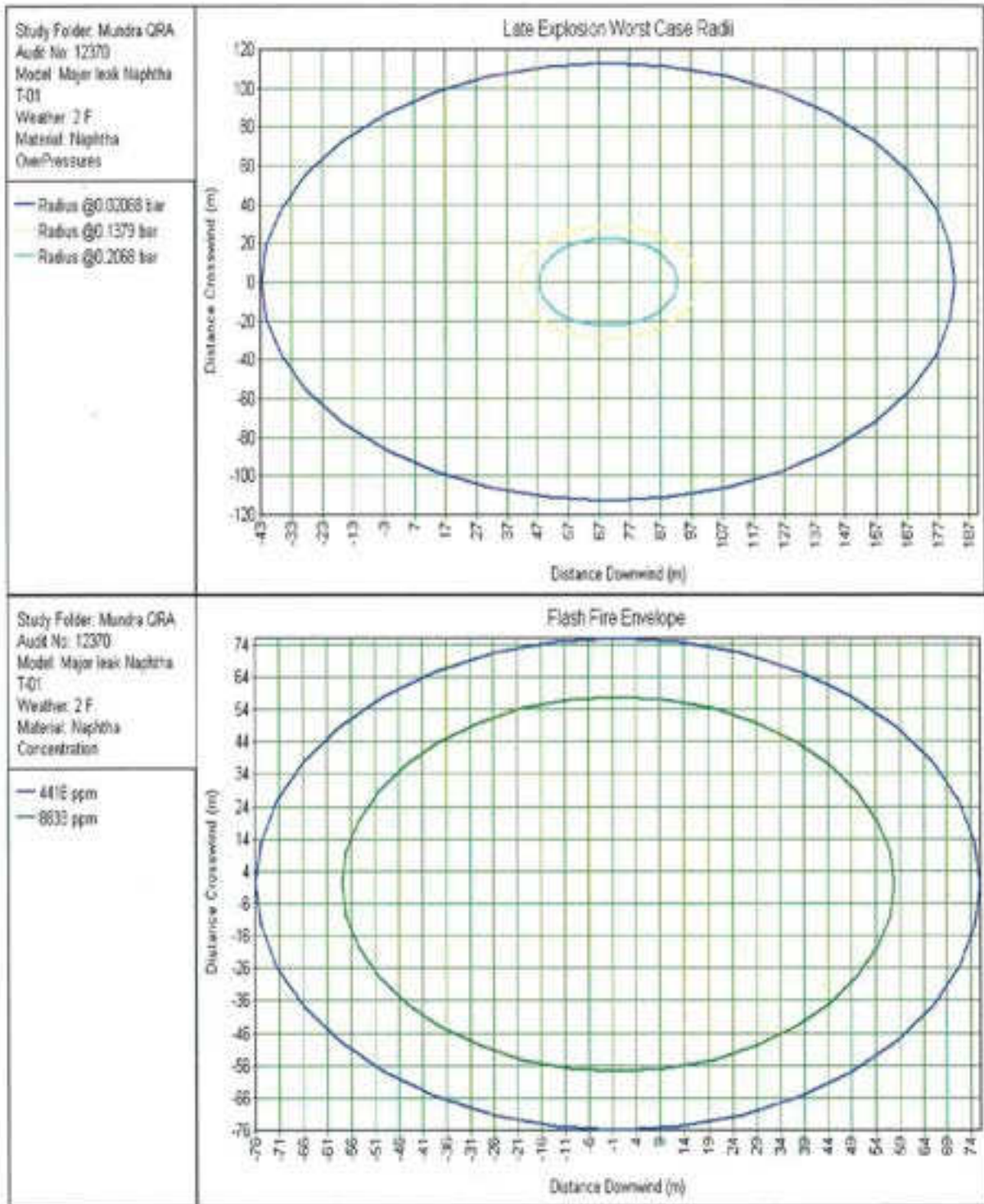
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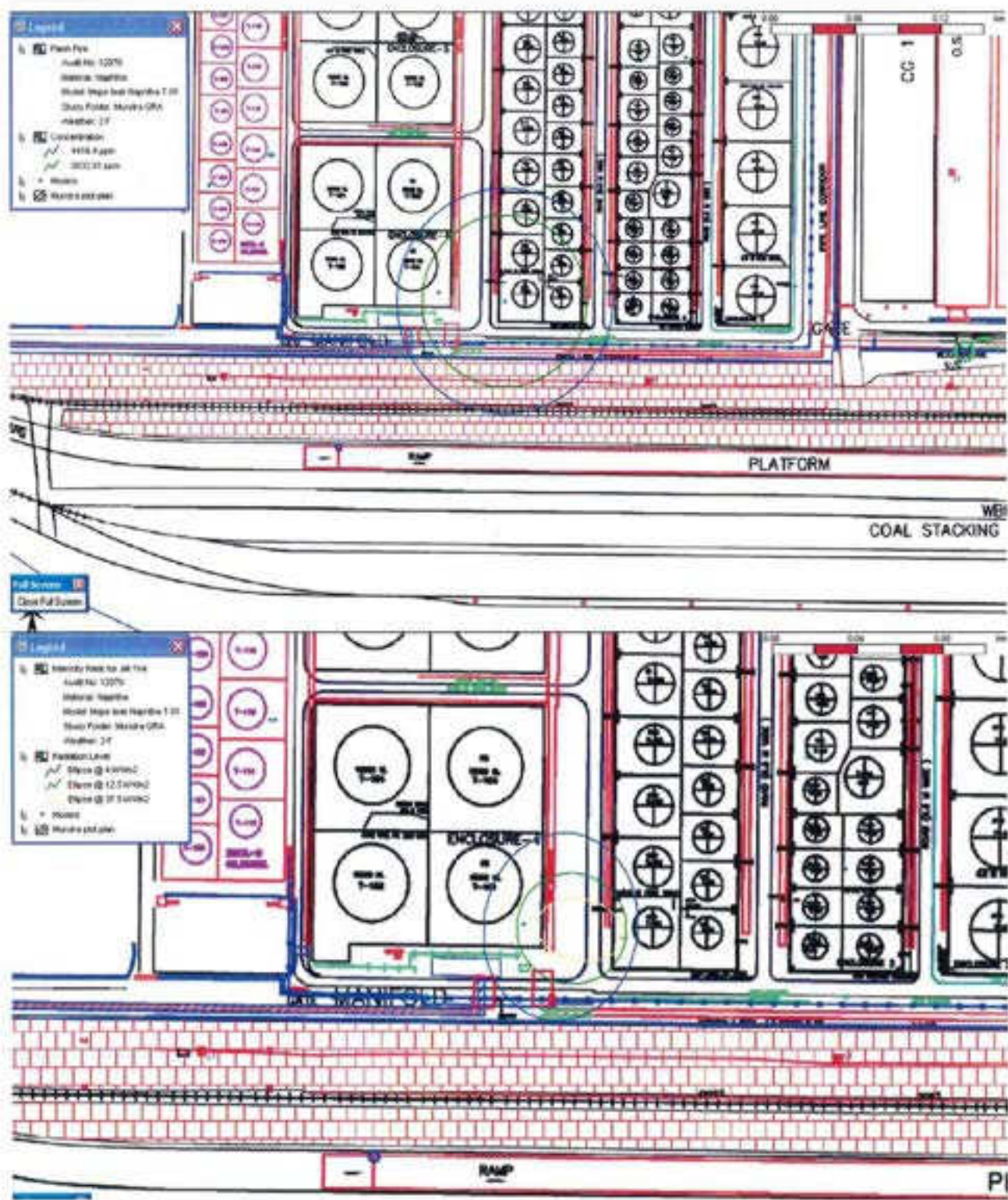
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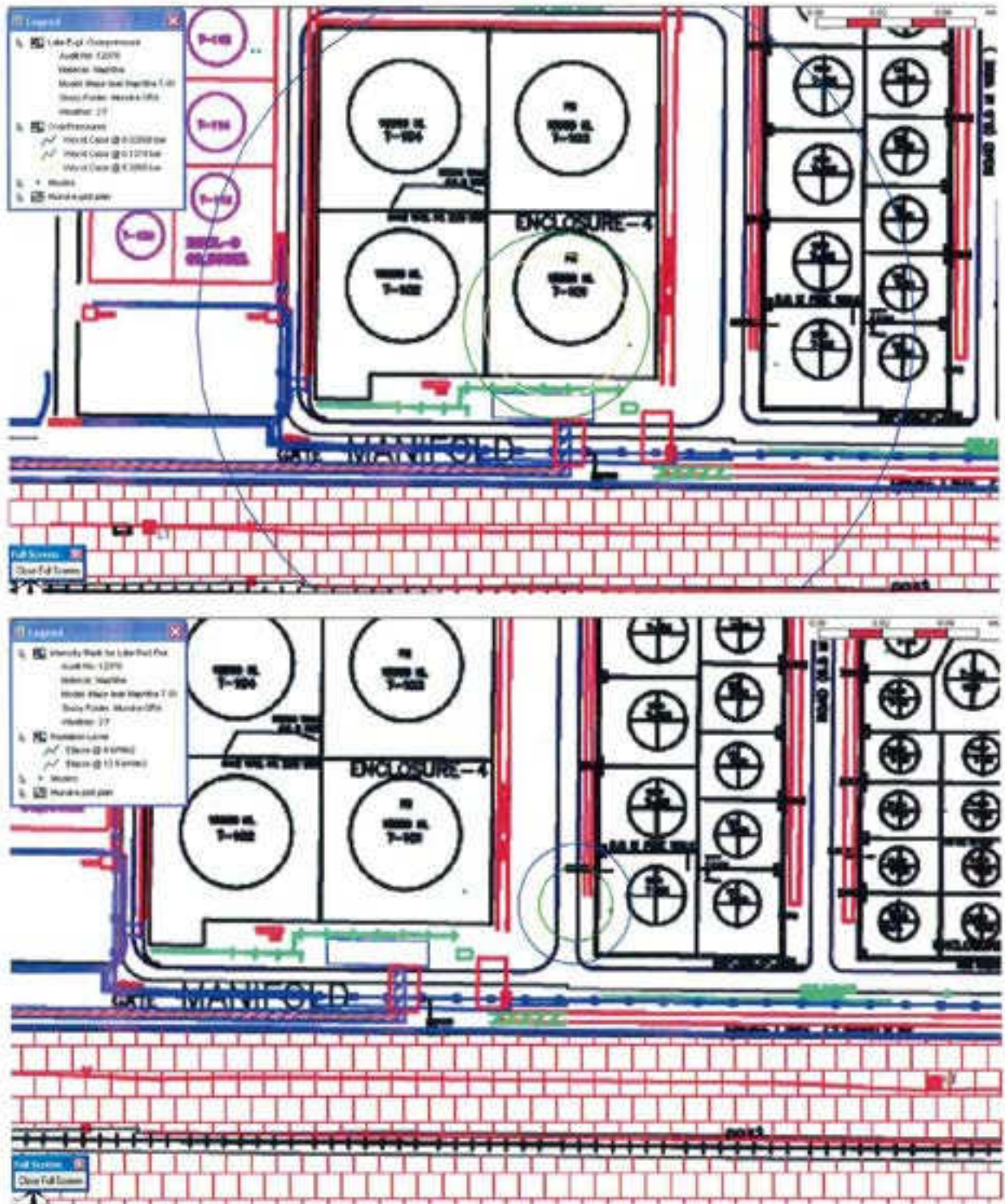
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ON SITE EMERGENCY PLAN (Port Area)



ON SITE EMERGENCY PLAN (Port Area)

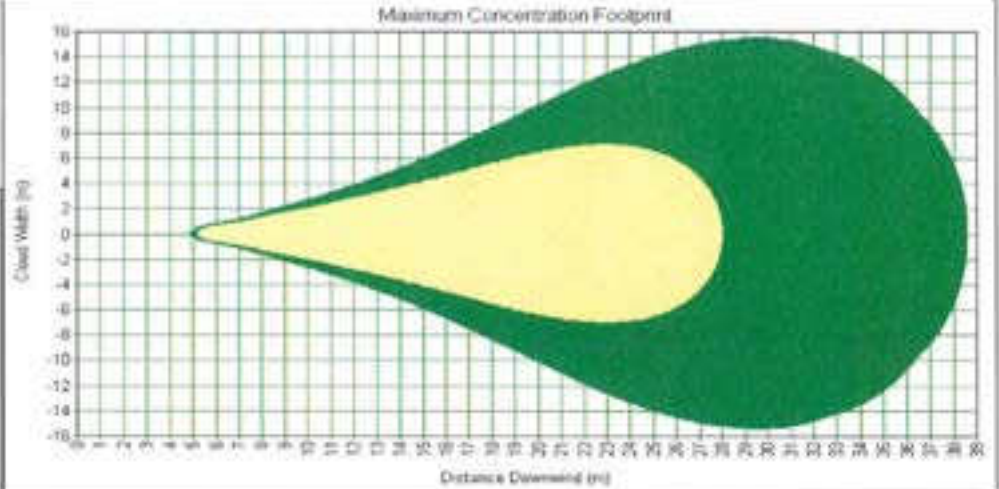


ON SITE EMERGENCY PLAN (Port Area)

Scenario No.:3

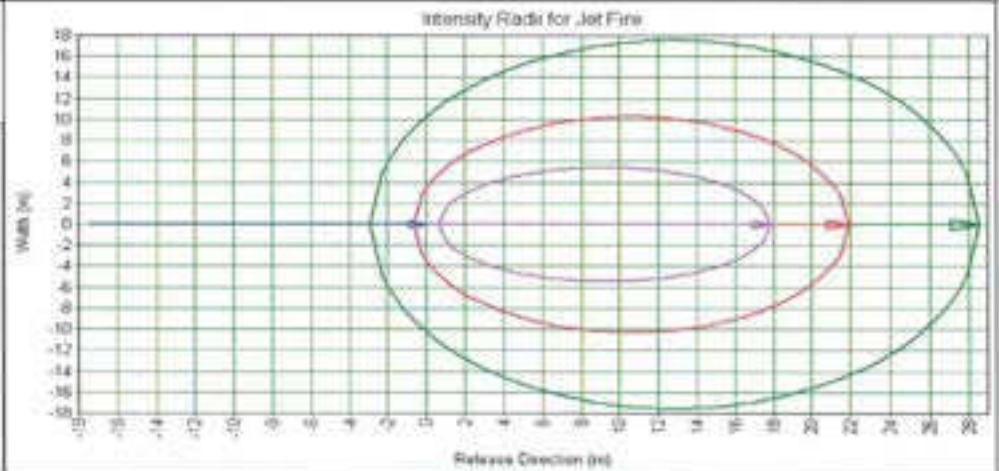
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Audit No: 12370
Model: Minor leak Naphtha
T:01
Weather: 2 F
Material: Naphtha
Arranging Time:
Flammable(18.75 s)
Height: 0 m
Concentration

617.874 m2 @ 4416 ppm
617.761 m2 @ 4417 ppm
192.55 m2 @ 9833 ppm



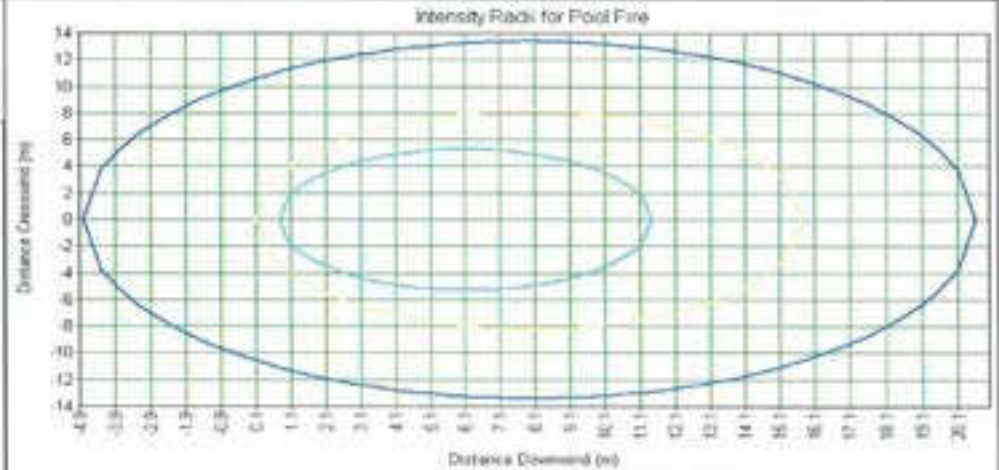
Study Folder: Mundra GFA
Audit No: 12370
Model: Minor leak Naphtha
T:01
Weather: 2 F
Material: Naphtha

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

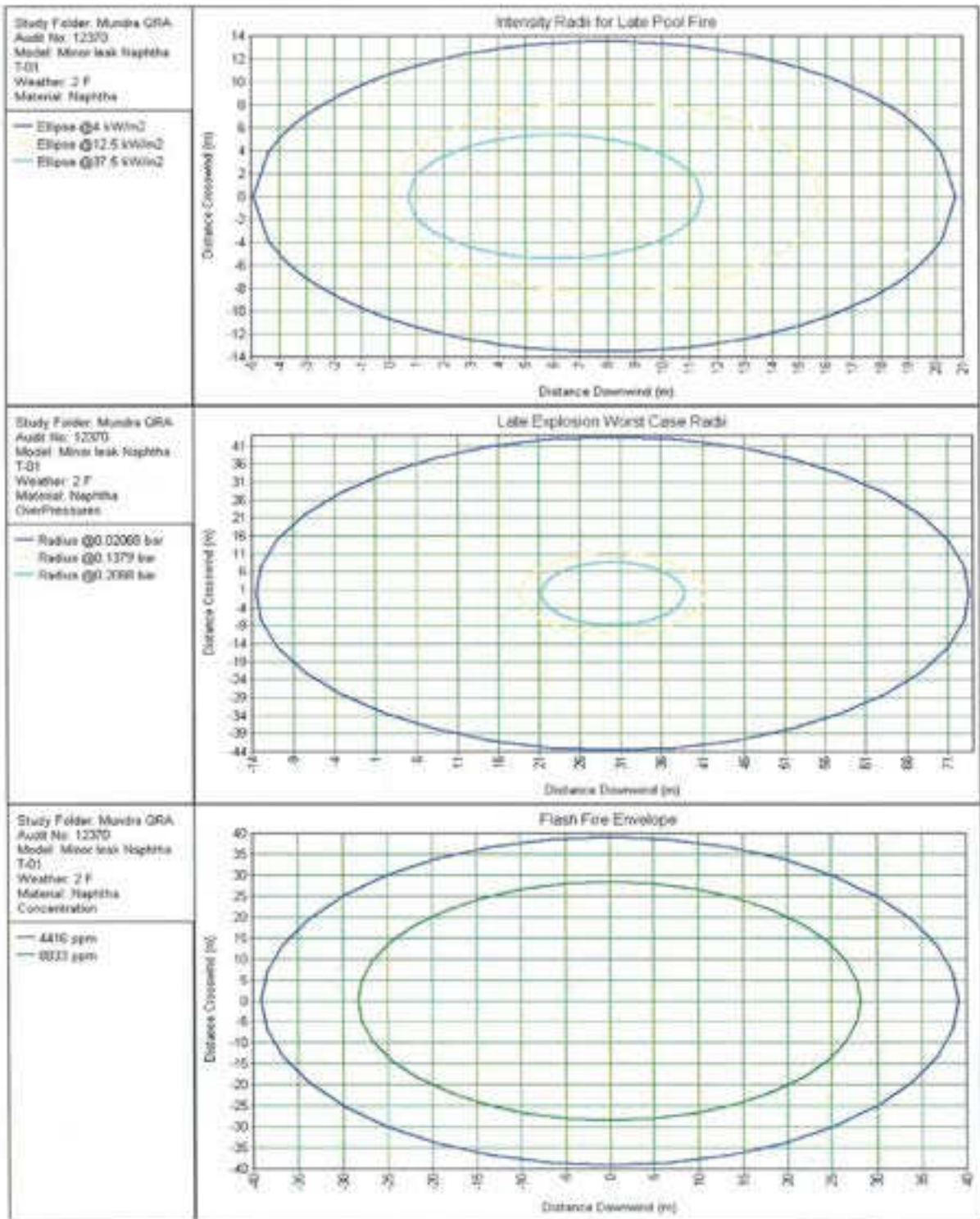


Study Folder: Mundra GFA
Audit No: 12370
Model: Minor leak Naphtha
T:01
Weather: 2 F
Material: Naphtha

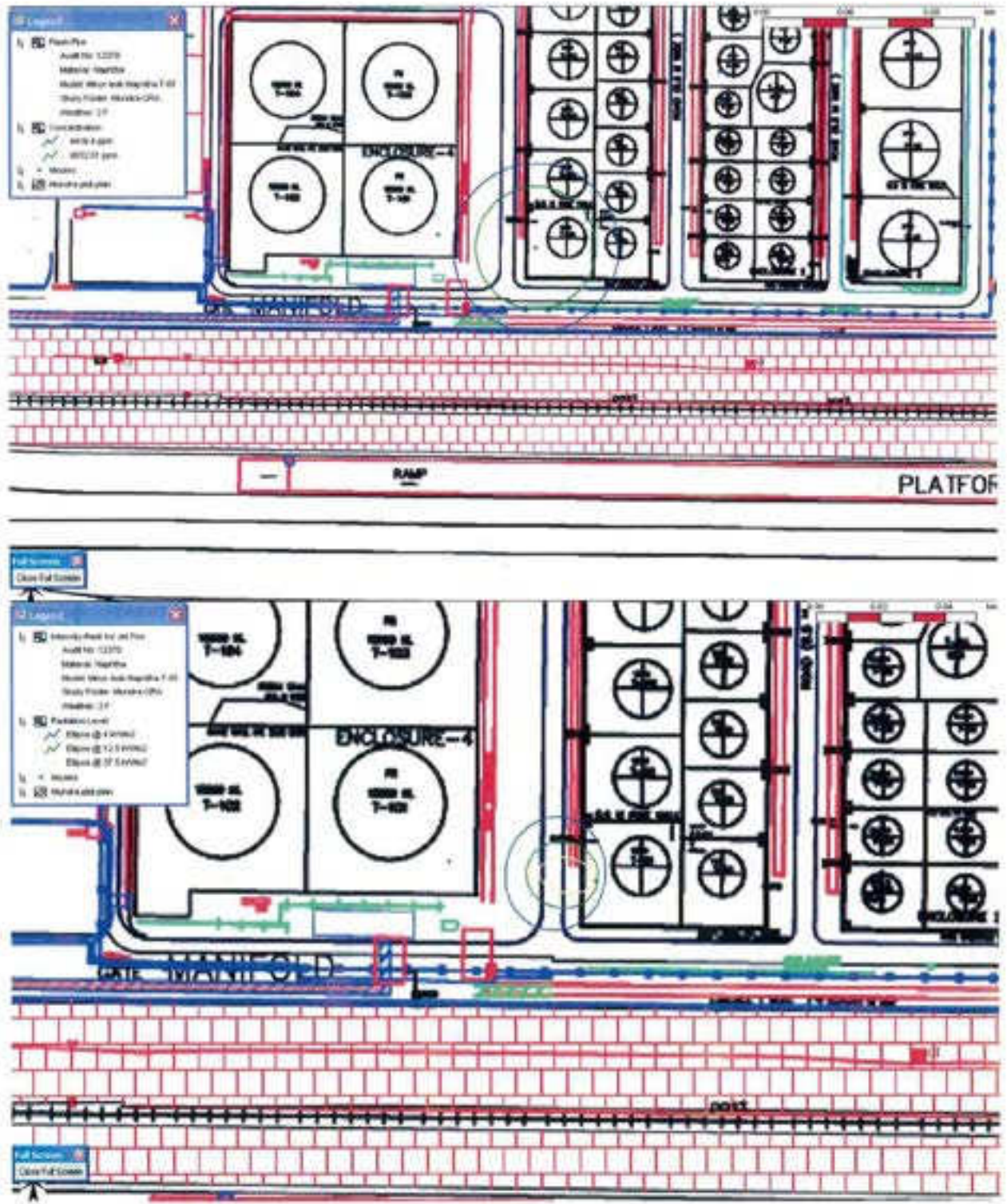
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2



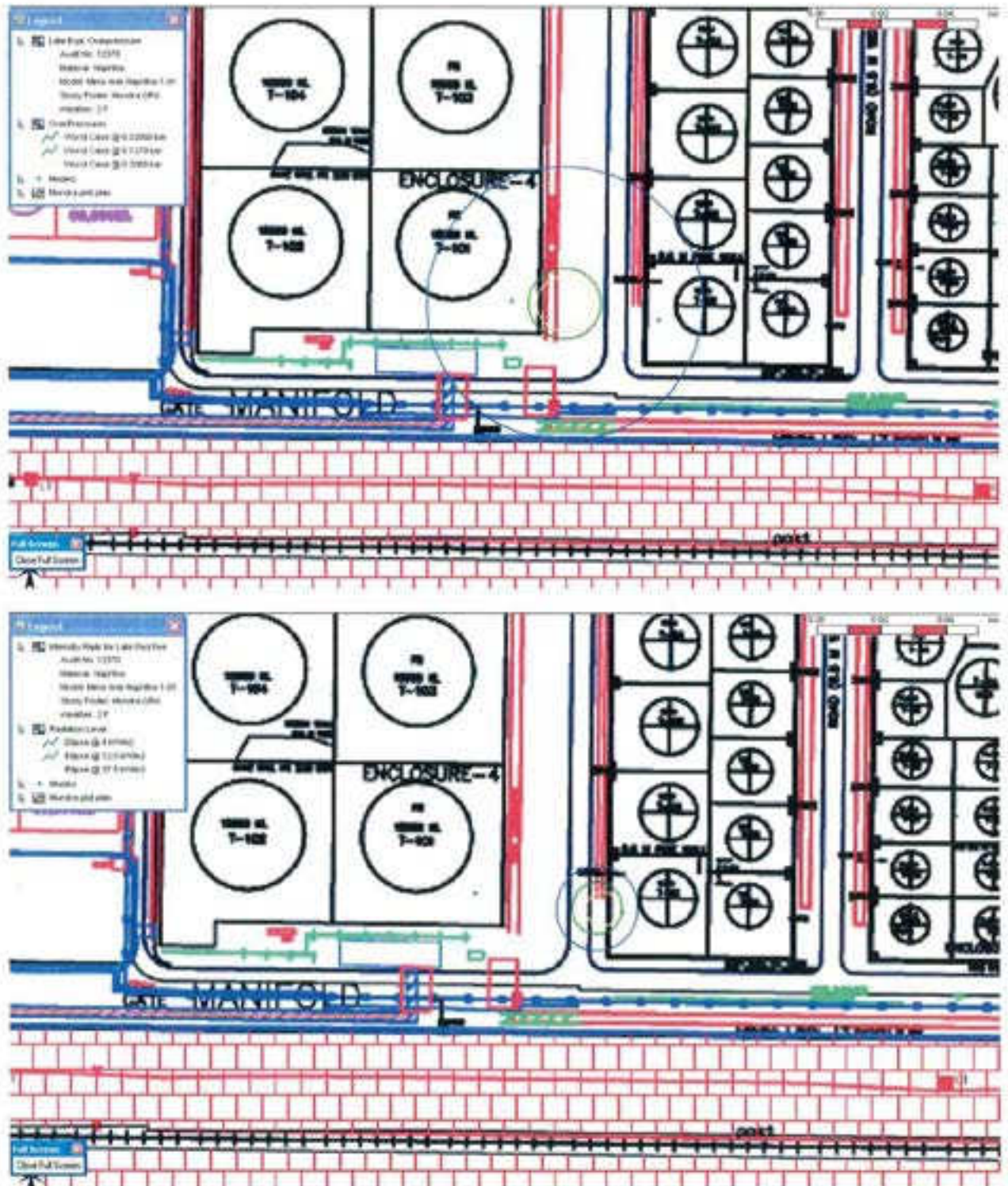
ON SITE EMERGENCY PLAN (Port Area)



ON SITE EMERGENCY PLAN (Port Area)

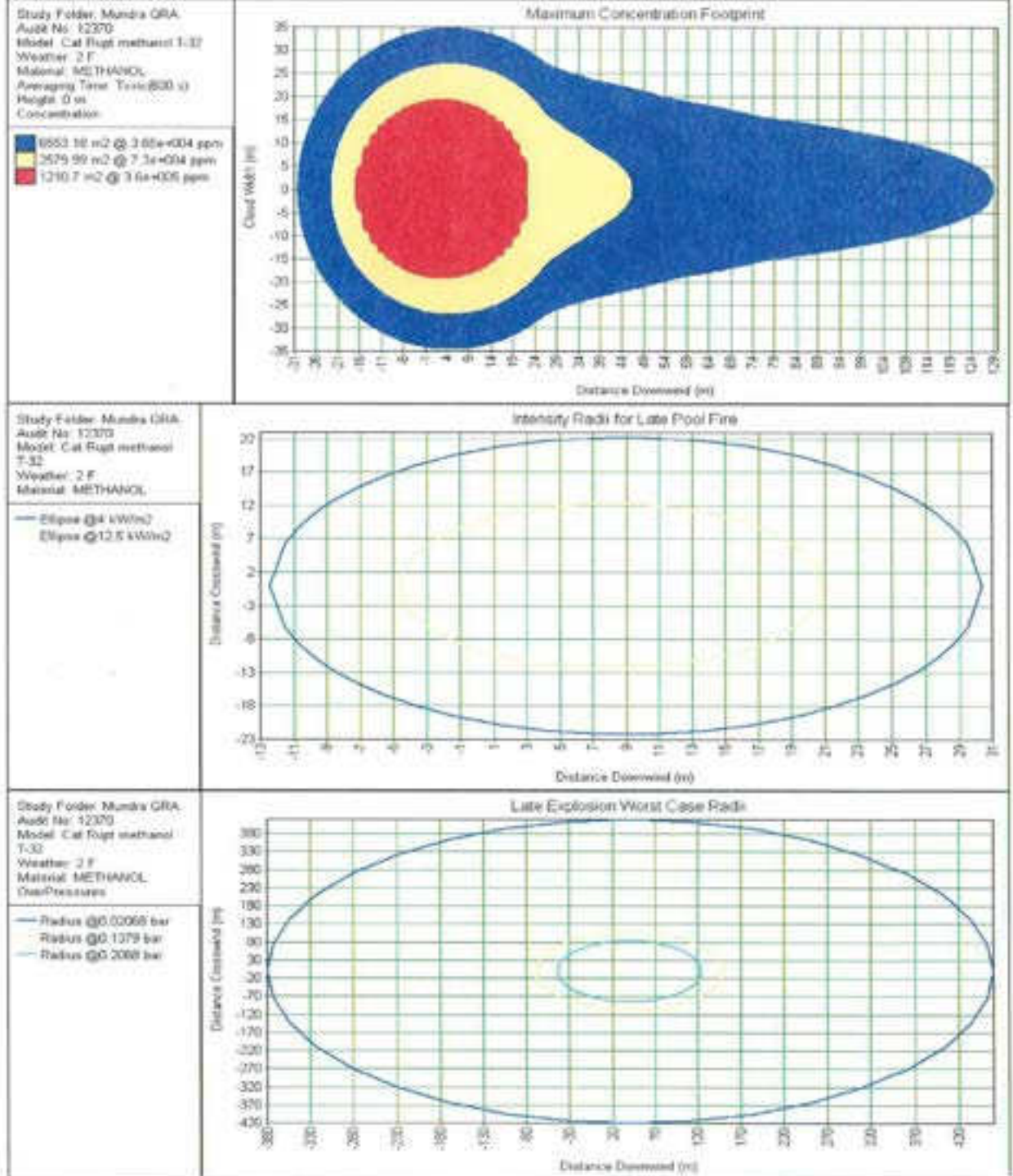


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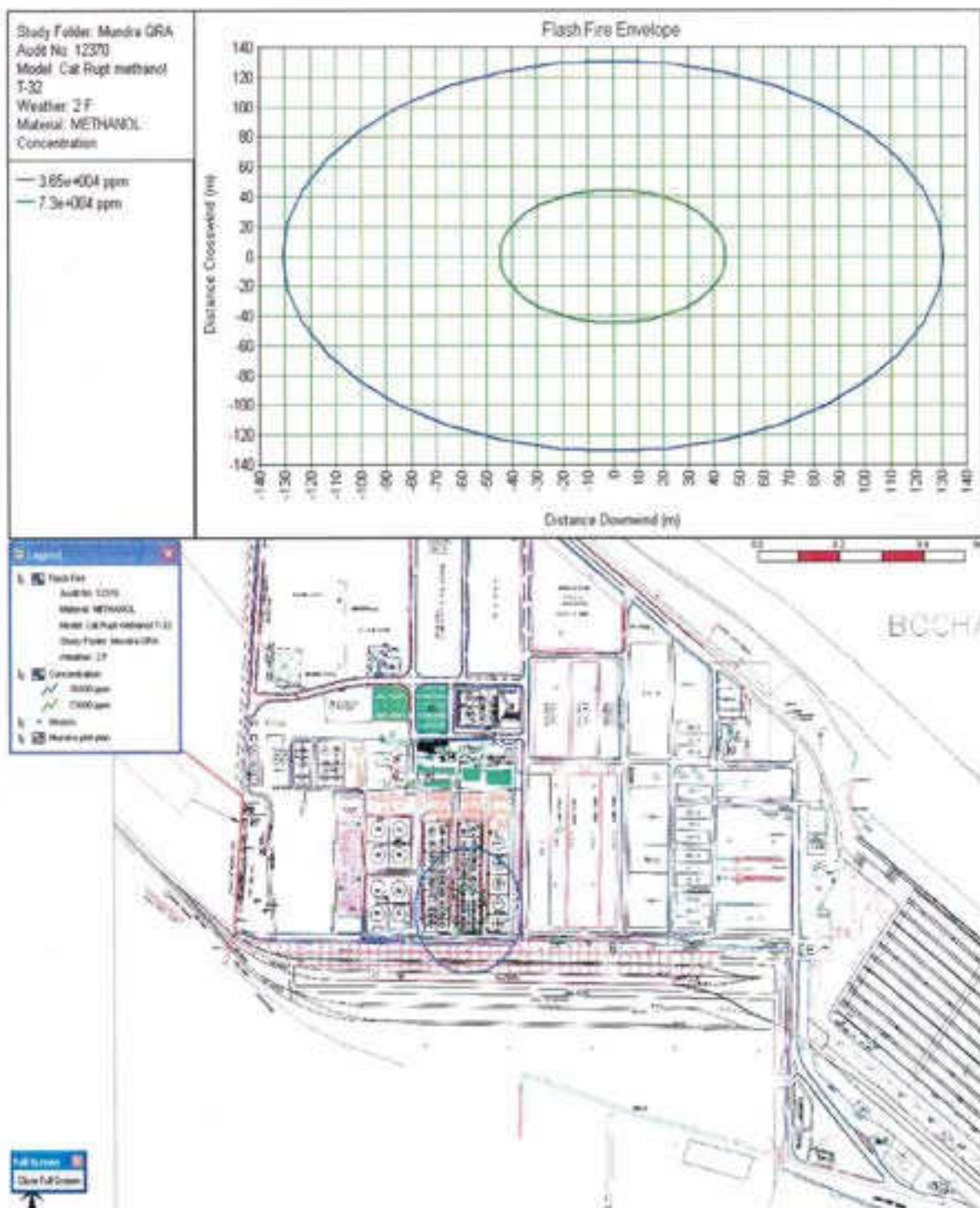


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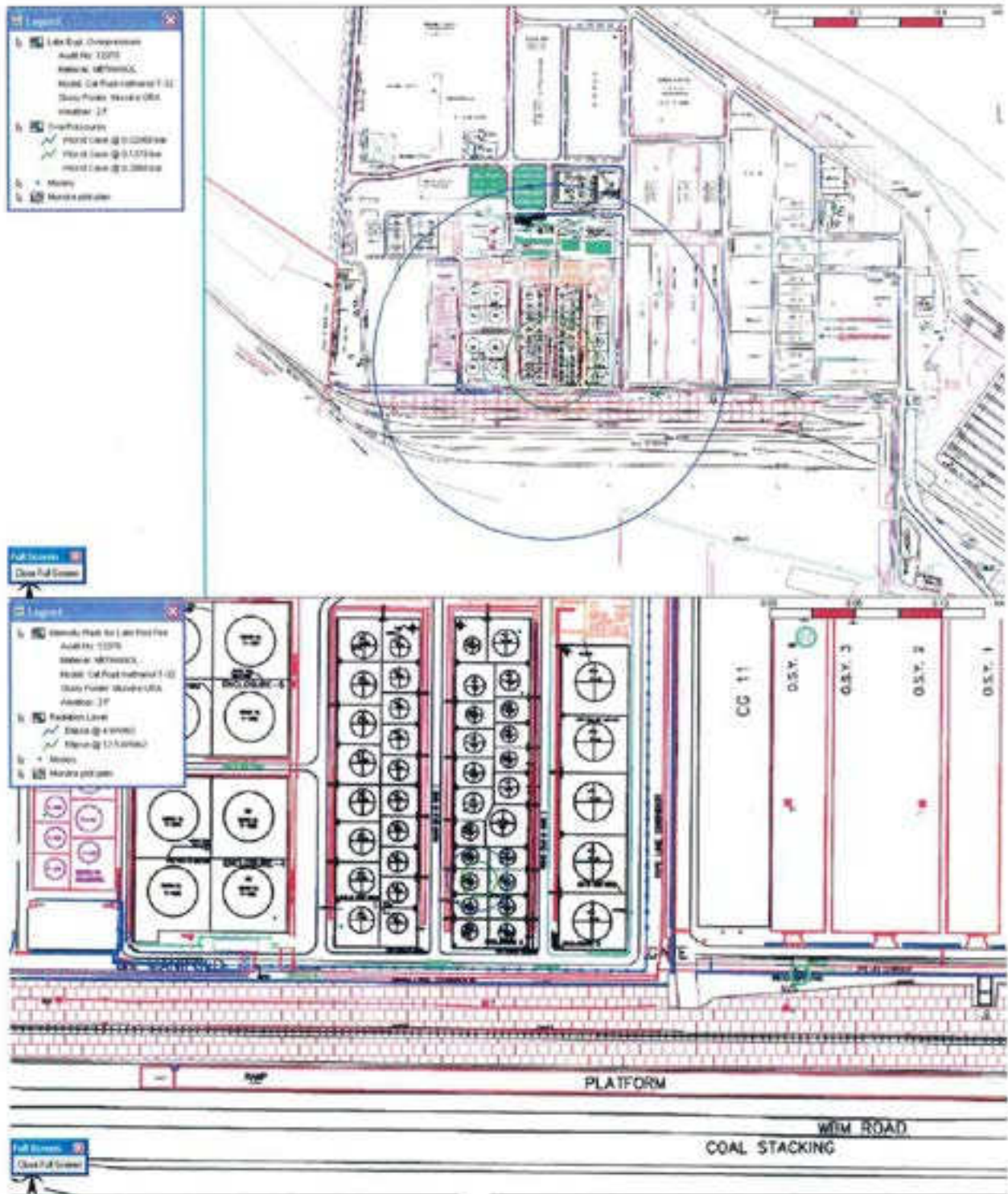
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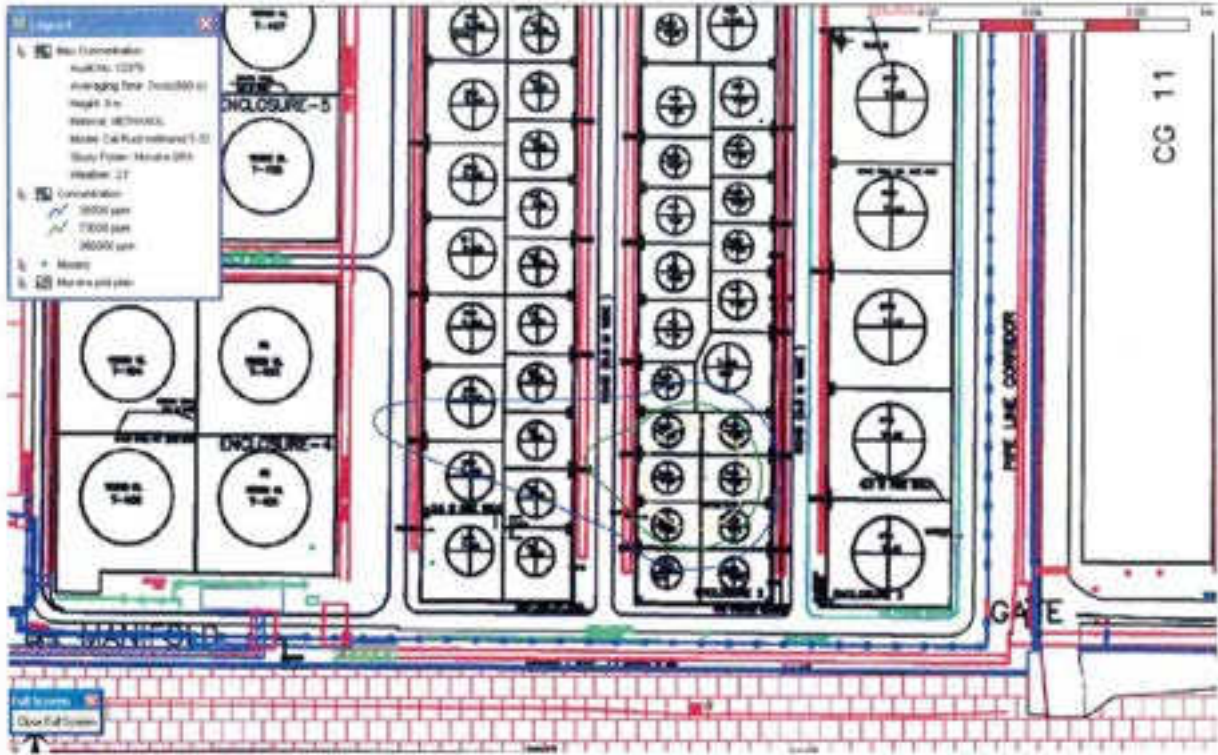
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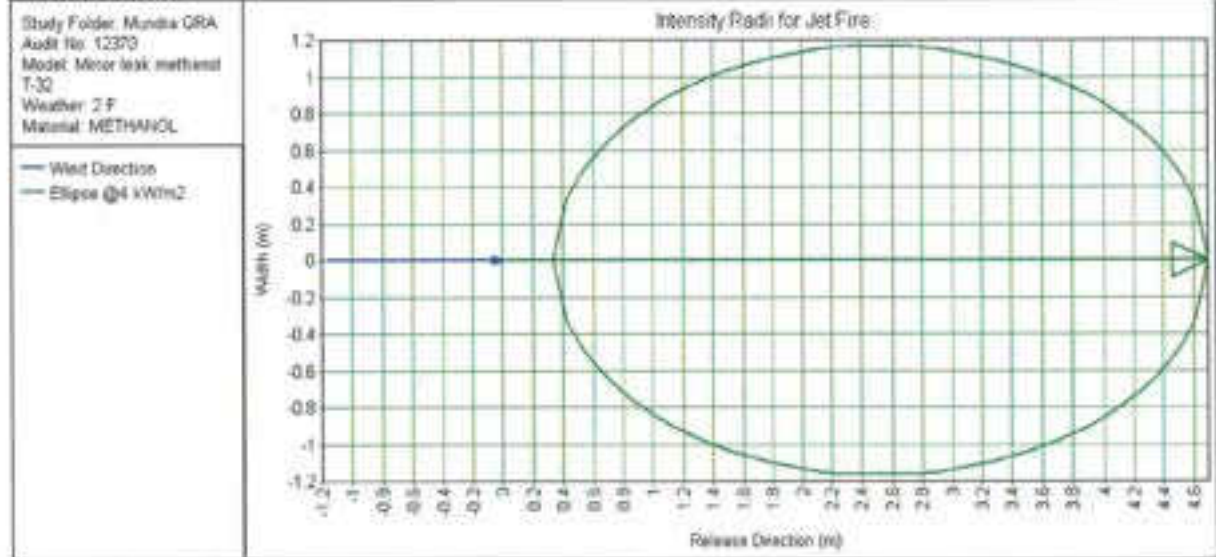
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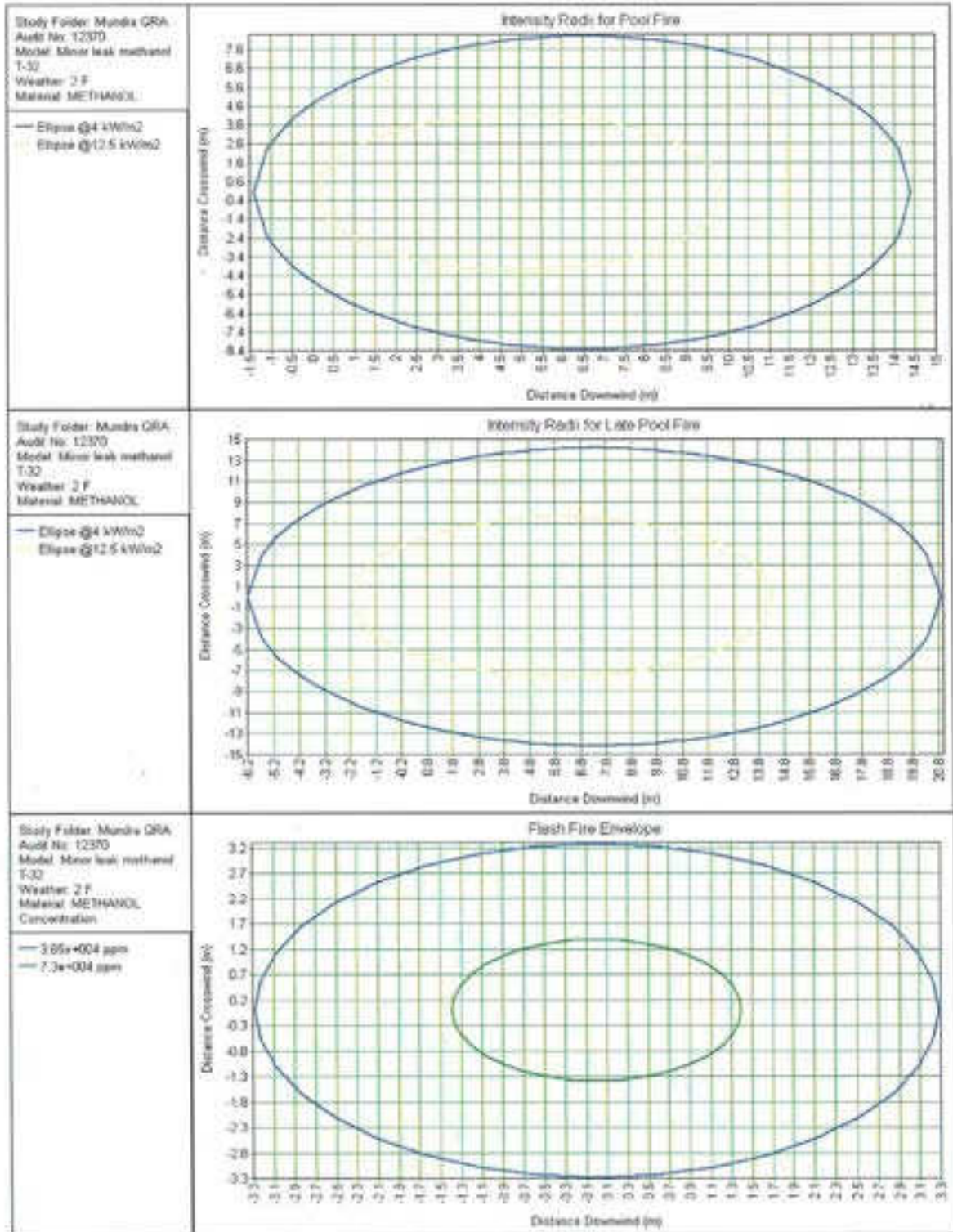
ON SITE EMERGENCY PLAN (Port Area)



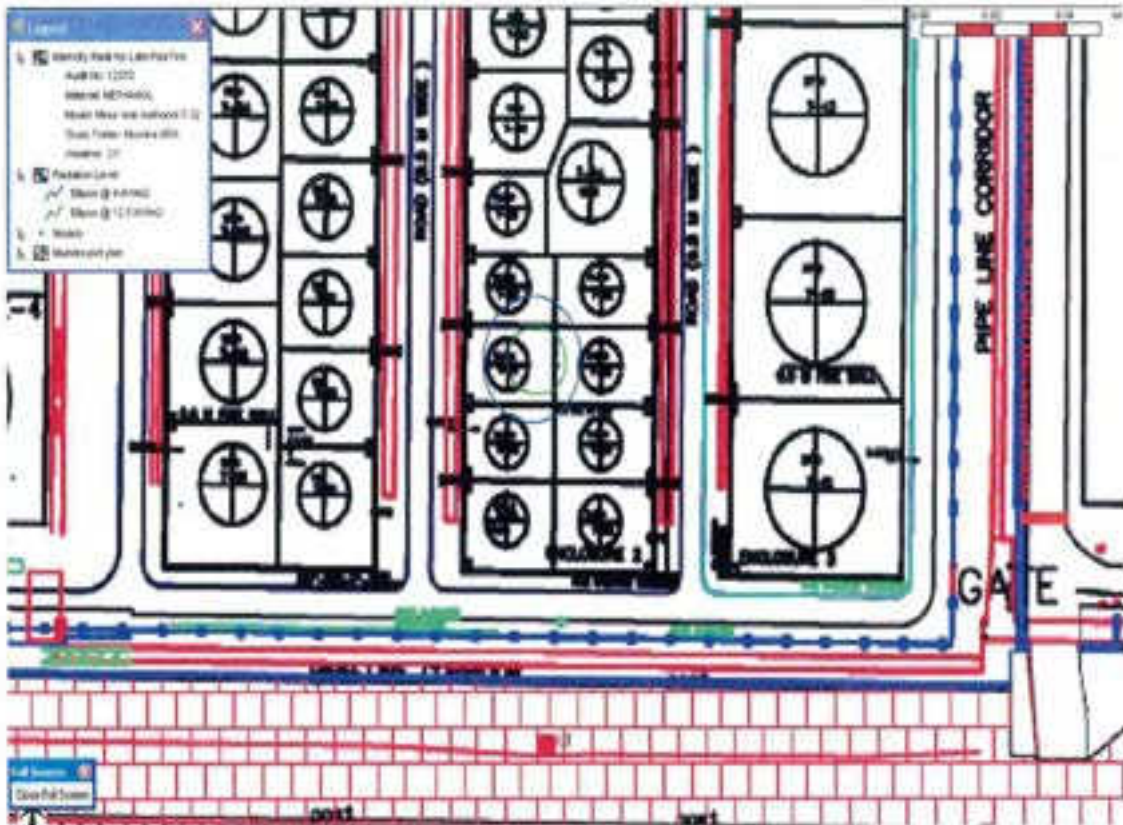
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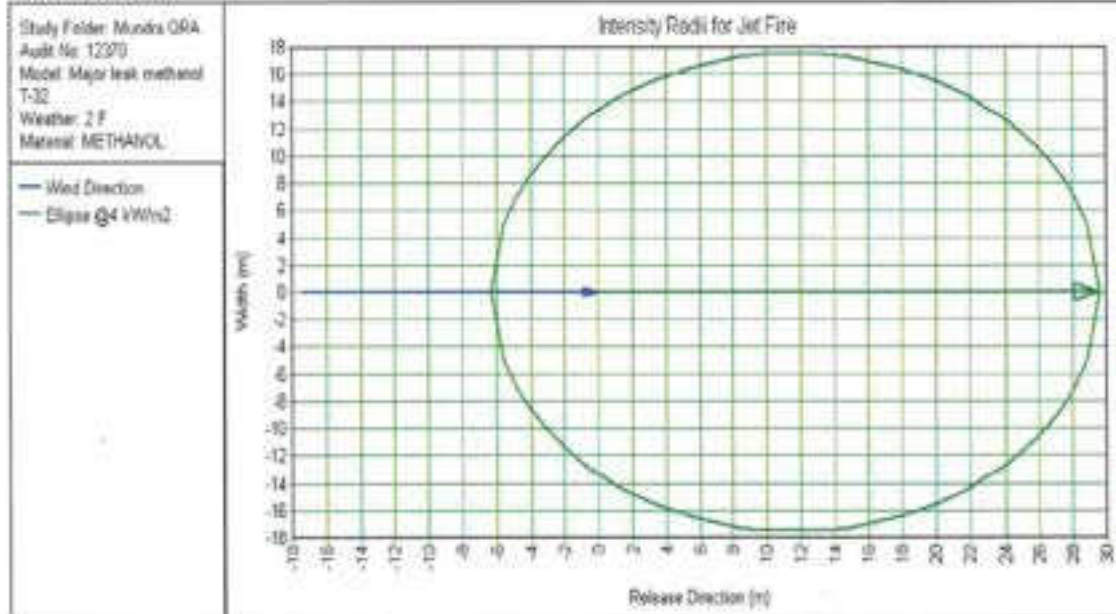
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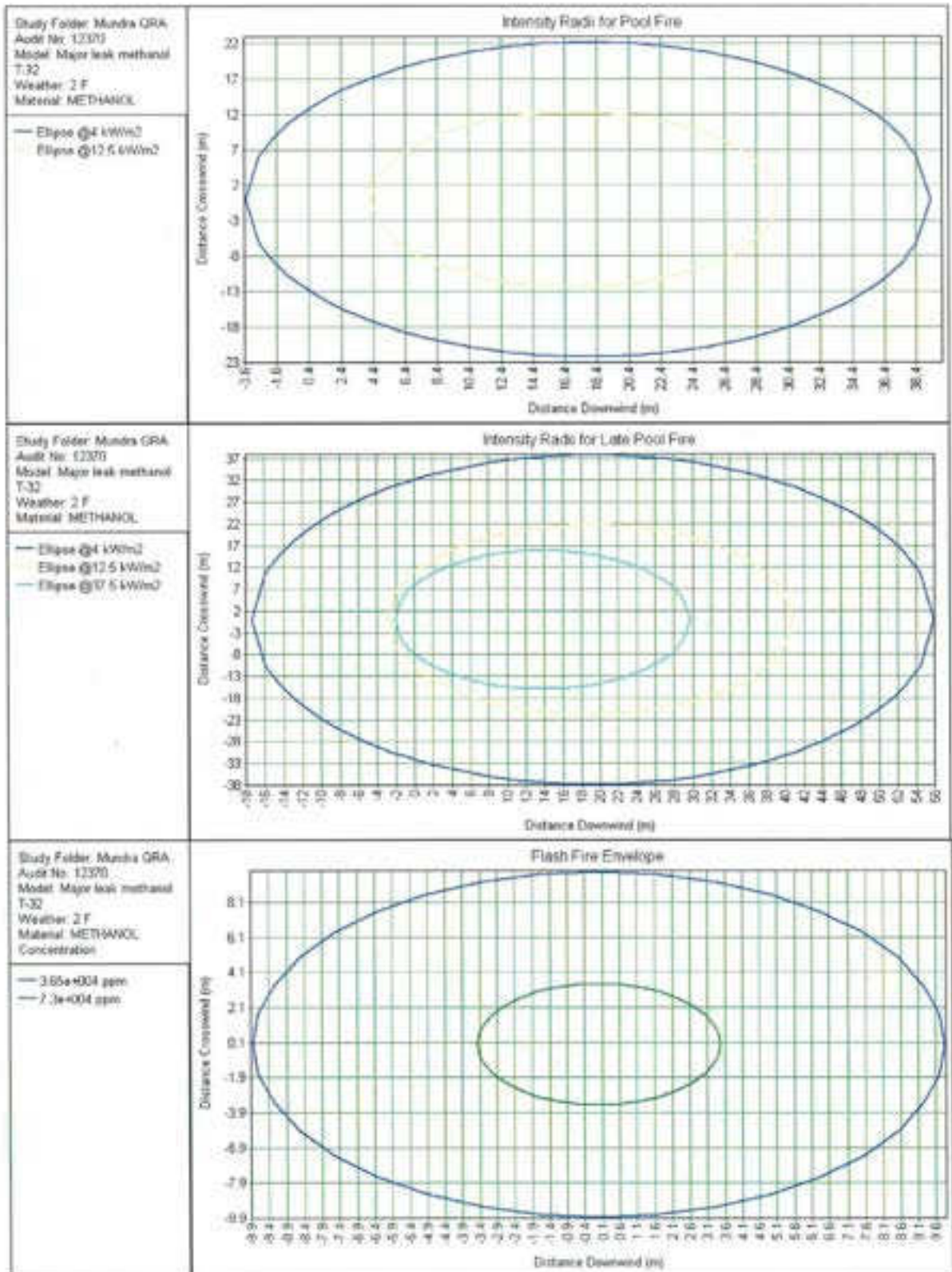
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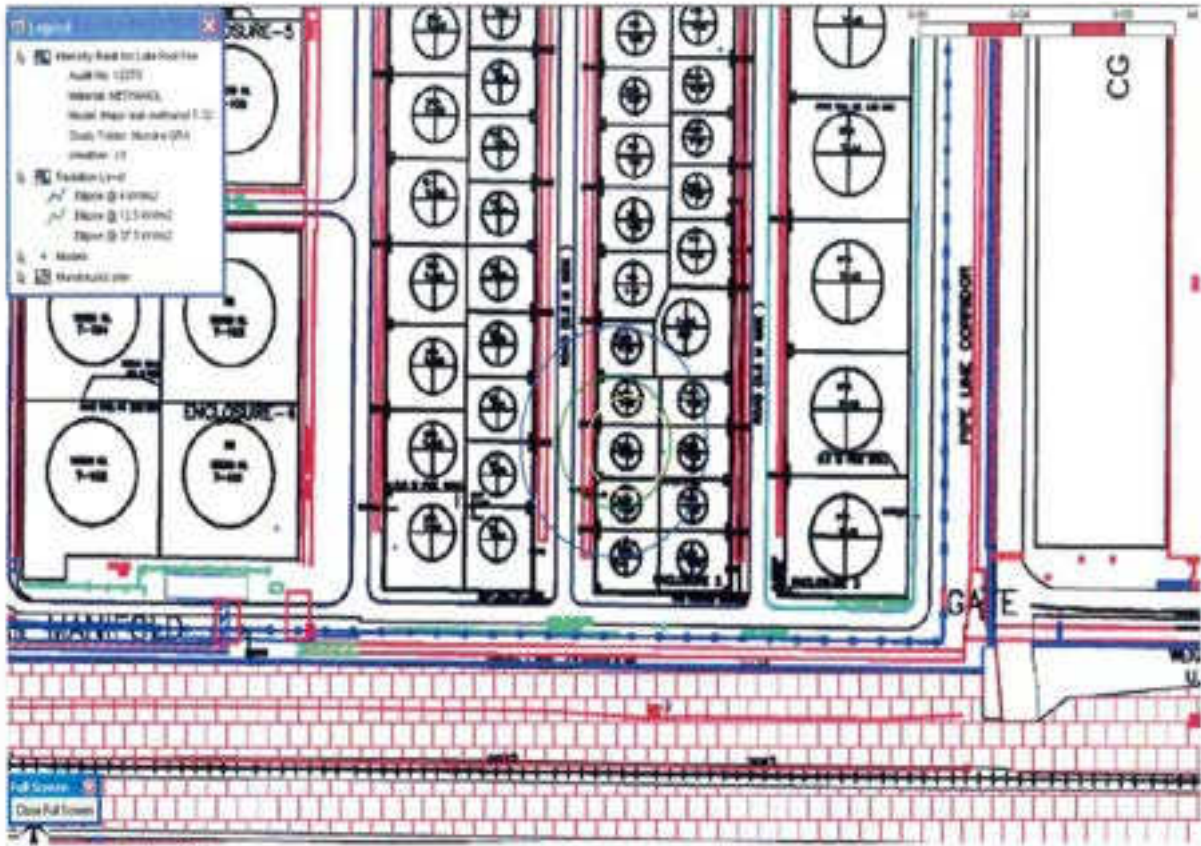
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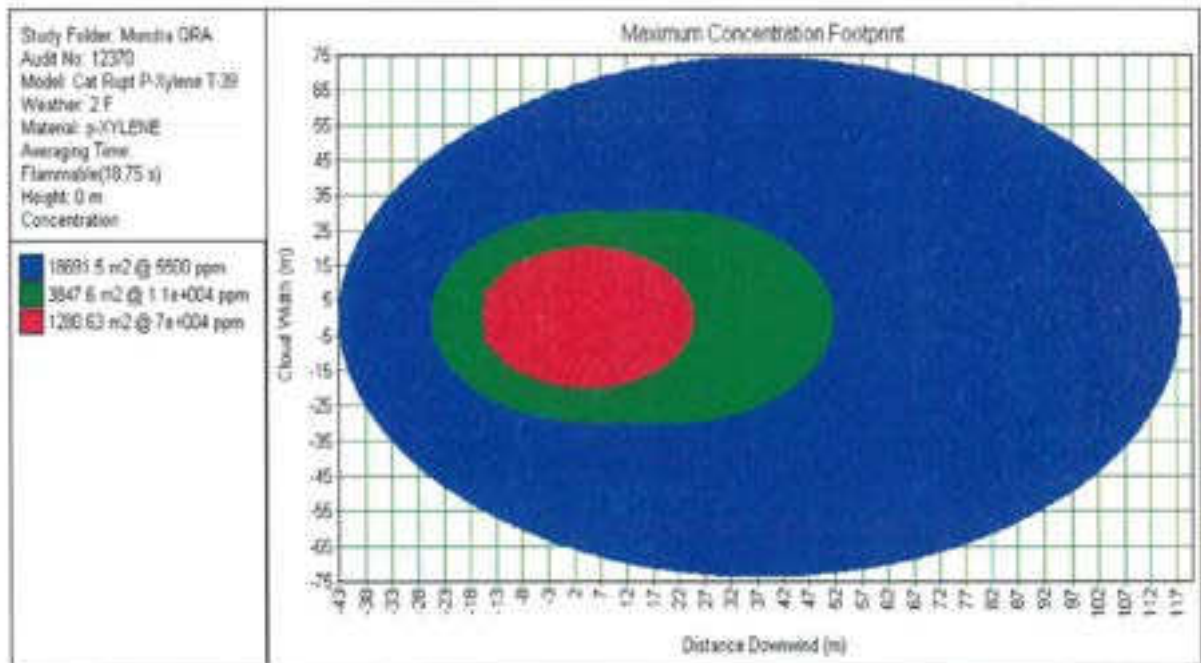
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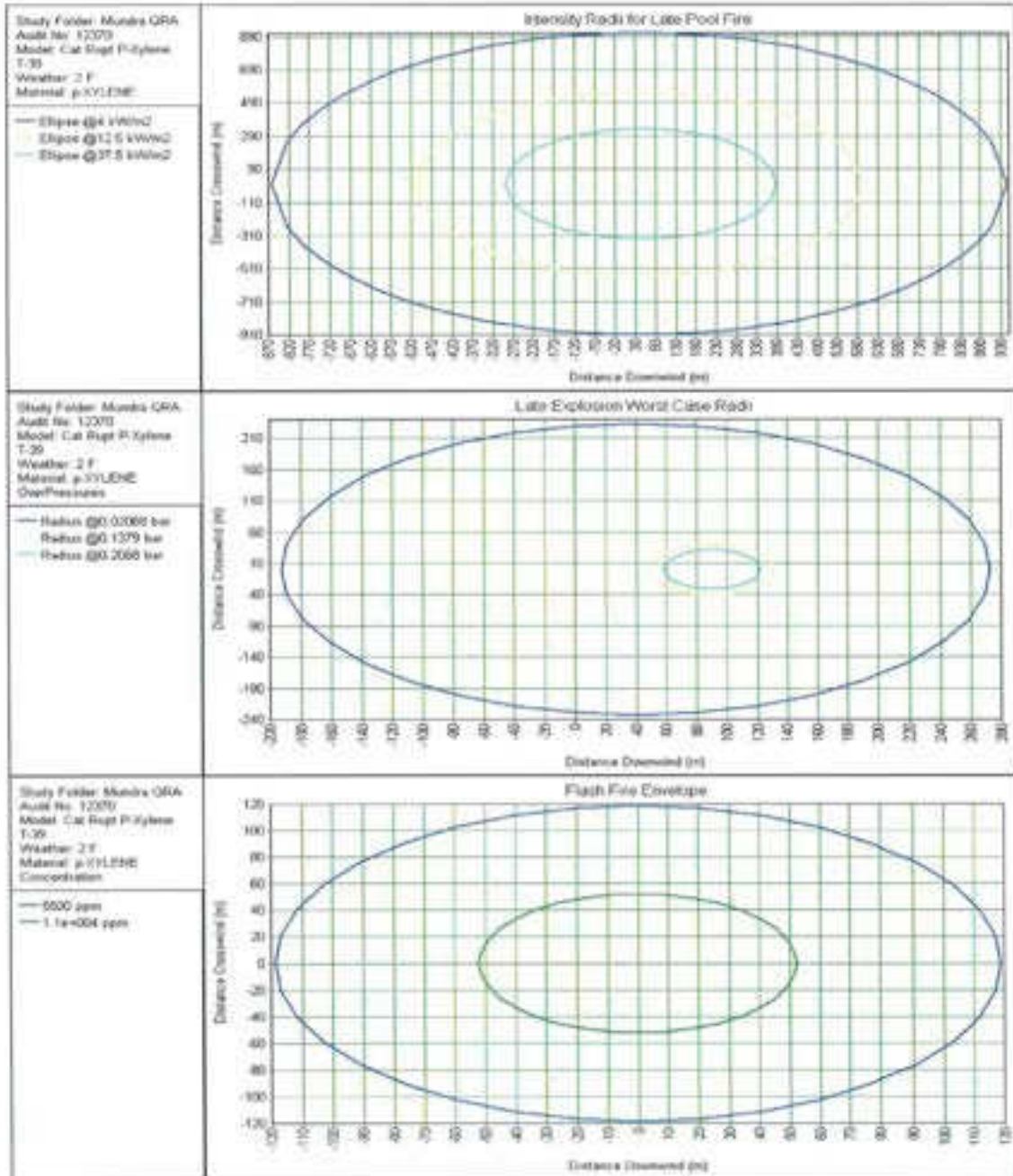
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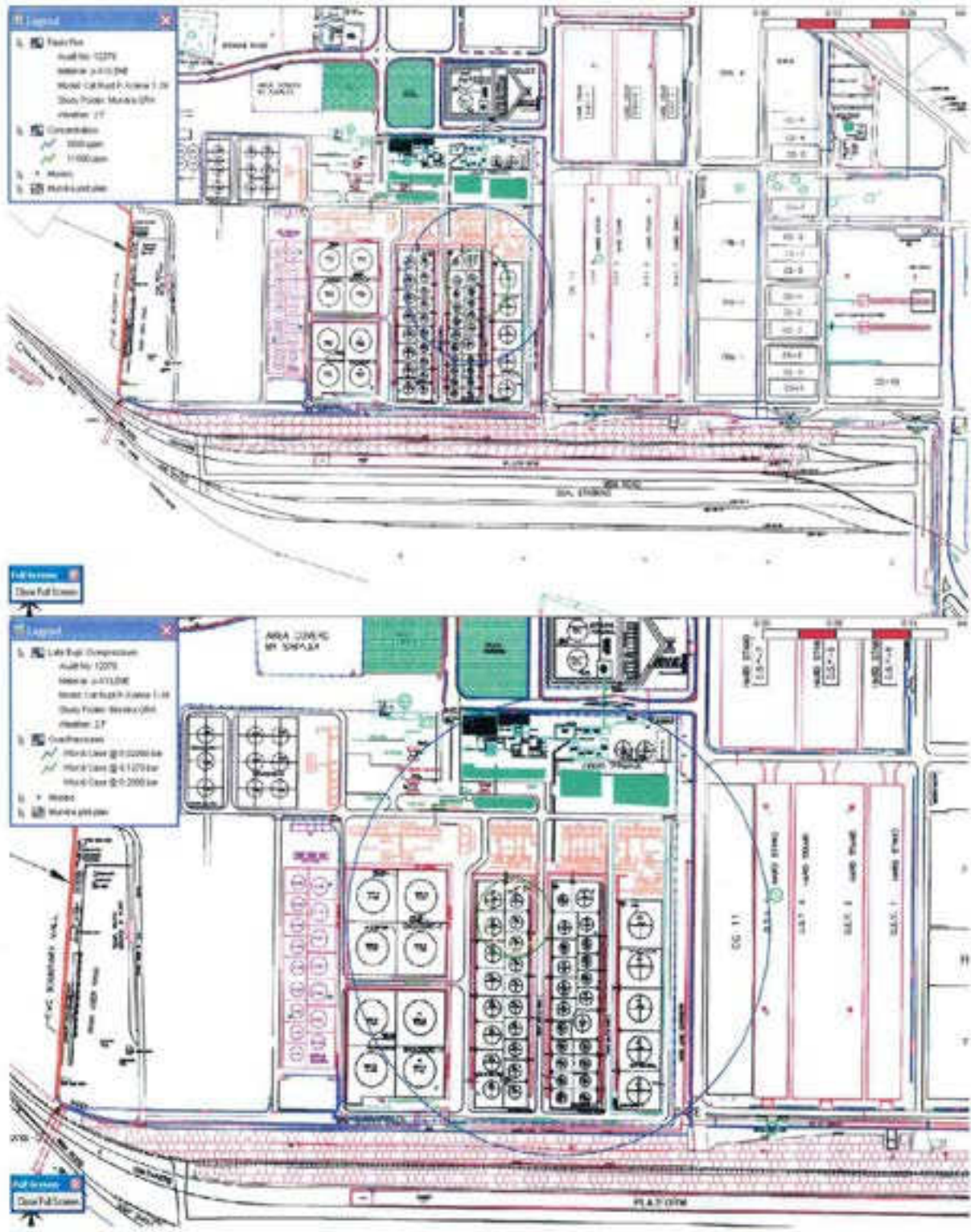
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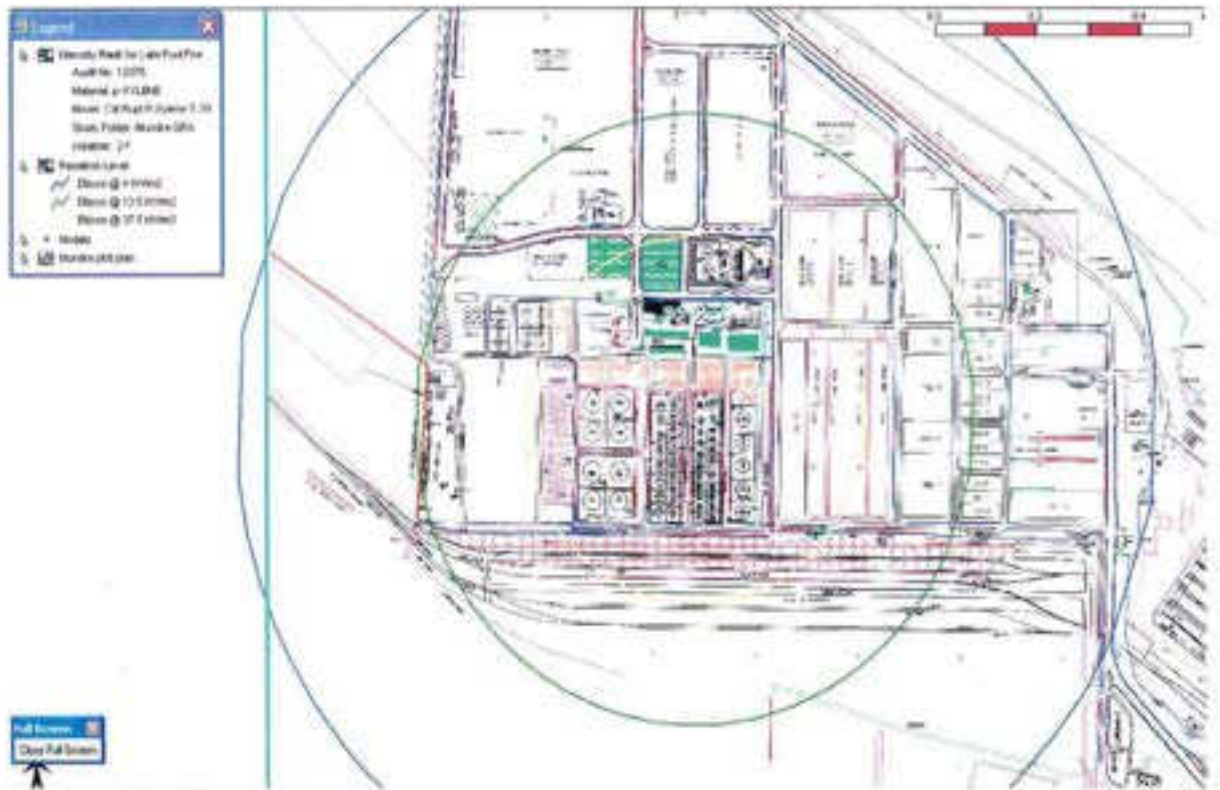
ON SITE EMERGENCY PLAN (Port Area)



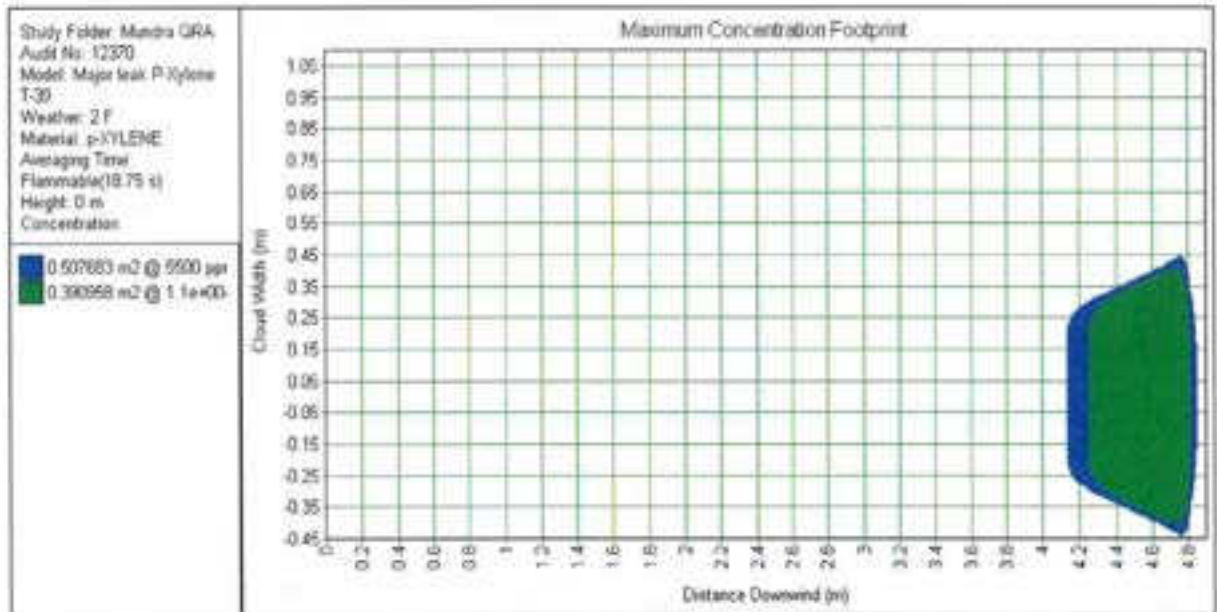
ON SITE EMERGENCY PLAN (Port Area)



ON SITE EMERGENCY PLAN (Port Area)

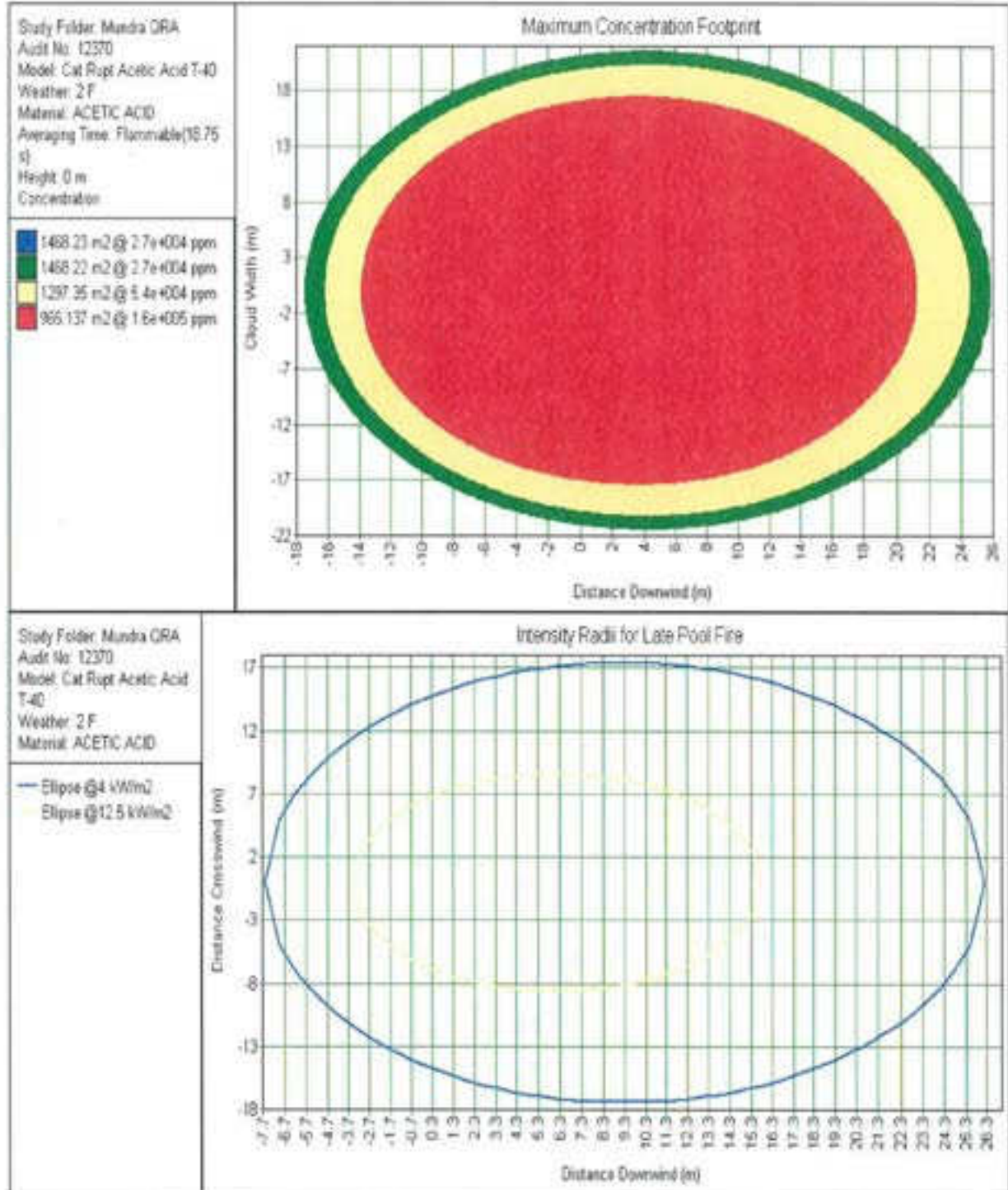


Scenario No.:11



ON SITE EMERGENCY PLAN (Port Area)

Scenario No.: 4



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CHAPTER NO. III

ABOUT EMERGENCY ORGANISATION

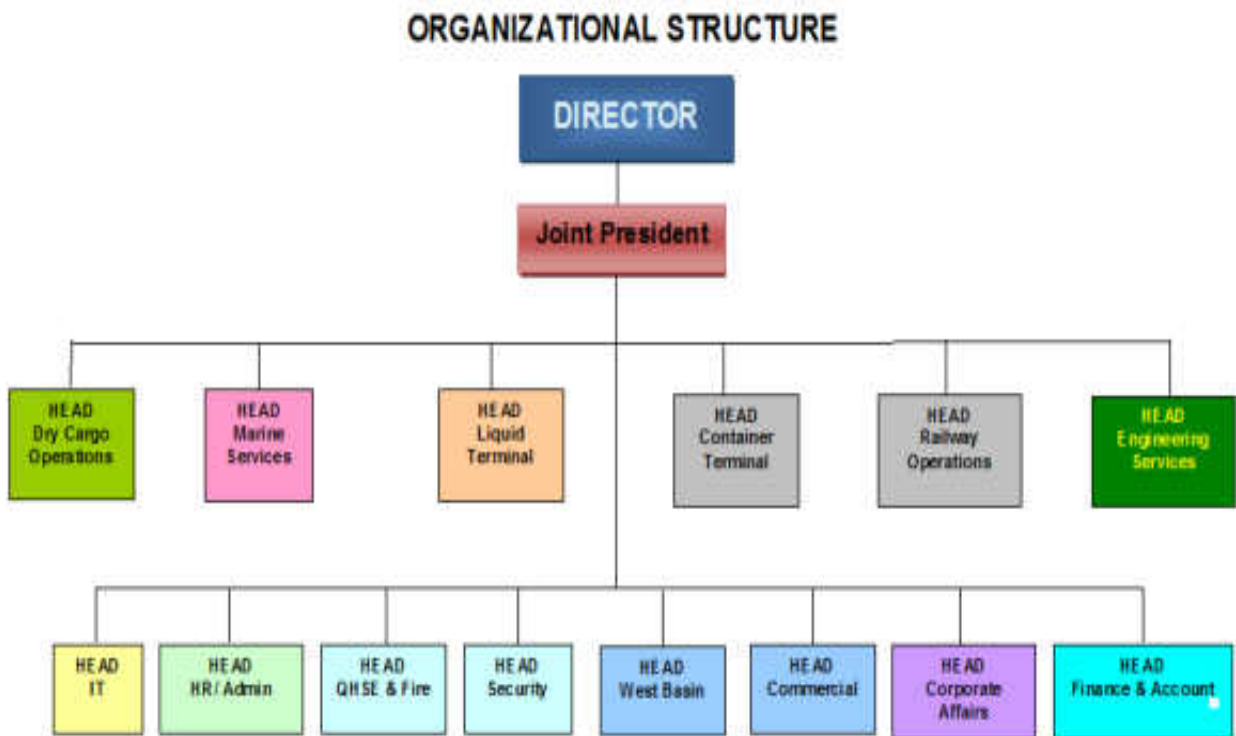
CONTENTS

- 3.00 ABOUT EMERGENCY ORGANIZATION
- 3.01 SCOPE & PURPOSE
- 3.02 THE NEED OF DISASTER PLANNING AT APSEZ
- 3.03 EMERGENCIES - CLASSIFICATION OF EMERGENCES
- 3.04 EMERGENCY RESPONSE ORGANIZATION
- 3.05 EMERGENCY REPORTING LINE
- 3.05 ASSEMBLY POINTS
- 3.06 CATEGORIES OF EMERGENCIES
- 3.07 DUTIES & RESPONSIBILITIES
- 3.08 EXTERNAL AID
- 3.09 MUTUAL AID MEMBERS
- 3.10 GOVERNMENT AUTHORITIES
- 3.11 REPORTING & INVESTIGATION
- 3.12 COMMUNICATION & PUBLIC AFFAIRS
- 3.13 PUBLIC AFFAIRS

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3.0 EMERGENCY ORGANIZATION

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



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

	ADANI PORTS AND SEZ LTD MUNDRA	JANUARY - 2022
	ON SITE EMERGENCY PLAN (Port Area)	

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

3.01 SCOPE & PURPOSE

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

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

PURPOSE :

The purpose of this plan is to:

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

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

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

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

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

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

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

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

3.03 EMERGENCIES - CLASSIFICATION OF EMERGENCES

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

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

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

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

b) Nature – II (Off – Site Emergency)

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

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POTENTIAL EMERGENCIES

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

3.04 EMERGENCY RESPONSE ORGANIZATION

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

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

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Primary Support Team

Coordinators (HOD or senior most functionaries)

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

Secondary Support Team

Coordinators (HOD or senior most functionaries)

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

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

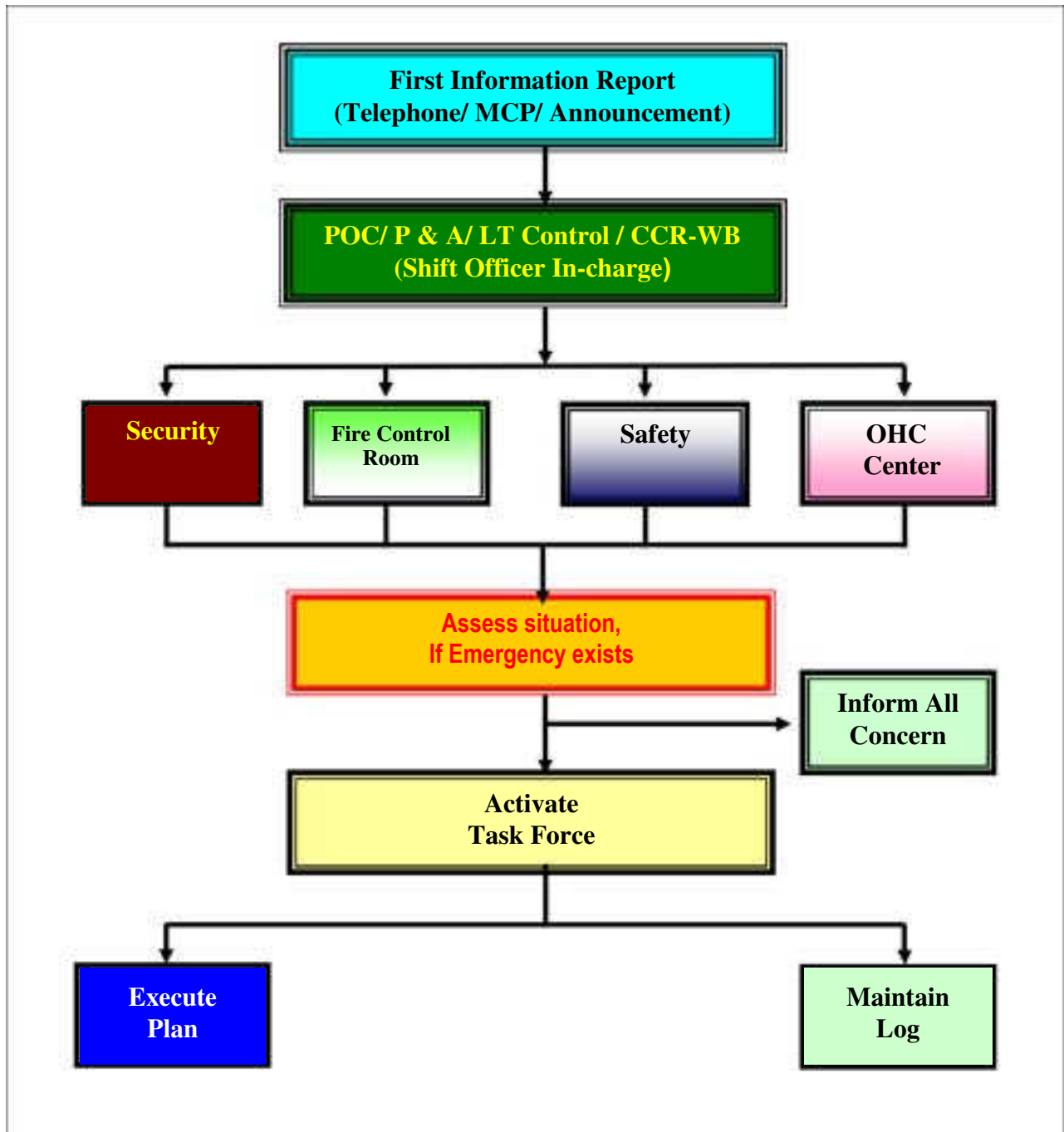
The primary role of the emergency response organization in an emergency shall be:

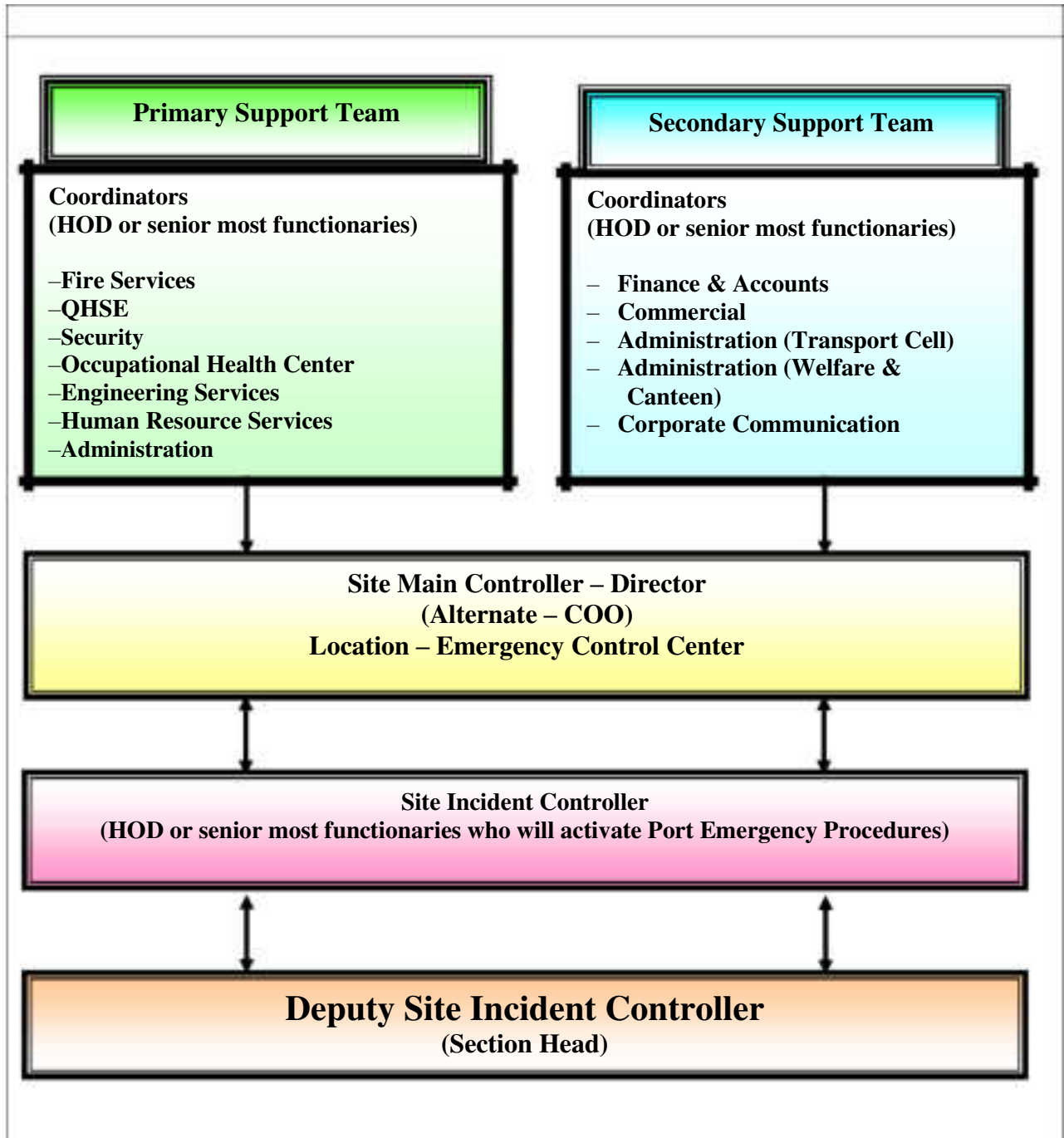
- ❖ Determine the degree to which the emergency response organization shall be activated.
- ❖ Determine extent of actual action required, organize and render assistance to Site Incident Controller.
- ❖ Coordinate with all other concerned.

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

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


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

ON SITE EMERGENCY PLAN (Port Area)
3.05 EMERGENCY REPORTING LINE


ON SITE EMERGENCY PLAN (Port Area)
EMERGENCY TASK FORCE


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3.06 ASSEMBLY POINTS

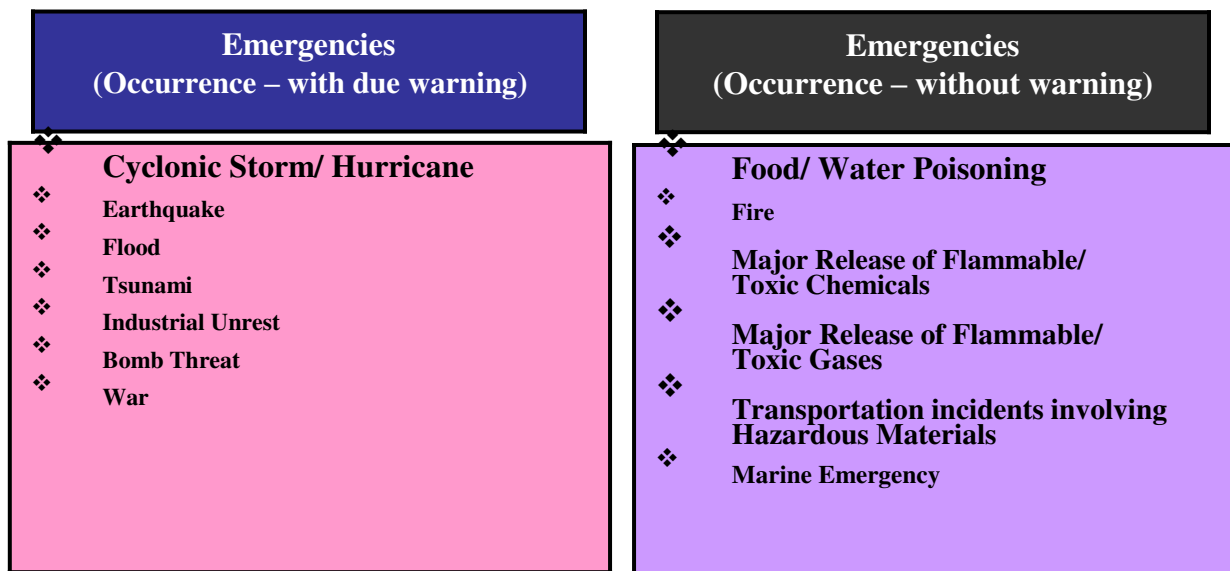
ASSEMBLY POINT	
 <p>EMERGENCY ASSEMBLY POINT</p>	
Port Emergency Assembly Points	
PORT AREA	
ZONE	AREA
ZONE – 1	Marine House
ZONE – 2	CG-7
ZONE – 3	Driver Canteen
ZONE – 4	Old Administration Canteen
ZONE – 5	Railway Building (R & D Yard)
ZONE – 6	Terminal – 2 (Security Gate)
ZONE – 7	Container Terminal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

3.07 CATEGORIES OF EMERGENCIES

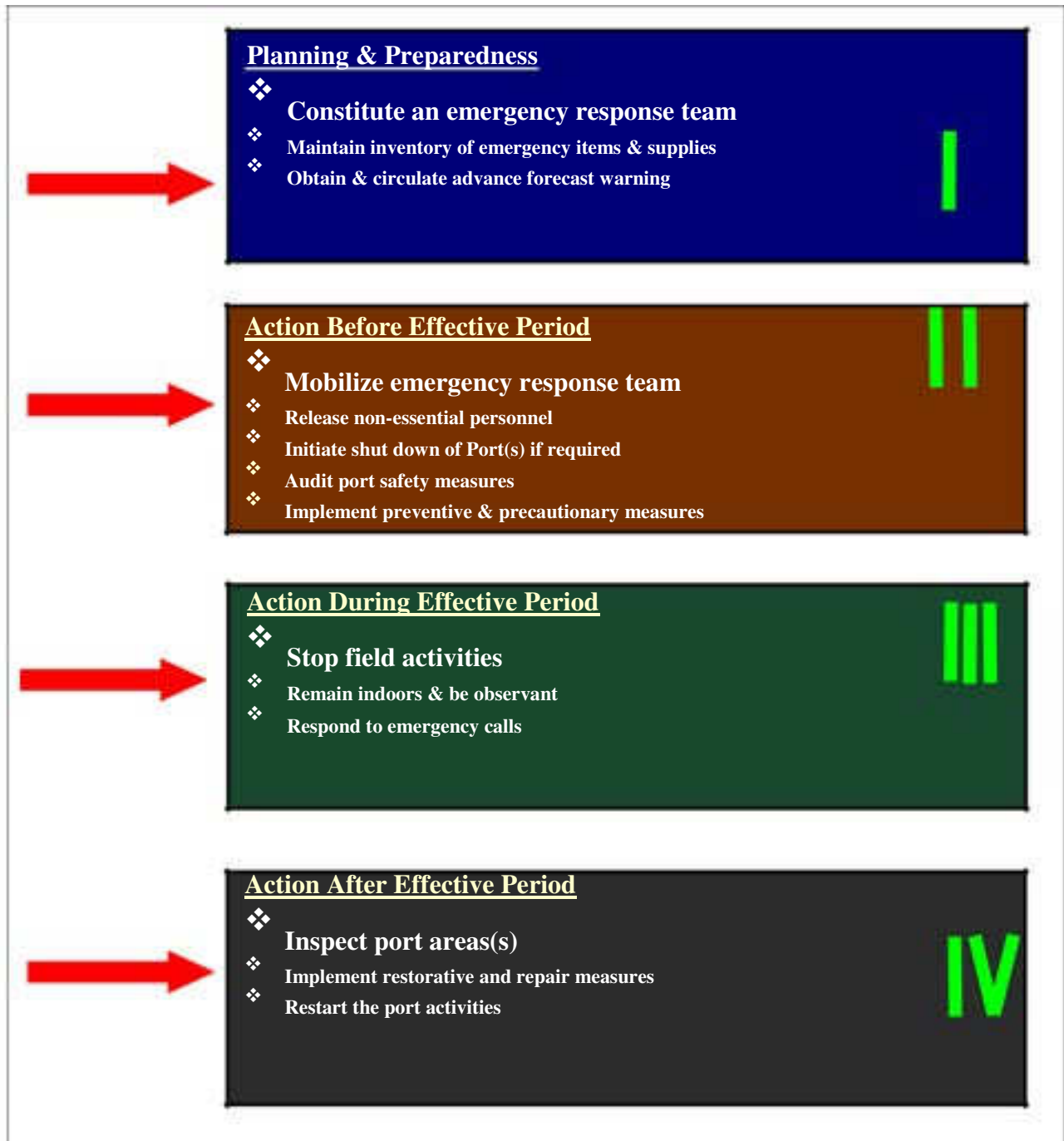
The general action plan to deal with:

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

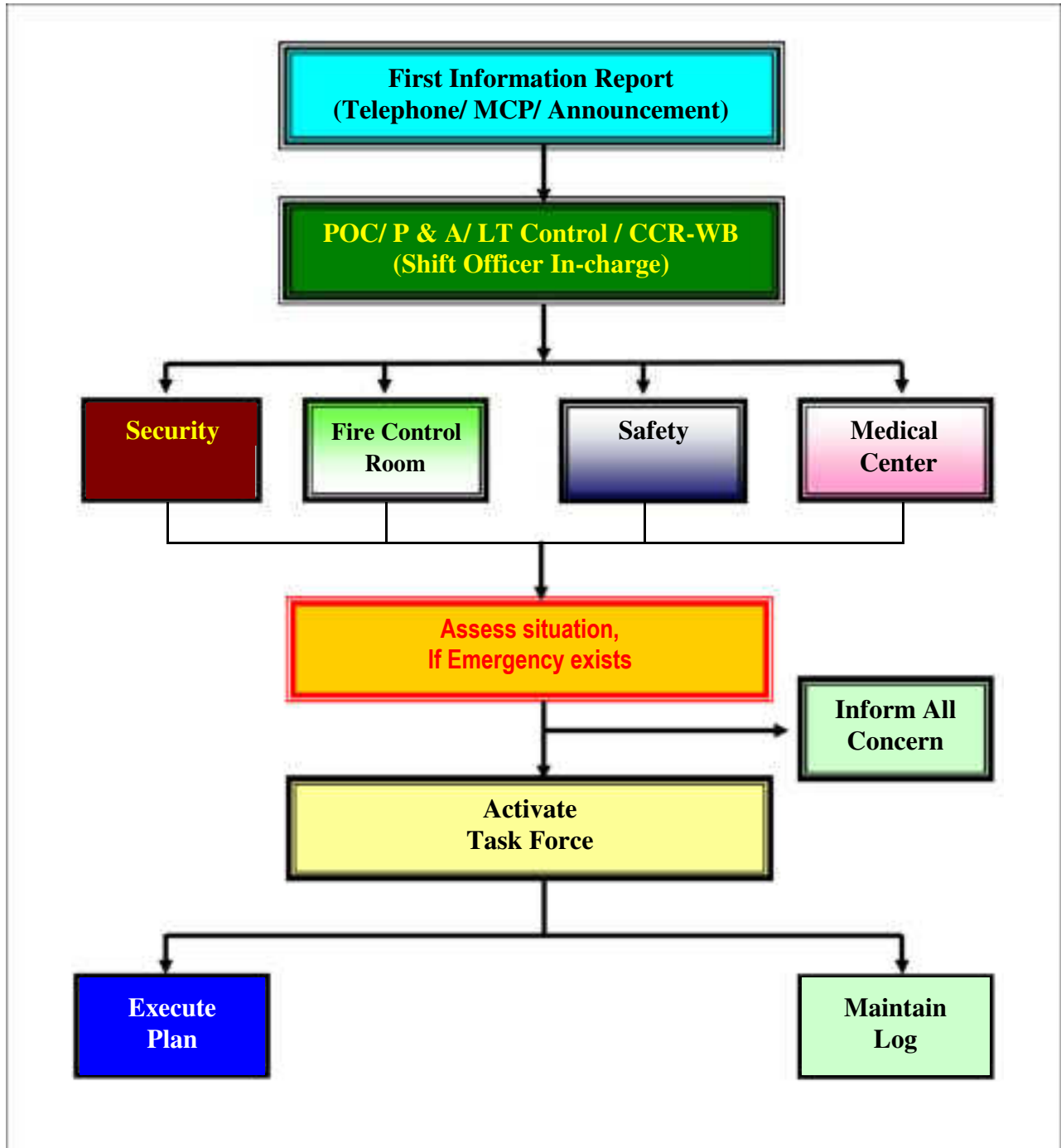
EMERGENCIES CATEGORY WISE



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



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



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3.08 DUTIES & RESPONSIBILITIES

3.8.1 Site Main Controller :

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

3.8.2 Site Incident Controller

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

3.8.3 Emergency Support Officers

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

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3.8.4 Emergency Support Officers (Cont.)

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

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

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

3.8.6 HOD – Human Resources

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

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3.8.7 HOD – Corporate Affairs

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

3.8.8 HOD – Engineering Services

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

3.8.9 HOD – Commercial

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

3.8.10 HOD – Finance & Accounts

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

3.8.11 HOD – Security

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

3.8.12 HOD – Security (Cont.)

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

3.8.13 HOS – Fire Services

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

3.8.14 HOD/ HOS – Safety

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

3.8.15 HOS – Occupational Health Center

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

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3.09 EXTERNAL AID

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

- Neighboring Industries (Mutual Aid Members)
- Government Authorities

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

Note: Agreement is under process.

3.10 MUTUAL AID MEMBERS

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

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

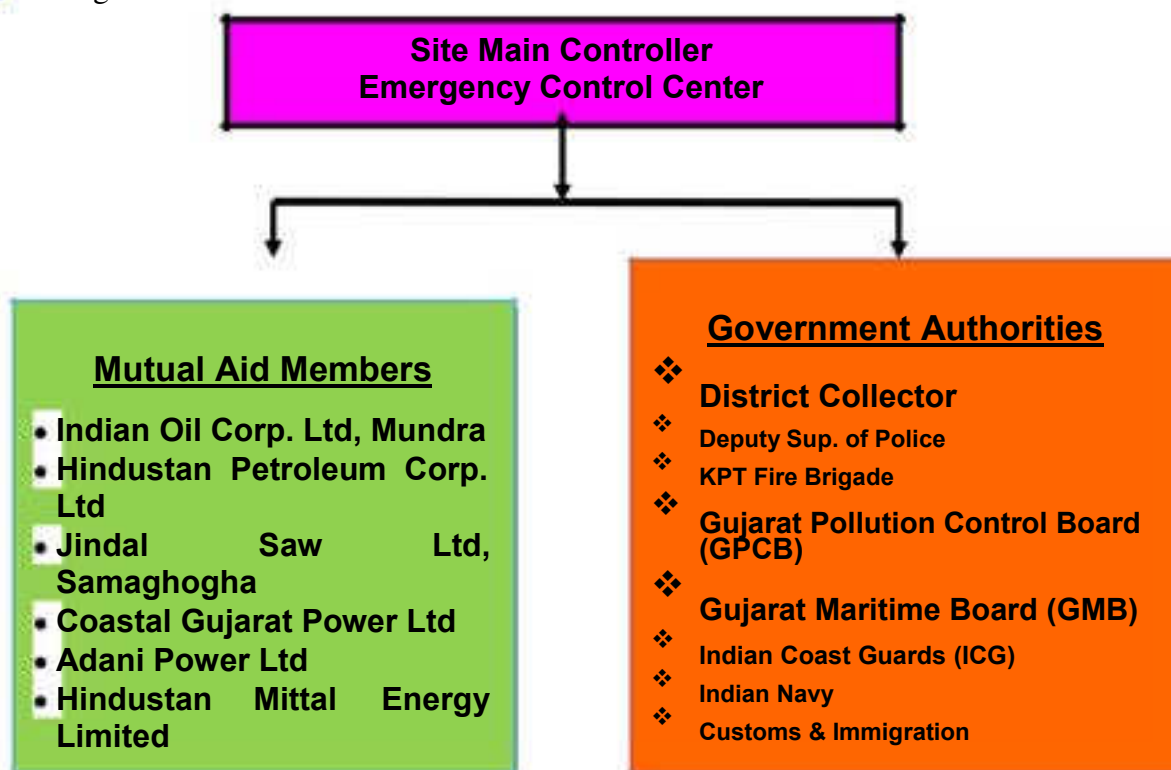
The mutual aid members shall:

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

3.11 GOVERNMENT AUTHORITIES

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

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



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3.12 REPORTING & INVESTIGATION

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

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

References

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

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

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

References

Incident Investigation Procedure

3.13 COMMUNICATION & PUBLIC AFFAIRS

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

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

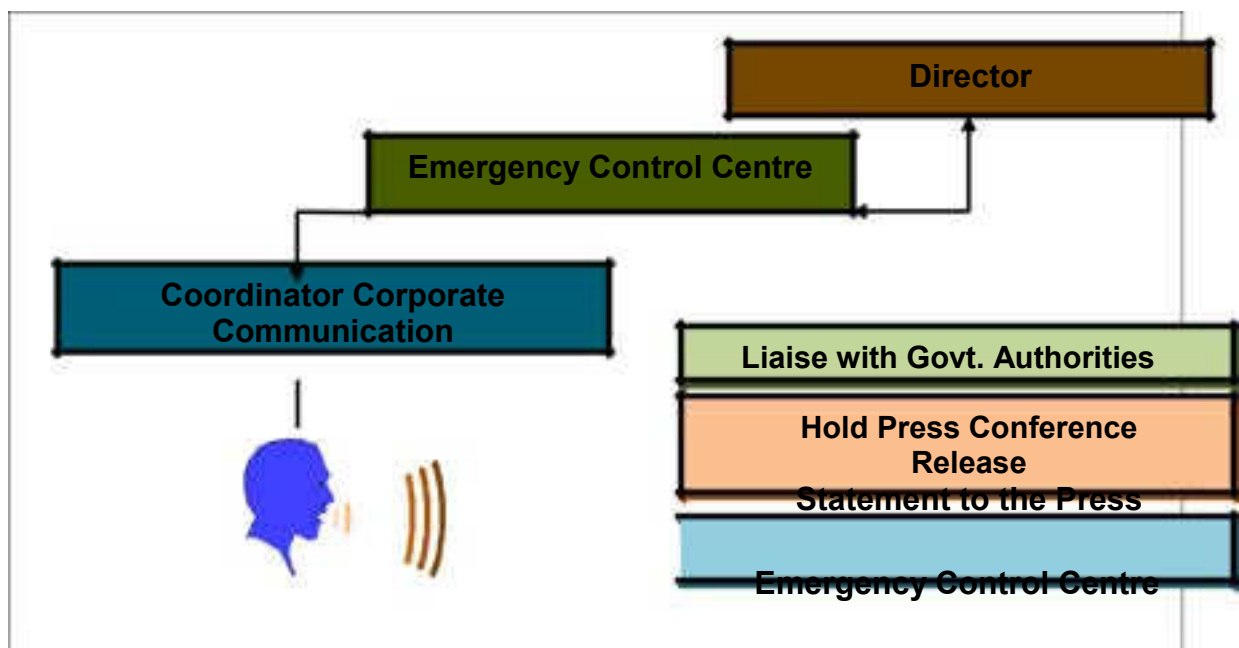
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❖ Emergency Vehicle

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

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

3.14 PUBLIC AFFAIRS



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CHAPTER - 4

EMERGENCY PLANNING

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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4.01 DRILLS & TRAINING

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

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

4.02 TRAINING

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

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

4.03 EMERGENCY PLANS

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

4.3.1 CYCLONIC STORMS / HURRICANE

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

Action By	Activity
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PLANNING & PREPAREDNESS

Port Key Person

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

Note

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

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

Note

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

CYCLONIC STORMS/HURRICANE (Cont.)

Action By	Activity
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ACTION BEFORE EFFECTIVE PERIOD

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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<p>Port Key Person</p>	<ul style="list-style-type: none"> ❑ Liaise with Site Main Controller ❑ Mobilize Emergency Response Team(s). Note <ul style="list-style-type: none"> ➤ Members to be briefed about the emergency. ➤ Members to be informed that they may be required to stay at site during & after the emergency. ❑ Release non-essential personnel. Note <ul style="list-style-type: none"> ➤ Port key person reserves prerogative on the release of employees. ➤ Personnel to be briefed on the possible time of return to work. ❑ Initiate Port shut down based in: <ul style="list-style-type: none"> ❖ Consultation with Site Main Controller. ❑ <i>Audit Port area(s) for safety measures to ensure that:</i> <ul style="list-style-type: none"> ❖ <i>Loose items are secured.</i> ❖ <i>Electric machinery is covered and protected against water ingress.</i> ❖ <i>Storm water drains are cleared of any obstructions.</i> ❑ <i>Implement preventive & precautionary measures (including but not limited) to ensure:</i> <ul style="list-style-type: none"> ❖ <i>Inventory of emergency supplies is maintained.</i> ❖ <i>Material and equipment that can possibly be damaged by water ingress is elevated.</i> ❖ <i>Windows & doors are weather tight.</i> ❖ <i>Roof mounted equipment are braced.</i> ❖ <i>Material & equipment that cannot be moved are covered.</i> ❖ <i>Sandbags are placed in doorways where flooding from storm water can occur.</i> <i>In flood as consequence of Cyclonic Storm/ Hurricane is anticipated, ensure:</i> <ul style="list-style-type: none"> ❖ <i>Dyke valves of Hydrocarbon storage tanks are open.</i> ❖ <i>Oil Spill Management Plan is actuated.</i>
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CYCLONIC STORMS/HURRICANE (Cont.)

<p>Port Key Person & Emergency Response Team</p>	<ul style="list-style-type: none"> □ Audit Port area(s) for damage assessment & prepare report □ Undertake restorative measures & repairs based on audit report on: <ul style="list-style-type: none"> ❖ Damaged equipment & buildings. ❖ Unsafe conditions.
<p>Port Maintenance Group</p>	<p>Note</p> <ul style="list-style-type: none"> ➤ Clearance report to be submitted to Site Main Controller through Port Key Person.
<p>Port Process Group</p>	<ul style="list-style-type: none"> □ Initiate restart up of the Port.

Department Wise Emergency Action Plan for Cyclone

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: center;">JANUARY - 2022</p>
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Dry Cargo Department	<ul style="list-style-type: none"> ❑ Remove all fine grained cargo stored at open storage yard and store at indoor warehouse. ❑ Secure the fine grained cargo stored at open storage yards with Tarpaulin. ❑ Stop all stevedoring activities, bring all Mobile Harbour cranes to shore, safely park the cranes and down its booms. ❑ Inform all contractors to remove all their equipment from jetty area and safely park at shore, in case of crane down its boom. ❑ Arrest all barge / ship loaders, and Mobile truck loading hoppers at its wheel to prevent horizontal movement due to wind and secure from its top by arranging guy ropes. ❑ Stop loading / unloading of ship and measure the ship cargo quantities along with clients surveyor and communicate Marine Dept. / shipping agencies to take the ship to anchorage area.
Marine Department	<ul style="list-style-type: none"> ❑ In coordination with dry cargo instruct all ship captains to take the ships anchorage. ❑ Stop all activities at jetty area. ❑ Ensure the jetty areas are free from loose and unsecured materials / equipment. ❑ Update all departments about the latest weather conditions. ❑ Ensure TUG's are shored and secured. ❑ Stop SPM operation remove pipes connections from the ship and conform to maintain safe distance from SPM.
Liquid Terminal Department	<ul style="list-style-type: none"> ❑ Stop loading / unloading of ship, take ullage with clients surveyor, detach hose connections with the shipping vessels and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area. ❑ Remove all loose materials and equipment from jetty area. ❑ Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.

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

	ADANI PORTS AND SEZ LTD MUNDRA ON SITE EMERGENCY PLAN (PORT AREA)	JANUARY - 2022
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Security Department	<ul style="list-style-type: none"> ❑ Close the gate and stop allowing visitors and transport trucks either inward or outward. ❑ Ensure vehicles are parked at designed parking areas, with wheels are blocked. ❑ Instruct all drivers to take shelter at canteens (concrete buildings).
Fire Department	<ul style="list-style-type: none"> ❑ Equip the fire tenders with rescue equipment, safely park the fire tenders and secure its wheel by providing blocks.
Project Management Cell (PMC)	<ul style="list-style-type: none"> ❑ Stop all activities, park the cranes and equipment's at safe location, lower the booms of cranes and secure them. ❑ Ensure all erected structures are secured with guy ropes and ties are provided. ❑ Remove all loose materials from top of buildings and structures or secure them. ❑ Ensure all workmen are sheltered at safe locations like canteens (concrete buildings). ❑ Secure the Jetty area piling rigs and cranes by tying with guy ropes. ❑ Stop all project vehicle movements and ensure the vehicles are parked at safe location with wheels are blocked. ❑ Ensure the barge type floating cranes are off loaded and brought to shore and its boom is downed. ❑ Ensure all vehicles and cranes are removed from break water embankments.

4.3.2 EARTHQUAKE

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

Action By	Activity
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PLANNING & PREPAREDNESS

Port Key Person

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

Note

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

ACTION DURING EFFECTIVE PERIOD

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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Individuals	<ul style="list-style-type: none"> ❑ Do not panic. ❑ Avoid standing near windows, external walls. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
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ACTION AFTER EFFECTIVE PERIOD

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

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

Action By	Activity
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PLANNING & PREPAREDNESS

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

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

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

4.3.4 FLOOD

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

Action By	Activity
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PLANNING & PREPAREDNESS

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

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

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

4.3.5 INDUSTRIAL UNREST

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

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

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

Action By	Activity
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PLANNING & PREPAREDNESS

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

Action By	Activity
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	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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ACTION BEFORE EFFECTIVE PERIOD

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

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

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

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

Action By	Activity
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PLANNING & PREPAREDNESS

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

Port Key Person	<ul style="list-style-type: none"> ❑ Inform all personnel to provide information regarding unidentified or suspicious objects/ persons. ❑ Liaise with Port Operation Centre. ❑ Liaise with HOD – Security for <li style="padding-left: 20px;">❖ Intensifying vigilance & patrolling. Initiating bomb search. <li style="padding-left: 20px;">❖ Making arrangements to minimize effects. Making arrangements for evacuation.
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ACTION DURING EFFECTIVE PERIOD

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

Port Key Person	<ul style="list-style-type: none"> ❑ Liaise with Site Main Controller for restoring normalcy (if bomb recovered/ no untoward incident occurs). <p style="color: red; margin-top: 5px;">If blast occurs</p> <ul style="list-style-type: none"> ❑ Assess damage (if any). ❑ Take restorative measures. ❑ Liaise with Site Main Controller.
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4.3.7 WAR

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

Action By	Activity
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PLANNING & PREPAREDNESS

Port Key Person	<ul style="list-style-type: none"> ❑ Constitute Emergency Response Team(s) comprising of at least: <li style="padding-left: 20px;">❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) <p style="color: blue; margin-top: 5px;">Note</p> <ul style="list-style-type: none"> <li style="padding-left: 20px;">➤ Based on total strength of the individual plant, more than one team may be constituted. <li style="padding-left: 20px;">➤ Each member of the team shall have a designated alternate member. ❑ Make arrangements for camouflage the flares. ❑ Liaise with HOD – Security to increase awareness in the Port personnel regarding war.
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ACTION BEFORE EFFECTIVE PERIOD

Port Key Person	<ul style="list-style-type: none"> ❑ Liaise with Port Operation Centre. ❑ Liaise with HOD – Security for <li style="padding-left: 20px;">❖ Intensifying vigilance & patrolling.
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ACTION DURING EFFECTIVE PERIOD

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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Port Key Person	<ul style="list-style-type: none"> ❑ Liaise with Site Main Controller for minimizing light (during night) & obtaining updated information. ❑ Liaise with HOD – Security for evacuation of non-essential personnel.
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ACTION AFTER EFFECTIVE PERIOD

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

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

Action By	Activity
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PLANNING & PREPAREDNESS

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

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

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

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

Action By	Activity
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PLANNING & PREPAREDNESS

Port Key Person

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

Note

- Based on total strength of the individual plant, more than one team may be constituted.
- Each member of the team shall have a designated alternate member.
- ❑ **Liaise with HOS – Fire Services to:**
 - ❖ Maintain adequate fleet of fire tenders & firefighting equipment.
 - ❖ Maintain patrolling to eliminate potential sources of fire hazard.
 - ❖ Impart regular refresher training to auxiliary fire squad members.

ACTION DURING EFFECTIVE PERIOD

Emergency Response Team

- ❑ Activate alarm. Try & contain fire.
- ❑ Liaise with Site Main Controller, HOS – Fire and HOS – Occupational Health Services to:
 - ❖ Evacuate non-essential personnel.
 - ❖ Ensure search & rescue
 - ❖ Ensure casualties receive attention.
- ❑ Liaise with HOD – Security to restrict movement in affected area.

ACTION AFTER EFFECTIVE PERIOD

Emergency Response Team

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

4.3.10 MAJOR RELEASE OF FLAMMABLE/TOXIC CHEMICALS

Plan to deal with major release of flammable/ toxic chemicals can be divided in stages:

Action By	Activity
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PLANNING & PREPAREDNESS

Port Key Person

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

Note

- Based on total strength of the individual plant, more than one team may be constituted.
- Each member of the team shall have a designated alternate member.
- ❑ **Maintain under flow baffle, over flow baffle, blocking gates & dykes.**
- ❑ **Liaise with HOD – QHSE for:**
 - ❖ Conducting regular audits.
 - ❖ Training of persons regarding various aspects of spillage.
 - ❖ Identifying locations to set up blockages.
- ❑ Liaise with HOS – Fire Services for acquiring equipment for recovery.

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

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

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

Leakage from the pipe lines

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

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

Port Key Person

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

Note

- Based on total strength of the individual plant, more than one team may be constituted.
- Each member of the team shall have a designated alternate member.
- ❑ Maintain pressure relief valves & vents.
- ❑ Identify location to isolate, redirect the lines to flares or re-circulation.
- ❑ Liaise with HOD – QHSE for:
 - ❖ Conducting regular audits.
 - ❖ Training of persons regarding various aspects gas leakage.
- ❑ Liaise with HOS – Fire Services for personnel protective equipment.

ACTION DURING EFFECTIVE PERIOD

Emergency Response Team

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

ACTION AFTER EFFECTIVE PERIOD

Emergency Response Team

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

4.3.12 TRANSPORTATION INCIDENTS INVOLVING HAZARDOUS MATERIAL

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

Action By	Activity
PLANNING & PREPAREDNESS	

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

4.3.13 MARINE EMERGENCY

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

On-shore Emergency (Nature I & Nature II)

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

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

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

Off-Site Emergency (Nature-II)

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

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

MARINE EMERGENCY (Cont.)

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

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CHAPTER – 5

EMERGENCY PREPAREDNESS

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

5.1.2 LIQUID TERMINAL

5.1.3 DRY CARGO AREA

5.1.4 TERMINAL – 2:

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

5.1.7 TERMINAL – 1:

5.1.8 WEST BASIN:

5.1.9 ADANI HOUSE & PUB :

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH ADANI PORT

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

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

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

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

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

- Adequate foam storage is provided to ensure firefighting in all areas for a minimum period as in accordance with Indian Standards or NFPA but on no account less than 30 minutes.
- All the firefighting systems is designed in accordance with the Indian and NFPA standards.
- The system follows the minimum design criteria as stipulated in the Guidelines, which are summarized hereunder:
 - In case of fire, the ship will be towed to the open sea and the firewater protection for the ship will be treated as first aid until towing is done.
 - One single largest risk is considered for providing fire protection facilities.
 - Sea water, which is available at the location, will be conveniently used.
 - As port terminals handling ships of size less than 50,000 DWT, one set of firewater pumps are provided this will cater to both monitors as well as hydrant service and water curtains.
 - The firewater pressure system is designed for a minimum residual pressure of 7 kg/m² at the hydraulically remotest point of application in the terminal.
 - Fire water flow rate will be the aggregate of the following:
 - Water flow for Water/Foam Monitors for protection of loading arms/piping manifold and ship;
 - Water flow for areas segregation through water curtains between ship and loading arms and hydrant service.
 - The water network laid to ensure multi-directional flow wherever possible. Isolation valves are provided in the network to enable isolation of any section of the network.

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

1. Monitors:

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

2. Curtain nozzles:

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

3. Water hydrants:

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

4. Mobile Monitor:

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

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

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

5.1.2 LIQUID TERMINAL

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

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

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a. Foam Pourers:

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

b. Water Spray Rings:

All the tanks of CTF and EOL are protected by medium velocity water spray system all around the tanks. The discharge rate of water spray is 3 lpm/m² for the effective cooling against radiation heat. The water sprays are also operated by quick opening type butterfly valves.

c. Water Monitors:

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

d. Hydrants:

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

5.1.3 DRY CARGO AREA

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

a. Hydrants:

All the open and covered type of storage areas are covered by Single or double type Hydrant posts. The hydrant system is kept fully pressurized at 7 Kg/cm² with a minimum operating pressure of 6 Kg/cm² at any point in the system.

■ FIRE STATION

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

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

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

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

5.1.4 TERMINAL – 2:

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

Fire Pump: 273 m³/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m³/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 2 and back-up yard.

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

Fire Extinguishers:

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

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

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

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- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m³/hr discharge X 1 no. of Vertical Turbine Electric Driven Main Pump and 273 m³/hr discharge X 01 no. of Vertical Turbine Diesel Driven Pump and 25 m³/hr discharge X 1 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at AMCT.

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

Fire Extinguishers:

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

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

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

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

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

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

Fire Tender: Multipurpose Fire Tender

5.1.7 TERMINAL – 1:

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

Fire Pump: 273 m³/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m³/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 1.

Fixed Fire Fighting System:

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

Fire Extinguishers:

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

CO2 fire extinguishers: 12 no (4.5 kg)

5.1.8 WEST BASIN:

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

Fire Pump: 273 m³/hr discharge X 2 no. of Horizontal end suction type Electric Driven Main Pump and 273 m³/hr discharge X 01 no. of Horizontal end suction type Diesel Driven Pump and 10.8 m³/hr discharge X 1 no. of Back pull out type Electric Driven Jockey Pump for fire prevention at West Basin.

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

Fire Extinguishers:

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

CO2 fire extinguishers: 12 no (4.5 kg)

Fire Tender:

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

5.1.9 ADANI HOUSE & PUB :

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

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■ Fire Control Plan :

Fire Pump:

96.10 m³/hr discharge X 01 no. of Electric Driven Main Pump,

10.8 m³/hr discharge X 01 no. of Electric Driven Jockey Pump for fire prevention.

Fixed Fire Fighting System:

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

Fire Extinguishers:

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

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

Fire Detection System:

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

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH APSEZ

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

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

Breathing Apparatus

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

Leak Control Equipment

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

First Aid Equipment

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

Miscellaneous

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

Absorbents and Containers

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

Monitoring Equipment

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

Miscellaneous

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

Tools and hardware

ON SITE EMERGENCY PLAN (PORT AREA)

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

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

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

Adequate number of fire tender

- There are three nos of fire tenders one is Foam Tender with water, foam, DCP and CO₂ facility having a centrifugal fire pump. Pump is of gunmetal and stainless steel also with 60 mtrs. long hose and nozzle provided above the pump panel.
- CO₂ gas cylinders of sufficient capacity are mounted for expelling the 75 kg DCP extinguishers. The foam tender also carry 6 x 22.5 kg. nos. of CO₂ Cylinder.
- Water Tender of 12000 ltrs water capacity with adequate numbers of fire fighting equipment and rear mounted portable pump of 450 ltr / pmt capacity

Neutralising Agents

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

5.03 ABOUT ON-SITE EMERGENCY PLAN

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

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

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

5.04 ABOUT POST EMERGENCY ACTIVITIES

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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CHAPTER NO.VI

OFF-SITE EMERGENCY PLAN

CONTENTS

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

	<p style="text-align: center;">ADANI PORTS AND SEZ LTD</p> <p style="text-align: center;">MUNDRA</p> <hr/> <p style="text-align: center;">ON SITE EMERGENCY PLAN (PORT AREA)</p>	<p style="text-align: right;">JANUARY - 2022</p>
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6.00 ABOUT OFF-SITE EMERGENCY PLAN

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

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

6.01 STRUCTURE OF OFF-SITE EMERGENCY

BASIC ACTIONS IN EMERGENCIES

Immediate Actions

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

- Take immediate steps to stop leakage/fire and raise alarm simultaneously.
- Initiate action as per FIRE ORGANIZATION PLAN or Disaster Management Plan, based on gravity of the emergency.
- Stop all operations and ensure closure of all valves and isolation valves
- All out efforts should be made to contain the spread of leakage/fire.
- Saving of human life shall get priority in comparison to stocks/assets.
- Plant personnel without specific duties should assemble at the nominated place
- All vehicles except those required for emergency use should be moved away from the operating area, in an orderly manner at pre-nominated route.
- Electrical system except for control supplies, utilities, lighting and fire fighting system should be isolated.
- If the feed to the fire cannot be cut off, the fire must be controlled and not extinguished.
- Start water spray system at areas involved in or exposed to fire risks.
- In case of leakage of chemicals without fire and inability to stop the flow, take all precautions to avoid source of ignition.
- Block all roads in the adjacent area and enlist Police support for the purpose if warranted.

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Fire Fighting Operations

- Enlist support of local fire brigade and neighboring industries.
- If escaping vapor cannot be stopped, jets of water should be directed at the point of leakage to asset controlled release of vapor and in between water fog should be used for dilution and rapid dispersion of vapor cloud.
- Fire fighting personnel working in or close to un-ignited vapor clouds or close to fire must wear protective clothing and equipment including safety harness and manned life line. They must be protected continuously by water sprays. Water protection for fire fighters should never be shut off even though the flames appear to have been extinguished until all personnel are safely out of the danger area.
- Exercise care to ensure that static charge is not generated in vapor cloud. For this purpose, solid jets of water must be avoided, instead for nozzles should be used.
- Fire fighters should advance towards a fire down – wind if possible.
- Cylinder fire should be approached using proper barricades / protection to avoid direct hit from flying cylinders.
- If the only valve that can be used to stop the leakage is surrounded by fire, it may not be possible to close it manually. The attempt should be directed by trained persons only. The person attempting the closure should be continuously protected by means of water spraying (through fog nozzles), fire entry suit, water jet blanket or any other approved equipment. The person must be equipped with a safety harness and manned life line.
- Any rapid increase in pressure or noise level of product discharged through safety relief valve of the vessel/pipeline should be treated as a warning of over pressurization. In such cases all personnel should be evacuated immediately
- As in case of any emergency situation, it is of paramount importance to avoid endangering human life in the event of fire involving or seriously exposing equipment containing chemicals or serious leakage of chemicals without the fire.

Action in the event of chemical leakage without fire

- Take basic action as detailed in (1) above
- If escaping is not on fire, close any valve which will stop the flow.

Action in the event of fire

- ❖ Take basic action as detailed in (1) above.
- ❖ Extinguish Fires – A small fire at the point of leakage should be extinguished by enveloping with a water spray. However, it is against, stressed that fire should not, except in special circumstances explained earlier, be extinguished until the escape of product has been stopped.
- ❖ Fire fighting procedure – Fire fighting procedures would vary depending upon various factors such as nature, sources sizes, location etc of fire. Basic fire fighting techniques have been explained earlier in section (2). However, for the purpose of guidelines, fire fighting techniques for few common cases are as follows:
- ❖ Cylinder Fire If a cylinder is involved in fire, internal pressure may start rising and if not relieved the built up pressure could rise and ultimately rupture the container. Ignition of the escaping gas would aggravate the fire but the release of pressure would reduce the possibility of rupture of the container. No attempt should be made to extinguish the burning gas. But the container and other containers in the vicinity should be kept cool by water sprays until the

contents of the container have burnt away. If the gas leakage does not ignite, the container should be approached from upwind (if in the open air) and be removed to a place of safety remote from sources of ignition.

- ❖ Cylinders not directly involved in the fire should be moved away from heat exposure, while applying cooling water sprays on cylinder directly involved.
- ❖ Fire on storage vessel: If a pressure vessel is exposed to radiant heat from external fire, it should be kept cool by water sprays to prevent excessive pressure rise in the vessel. Cooling water sprays must be applied without delay in the heat affected areas using fixed water sprinkler system or equivalent spray water coverage, through fixed monitors or other equipment. Cooling the vessel with water sprays reduces the heat input to the vessel and thereby reduces the pressure, thus reducing the rate of discharge from the relief valves.

Fire Fighting Organization Plan

A plan of action for use in the event of a major leakage of with a fire or risk of fire is essential. Such a plan must be carefully prepared for each area. It should be fully understood by all the Port supervisory personnel and other personnel's responsibilities for action as per plan. It shall be based on the following:

- Port personnel shall be fully trained for specialized techniques necessary for combating leakages and fires.
- If leakage and / or fire occurs, all personnel should use the equipment provided and to carry out their allotted tasks as detailed in the fire fighting organization plan.
- Personnel should be conversant with fire control equipment and also its location.
- Port personnel should be familiar with the standard recognition markings of the control, first-aid and all safety equipment, must know the location of emergency exits, and they should know the location of water points/monitors and must be familiar with the sound of the emergency (fire) alarm.
- The fire fighting organization plan together with layout of fire fighting and safety devices shall be displayed at prominent places and explained to all personnel. It shall include the following functions, expanded to suit the location facilities / equipment:
 - Sounding the emergency (fire) alarm.
 - Shutting off the supply to any leakage point / fire.
 - Summoning the fire brigade / police
 - Fire control, with first-aid, fire fighting equipment
 - Closing down all operations in the area pertaining to emergency
 - Preventing all sources of ignition in case flammable substance' leak occurs
 - Evacuation of vehicles
 - Evacuation and mustering of personnel
 - Establishing an emergency fire-control center
 - Traffic control
 - Stations and duties of all personnel
 - Policing of affected areas
 - Any other specialized duties
 - Display of fire brigade, ambulance, Police telephone numbers etc.
 - All clear signal by competent person.

Liaison with local Fire Brigade

Close co-operation with the local fire authorities is essential and shall take the following form:

- Fire brigade other than of Port should be made familiar with layout of plant and the location of important equipment / facilities provided, and their method of use. Mock fire drills / exercise jointly by plant personnel and outside fire brigades shall be planned.
- Fire fighting equipment at the plant shall be compatible with the outside fire brigade equipment, otherwise adopters shall be kept ready for hoses,
- The outside fire brigade shall be aware of the ports fire fighting organization plan and the views held at the plan regarding the most effective fire control method. (Water insoluble)
- In the event of an emergency / fire, the Port manager and / or his representative shall advise the Fire Officer about particular or potential hazards that may be present at that particular point of time.

Fire Drills & Training

- ❖ Drills for all plant personnel, making use of the Fire Fighting Organization plan and practicing the specialized techniques required for fighting fires or dispensing / diluting vapor shall be held minimum once in a month.
- ❖ The drills should cover various types of incidents, e.g. Major spillage, leak / fire, cylinder fire etc.
- ❖ Extinguishers due for recharging due for hydro testing shall be discharged during drills and replenished subsequently 50% (Min.) stock of refills as replenishment for Fire Extinguishers should be maintained.
- ❖ The fire pump should be run, sprinkler system activated, emergency systems tested, water hoses run out and spray / set techniques practiced during drills.
- ❖ Fire alarm shall be sounded / tested / neighbouring areas and the fire brigade shall be warned in advance of this test).
- ❖ Protective clothing, mask and any other specialized safety equipment available shall be tried out during drills to train all concerned in their application.
- ❖ The local fire brigade should be encouraged to participate in fire drills periodically.
- ❖ Any shortcoming, noticed during the drill shall be rectified.

ON-SITE EMERGENCY PLAN (DISASTER MANAGEMENT PLAN)

It is basically a pre-plan to handle any emergency situation of a higher magnitude arising out of factors listed below:

- ✓ Major fire / explosions
- ✓ Lighting
- ✓ Heavy floods
- ✓ Earthquakes
- ✓ Sabotage/ terrorist outrage
- ✓ War situation

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Due to varying risk potentials and also varying hazards at / around each location _ON SITE EMERGENCY PLAN_ for each location shall be drawn up individually based on the outline given below:

- Identify disaster scenario i.e. the situations under which the plan would become operational. Plan for the worst possible scenario.
- Identify resources required from each of the outside agencies.
- Establish outside agencies, role of each agency and obtain their commitment for rendering the assistance in crises situation as per the agreed plan.
- Establish organogram for ON SITE EMERGENCY PLAN based on available manpower in various groups and identify the leader and alternative leader for each of the groups and the role to be played by each team in various likely crises situations.
- Identify Disaster Control room / group.
- Furnish detailed data and drawings relevant for the crises management.
- Mock drills to be conducted minimum once a year.
- Modify the plan based on the experience gained through mock drills and try out the modified plan through subsequent mock drills.
- The plan shall be updated as and when the changes recorded in the plan occur and communication sent to all concerned.

Communication organogram

As a part of ON SITE EMERGENCY PLAN, communication organogram shall be drawn up giving flow of communication from the originating location to various local agencies and also to Statutory Authorities and upwards within the organization to mobilize support and to consider alternatives for maintaining essential supplies. **(As mentioned in Chapter 3.13 & 3.14 Communication & Public Affairs)**

MANAGER (SITE MAIN CONTROLLER)

1. Rush to the port on receiving the message of the incident
2. Call other persons if required.
3. Inform hospitals, doctor, police, dist.authorities, Director, Industrial Safety & Health
4. Arrange for roll call of workers and find if anyone missing
5. Arrange for first aid of injured and hospitalization
6. Arrange food / water for persons controlling the emergency
7. Arrange for money
8. Assess situation & determine area likely to be affected

OCCUPIER

1. Prepare a statement for press & public release and take responsibilities of press and public relationship
2. Plan out rehabilitation / post emergency activities

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6.02 ROLE OF MANAGEMENT


A copy of this on-site emergency to be submitted in duplicate to Deputy Director, Industrial Safety & Health, District Authority.

6.03 ROLE OF POLICE AND EVACUTION AUTHORITY


Police may be required for maintaining law and order outside the factory and on the approach road.

6.04 ROLE OF MUTUAL AID UNITS


Agreement with nearby units is to be made for providing help, aid, assistance, vehicle, expert to overcome the situation.

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
	Authorized by: AGM (QHSE) Rev : 09 Issue No. : 04	Date: 4 th January 2022


Annexure – 1																																	
IDENTIFICATION OF FACTORY																																	
Full Name & Address of factory			ADANI PORTS and SEZ LIMITED P.O. Box 1, Mundra – 370 421 (KUTCH) Gujarat, India.																														
Phone	02838-255000		Office																														
Fax No.	02838-226301		E-mail	info@mundraport.com																													
Full Name & Address of the Occupier			DR. MALAY MAHADEVIA C/O. ADANI PORTS & S.E.Z. LIMITED NAVINAL ISLAND, MUNDRA.																														
Phone No.			Office	Residence																													
			--	--																													
Full Name & Address of the Manager			CEO. DOUGLAS CHARLES SMITH C/O. ADANI PORTS & S.E.Z. LTD., NAVINAL ISLAND, MUNDRA																														
Phone No.			Office	Residence																													
			02838-255000	--																													
Manufacturing Process			Handling of Dry and Liquid Cargo in Bulk																														
<table border="1" style="width: 100%;"> <tr> <th rowspan="2">Name of the Shift</th> <th colspan="3">Maximum Worker at a time</th> <th rowspan="7">In "Workers" include all Employees, Contract Workers, Trainees ,Apprentices, etc.</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Total</th> </tr> <tr> <td>General Shift – G</td> <td>1187</td> <td>42</td> <td>1229</td> </tr> <tr> <td>Shift – A</td> <td>402</td> <td></td> <td>402</td> </tr> <tr> <td>Shift – B</td> <td>402</td> <td></td> <td>402</td> </tr> <tr> <td>Shift – C</td> <td>380</td> <td></td> <td>380</td> </tr> <tr> <td>Total Shifts:</td> <td>2371</td> <td>42</td> <td>2413</td> </tr> </table>						Name of the Shift	Maximum Worker at a time			In "Workers" include all Employees, Contract Workers, Trainees ,Apprentices, etc.	Male	Female	Total	General Shift – G	1187	42	1229	Shift – A	402		402	Shift – B	402		402	Shift – C	380		380	Total Shifts:	2371	42	2413
Name of the Shift	Maximum Worker at a time			In "Workers" include all Employees, Contract Workers, Trainees ,Apprentices, etc.																													
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Shift – A	402		402																														
Shift – B	402		402																														
Shift – C	380		380																														
Total Shifts:	2371	42	2413																														
First Person to be contacted in case of emergency :																																	
Name of the shift	Name & Designation	Place of Availability	Phone No.																														
			Mobile	In Factory	Residence																												
(A),(B),(C) shifts	Port Operation Center	POC office	9825000949	02838-255762 02838-255781	-																												
Any Other information, if any : Any of the persons will be available round the clock :																																	

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

Annexure – 4									
STORAGE HAZARDS & CONTROL									
Name of the hazardous substance (Mention concentration if any)	Sr. No. of the MSDS enclosed	Quantity		Place of its storage	Operating pressure & Temp.	Type of Hazards possible (Fire, explosion, Toxic release, Spill etc.)	Control Measures Provided	In charge Person	
		Maximum That can be stored	Actually stored (Including in process & handling)					Name & Designation	Phone No.
1	2	3	4	5	6	7	8	9	10
A. <u>Raw Materials:</u>	Available	Storage of Liquid 3.25 Lac KL	185135 MT as on 04.01.22	Liquid Storage Tanks	Ambient Temperature and Pressure	Fire, explosion, Toxic Release, Spill	Water Sprinkler, Foam Pourer, Hydrant System	Mr. Gaurang Chudasama (Head – LT)	8980802997
B. Finished Product:	--	--	--	--	--	--	--	--	--
C. Intermediates	--	--	--	--	--	--	--	--	--
D. Bye-Products :	--	--	--	--	--	--	--	--	--
E. Other: (E.g. Catalysts, inhibitors etc.)	--	--	--	--	--	--	--	--	--
Note: There is no process or manufacturing activity only storage handling of dry and liquid cargo in bulk.									

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022


Annexure – 6									
PROCESS & VESSEL HAZARDS AND CONTROLS									
Sr. No.	Name of the Plant, Department or place	Name of the hazardous process and operation	Materials in the process/ operation with their quantity	Name of the vessel and its location	Operating parameters: (Pressure, Temp. etc)	Type of hazards possible (exothermic, run away, pressure release, toxic release, fire, explosion etc)	Control Measures provided	In charge Person	
								Name	Tele. No.
1	2	3	4	5	6	7	8	9	10
1	Air compressor (LT workshop)	Air compression	Compressed Air	Air driers & Air Receivers	Pressure	High Pressure release	Safety Valve,	Mr. Gaurang Chudasama (Head – LT)	8980802997
2	Nitrogen compressor (LT workshop & Near ISPS Gate)	Nitrogen compression	Nitrogen	Nitrogen Receiver	Pressure	Nitrogen release with high pressure	Safety valve		

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	


Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
1.	Used/Spent Oil	300.0 MT	All the departments	Reception, Collection, Storage, Transportation & Disposal by selling out to registered recycler/ reprocessor	Send to authorized recycler	-----	Disposal by selling out to registered recycler/ reprocessor	Mr. Ashok Sharma, Central Store 8980015147 (M)
2.	ETP Sludge	1.095 MT	Liquid Terminal	Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 980802997 (M)

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	


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Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
3.	Sludge & Filters contaminated with oil	5.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Ashok Sharma, Central Store 8980015147 (M)

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
4.	Waste Residue Containing Oil	100.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Sanghi Cement / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Bhagwat Swaroop Sharma Environment 7622947676 (M)
5.	Bottom sludge	Whatever quantity generated	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 8980802997 (M)


	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 8								
TRADE WASTE DISPOSAL								
Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
6.	Pig Waste	24.0 MT	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 8980802997 (M)

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

Rev : 09
Date: 4th January 2022


Annexure – 13					
WEATHER CONDITIONS					
Sr. No.	Period of the year	Wind Velocity, M/Sec.	Wind Direction	Weather conditions	Pasquill classification A to F
	Month				
1	2	3	4	5	6
1	JANUARY	5-7	NNE / NE	CALM	D
2	FEBRUARY	5-7	NNE / NE	CALM	D
3	MARCH	7-9	SSW / SW	CALM	D
4	APRIL	9-10	SSW / SW	CALM	D
5	MAY	10-12	WSW / SW	SLIGHT	D
6	JUNE	10-12	WSW / SW	MODERATE / ROUGH	D
7	JULY	12-15	WSW / SW	ROUGH	D
8	AUGUST	12-15	WSW / SW	ROUGH / MODERATE	D
9	SEPTEMBER	8-10	WSW / SW	SLIGHT	D
10	OCTOBER	8-9	WSW / SW	CALM	D
11	NOVEMBER	5-7	WSW / SW	CALM	D
12	DECEMBER	5-7	NNE / NE	CALM	D
Legend: A: Extremely Unstable B: Moderately Unstable C: Slightly Unstable D: Natural E: Slightly Stable F: Moderately Stable					

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022


Annexure – 14									
INCIDENT CONTROLLERS									
Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Bhagwat Upadhye	Head – Dry Cargo	Tug Berth Building	Shantivan Colony	98792 03599 02838-255870	--	Mr. Mahavirsinh Jhala	Tug Berth Building	9687639228 02838-255838
2	Mr. Gaurang Chudasama	Head - LT	Liquid Terminal	Shantivan Colony	8980802997 02838 - 255742	4459	Mr. K R Rao	Liquid Terminal	99252 03436 02838-255872
3	Mr. Pradeep Jayaraman	Head – AMCT	(AMCT) CT2 Building	Samudra Township	9099005240 02838 – 255732	--	Mr. Prakash Pillai	(AMCT) CT2 Building	7574894335 02838 - 255917
4	Mr. Cherian Abraham	Head - AICTPL	(AICTPL) CT3 – Building	Samudra Township	8980048850 02838 – 255732	--	Mr. Jignesh Bhatt	(AICTPL) CT3 – Building	7069083202 02838 - 255551
5	Capt. Pradeep Ramachandran	Head - ACMTPL	(ACMTPL) CT4 – Building	Shantivan Colony	6358940439 02838 - 255809	4458	Mr. Gajanan Govekar	(ACMTPL) CT4 – Building	7069013836 02838 - 255409
6	Mr. Mavji Vaghamshi	Head - ES	Tug Berth Building	Shantivan Colony	97277 84691 02838-255949	--	Mr. Kuldipsinh Zala	Tug Berth Building	9727784692 02838 - 255949
7	Capt. Sachin Srivastava	Head – Marine	Tug Berth Building	Shantivan Colony	6359883102 02838 – 255727	4629 / 4630	Capt. Divya Gupta	Tug Berth Building	6359631088 02838- 255947

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4th January 2022	


8	Mr. Jawed Iqbal	Head- Railway Services	Railway Building	Shantivan Colony	98982 91000 02838 – 255763	4477	Mr. O P Sharma	Railway Building	98253 00413 02838 - 255765
9	Mr. Vikas Arora	Head – Howe	PUB Building	Shantivan Colony	98792 03557 02838 – 255581	4721	Mr. Harit Mehta	PUB Building	98792 03557 02838 - 259142
10	Mr. Arindam Goswami	Head-HR	Adani House	Shantivan Colony	6357160026 02838 - 255723	4635 / 4636	Mr. Shashikant Patyal	Adani House	8660183841 02838 - 255164

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022


Annexure – 14B (West Basin)									
INCIDENT CONTROLLERS									
Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. K Hari	Head – West Basin Port	SS-1	Shantivan Colony	9099055203 02838 - 255708	4623 4624	Mr. Kashyap Pandya	SS-1	9925223632
2	Mr. Nirbhay Devmurari	Manager	SS-1	Samudra Township	89800 15303	--	Mr. Vishal Bhavsar	SS-1	9879203580
3	Mr. Bibhudatta Ray	Sr. Manager – DC	SS-1	Shantivan Colony	89800 15282	B-block	Mr. Kasulu Nagireddy	SS-1	89800 15284

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 15									
DEPUTY INCIDENT CONTROLLERS									
Sr. No.	Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
	Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	3	4	6	7	8	9	10	11	12
1	Mr. Mahavirsinh Jhala	Manager – Dry Cargo	Tug Berth Building	Shantivan Colony	89800 15471 02838-255939	--	Mr. Mayursinh Jadeja	FCC	8980048813 02838-255987
2	Mr. K R Rao	DGM – LT	Liquid Terminal	Shantivan Colony	99252 03436 02838 - 255745	4501	Mr. Manish Jain	Liquid Terminal	98796 14715 02838 - 284419
3	Mr. Prakash Pillai	Senior Manager – AMCT	(AMCT) CT2- New Building	Samundra Township	8980015456 02838 - 255917	4458	Duty Superintendent	(AMCT) CT2- New Building	96876 39248
4	Mr. Jignesh Bhatt	Manager – AICTPL	(AICTPL) CT3 – Building	Samundra Township	7069083202 02838 – 255551	--	Duty Superintendent	(AICTPL) CT3 – Building	89800 48857
5	Mr. Gajanan Govekar	AGM - AICTPL	(ACMTPL) CT4 – Building	Samundra Township	7069013836 02838 - 255408	4466	Duty Superintendent	(ACMTPL) CT4 – Building	70690 83090
6	Mr. Kuldipsinh Zala	DGM-ES	Tug Berth Building	Shantivan Colony	9727784692 02838 - 255949	4506	Mr. Devendra Dubey	Tug Berth Building	98792 03578 2838-255832
7	Capt. Divya Gupta	DGM- Marine	Tug Berth Building	Shantivan Colony	6359631088 02838- 255947	4444	Mr. Sudhakar Singh	Tug Berth Building	70690 83039 02838-255787

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED							
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04							
						Rev : 09 Date: 4th January 2022		


8	Mr. O P Sharma	AGM – Railway	Railway Building	Shantivan Colony	98253 00413 02838 - 255765	4428	Mr. Paresh Palan	Railway Building	99252 03424 02838-255787
9	Mr. Vikas Arora	DGM – Howe	PUB Building	Shantivan Colony	98792 03557 02838 - 259142	4482	Mr. Harit Mehta	PUB Building	98792 03557 02838 – 255719
10	Mr. Shashikant Patyal	GM-Admin	Adani House	Shantivan Colony	9871110840 02838 - 255164	--	Mr. Supratim Sengupta	Adani House	9979855956 02838 - 255158

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022


Annexure – 15B (West Basin)								
DEPUTY INCIDENT CONTROLLERS								
Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
		In Factory	Residence Address	In the Factory	Residence			
2	3	4	5	6	7	8	9	10
Mr. Kashyap Pandya	Senior Manager – WB	SS-1	Shantivan Colony	9925223632	4517	Mr. Nital Bhut	SS-1	89800 15358
Mr. Bibhudatta Ray	Sr. Manager - DC	SS-1	Samudra Township	89800 15282	B – Block	Mr. Kasulu Nagireddy	SS-1	89800 15284
Mr. Kashyap Pandya	Sr. Manager ES – MHS	SS-1	Shantivan Colony	97277 84692	4472	Mr. Mayur Sadhu	SS-1	8980 015121
Mr. Nirbhay Devmurari	Manager ES – MHS	SS-1	Samudra Township	89800 15303	B – Clock	Mr. Vishal Bhavsar	SS-1	98792 03580
Supporting Staff of Channai Radha [Engineering Services]								
Name	Designation	Place of Availability in Factory		Residence	Phone No.			
Mr. Ravi V	RM – Channai Radha	Workshop		Mundra	8607700609			
Mr. Tapankumar Sarkar	Operation Head - Channai Radha	Workshop		Mundra	9726412631			
Mr. Mahesh Kumar	Maintenance Head – Channai Radha	Workshop		Mundra	9726418881			
Mr. Arha Chakrabarty	HOS E & I - Channai Radha	Workshop		Mundra	9726429031			
Mr. Lakshmanan T	Mechanical Head - Channai Radha	Workshop		Mundra	8683800531			

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4th January 2022	

Annexure – 16									
SITE MAIN CONTROLLERS									
Sr. No	Site Main Controllers						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	6357160100 02838 - 255002	4568 / 4569	Mr. Rakesh Mohan COO	ACMTPL	8018059999 02838 – 255404


	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 17							
KEY PERSONNEL							
EMERGENCY CONTACT NUMBERS							
Sr. NO.	NAME	Designation	Place of Availability		Phone No		
			Factory	Residence	Land line	Residence	Mobile
1	2	3	4	5	6	7	8
2	Mr. Douglas Charles Smith	CEO	Adani House	Shantivan Colony	02838 – 255002		6357160100
3	Mr. Mr. Rakesh Mohan	COO	ACMTPL	Shantivan Colony	02838 – 255404		8018059999
4	Mr. K Hari	Head - WB	SS – 01 WB	Shantivan Colony	--	4623 / 4624	9099055203
5	Mr. Rakshit Shah	ED	Adani House	Shantivan Colony	02838 - 255001	52497	99791 21111
6	Mr. Mavji Vaghamshi	Head-ES	Tug Berth Bld.	Shantivan Colony	02838 - 255713	--	97277 84691
7	Mr. Gaurang Chudasama	Head- LT	Liquid Terminal	Shantivan Colony	02838 - 255742	4459	8980802997
8	Mr. Arindam Goswami	Head - HR	Adani House	Shantivan Colony	02838 - 255723	--	90990 05225
9	Mr. Pradeep Jayaraman	Head – AMCT	CT2- New Bld.	Samudra Township	02838 – 255732	4617 / 4618	9152036949
10	Mr. Cherian Abraham	Head – AICTPL	CT3 Bld.	Shantivan Colony	02838 - 255733	--	8980048850
11	Capt. Pradeep Ramachandran	Head - ACMTPL	CT4 Bld.	Shantivan Colony	02838 – 255727	4629 / 4630	6358940439
12	Capt. Sachin Srivastava	Head – Marine	Tug Berth Bldg.	Shantivan Colony	02838 – 255727	4629 / 4630	6359883102
13	Mr. Bhagwat Upadhye	Head – Dry Cargo	Tug Berth Bldg.	Shantivan Colony	02838-255870	--	98792 03599
14	Mr. Jawed Iqbal	Head - Railway	Rly. Building	Shantivan Colony	02838 – 255763	--	90999 91319
15	Mr. Shivaraman Lvc	Head – OHS & F	CT2- New Bld.	Samudra Township	02838-255777	--	9884869471
16	Mr. Neeraj Kaushik	Head - Security	Adani House	Shantivan Colony	02838-255800	--	9109988165
17	Mr. Mukul Varshney	SEZ Utilities	Adani House	Samudra Township	02838-255828		6357160086

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 19
SAFE ASSEMBLY POINTS

Identificati on Sr. No. of the Assembly Point	Location	Accomm odation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential address		
1	2	3	4	5	6	7	8	9
Zone 1.	Terminal -1 (Sec. Gate)	100	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 2.	CG 7	200	Mr. Shivaraman Lvc	Head – OHS & F	CT2 New bld.	Samudra Township	02838 – 255777	89808 02997
Zone 3.	Driver Canteen	200	Mr. Gaurang Chudasama	Head – LT	LT	Shantivan Colony	02838 - 255742	89808 02997
Zone 4.	LT - Behind Encl-09	200	Mr. Gaurang Chudasama	Head – LT	LT	Shantivan Colony	02838 - 255742	89808 02997
Zone 5.	Old Admin Canteen	200	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bld.	Samudra Township	02838 - 255870	98792 03599
Zone 6.	Rly. Buldng	200	Mr. Jawed Iqbal	Head – Rly	Rly. Buldng	Shantivan Colony	02838 – 255763	98982 91000
Zone 7.	Terminal 2 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 8.	AMCT CT-2 (Sec. Gate)	200	Mr. Pradeep Jayaraman	Head – AMCT	CT2 New bld.	Shantivan Colony	02838 – 255732	91520 36949
Zone 9.	Main Gate	500	Mr. Neeraj Kaushik	AGM - Security	Main Gate	Shantivan Colony	02838 - 255800	9109988165
Zone 10.	PUB	500	Mr. Vikas Arora	Head Howe	PUB	Shantivan Colony	02838 - 255932	98792 03557
Zone 11.	Adani House	200	Mr. Arindam Goswami	Head – HR	Adani House	Shantivan Colony	02838 - 255723	90990 05899
Zone 12.	Terminal – 3 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 13.	AICTPL (Sec. Gate)	500	Mr. Cherian Abraham	Head - AICTPL	CT – 03 (AICTPL)	Shantivan Colony	02838 - 255733	89800 48850


	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	<hr/>		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE)	Rev : 09	
	Issue No. : 04	Date: 4th January 2022	

Zone 14.	ACMTPL (Sec. Gate)	500	Capt. Pradeep Ramachandran	Head – ACMTPL	CT – 04 (ACMTPL)	Samudra Township	02838 - 255809	63589 40439
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Annexure – 19B (West Basin)

SAFE ASSEMBLY POINTS

Identification Sr. No. of the Assembly Point	Location	Accommo dation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential Address		
1	2	3	4	5	6	7	8	9
Zone 1	Opp. SS-1	100	Mr. Vimal Baldaniya	AM -ES	SS-1	---	----	89800 15123
			Mr. Jignesh Kansara	Junior Officer – DC	SS-1	Mundra	02838 – 252936	99132 43060
Zone 2	Nr. Howe Office	100	Mr. Bharat Pokar	Officer – Safety	Howe office	Mundra	----	89800 15467
Zone 3	GIS	100	Mr. Vishal Bhavsar	Manager – E & I	SS-1	Shantivan Colony	----	89800 15057
			Shift In charge – E & I	----	SS-1	----	----	89800 15212
Zone 4	Nr. Main Gate	100	Mr. Khadim Hussain	Junior Officer, Security	Main Gate	----	----	84609 28563
			Security Shift Incharge	----	Main Gate	----	02838 – 252900	97277 84645
Zone 5	Approach-3	100	Mr. Kashyap Pandya	Sr.Mgr – MHS	SS-1	Shantivan Colony	02838 – 255973	99252 23632
			Mr. Bibhudatta Ray	Sr.Mgr. – DC	SS-1	Samudra Township	02838 – 255924	89800 15282
Zone 6	Amenities Building	100	Mr. Narendrasinh Jadeja	AM - ES	SS-1	Shantivan Colony	02838 – 2562381	89800 16461

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
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	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE)	Rev : 09	
	Issue No. : 04	Date: 4th January 2022	

			Mr. Paresh Gadhavi	Assistant-Admin	SS-1	Mundra	02838 – 255969	89800 16462
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Annexure – 21										
Fire & Toxicity Control Arrangements										
Fire Water & Other sources	Nos. of Reservoir	03 (U/G water reservoir)	Nos. of Tanks	08 (O/H water storage tank)	Total Quantity				31383 KL	Nos. of CO2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Monitors					
					Fixed(113)		Portable (04)		Alternative power arrangement	
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada water	531	<u>Diesel pump:</u> 09 no. – 1050 M³/hr 03 no. – 795 M³/hr 02 no. – 616	60 mtr lengths – 54 nos.& 600 nos hoses	05 no. fire tender	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm²	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm²	Diesel Generator backup	1096 Nos.




ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

EMERGENCY ACTION PLAN


Authorized by: AGM (QHSE)
Issue No. : 04

Rev : 09
Date: 4th January 2022


		M ³ /hr 06 no. – 273 M ³ /hr 01 no. – 136 M ³ /hr <u>Electric pump:</u> 05 no. – 273 M ³ /hr 04 no. – 616 M ³ /hr 01 no. – 136 M ³ /hr <u>Jockey pump:</u> 02 nos -225 M ³ /hr 08 nos. –10 to 30 M ³ /hr 01 nos-40 M ³ /hr 01 no. – 90 M ³ /hr		Capacity: 1) Foam tender 01 - 6 KL Water & 3 KL Foam 2) Foam tender 02 - 5 KL water & 1 KL foam 3) Multipurpose fire tender - 8 KL Water - 3 KL Foam - 45 Kg CO ₂ - 150 Kg DCP 4) Foam Tender-03 - 9 KL water & 3 KL foam 5) Aviation Mini Fire Tender - 1 KL water & 0.5 KL foam						
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	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022


Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipments			
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Respiratory		Non-respiratory	
								Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23
Sodium bicarbonate; 2000 kg	1463 Nos.	AFFF & AR-AFFF 44KL in Tank & 35 KL storage	26 Nos.	163 cm X 152 cm 04 nos.	Nil	Water CO2 type	9 Ltr – 4	1) Self-Contained Breathing Apparatus Set 2) Airline Self-Contained Breathing Apparatus Set	1) 33 nos. 2) 01 Nos.	Safety Helmet Gumboot	50 nos. 25 Nos.

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 21B (West Basin)										
Fire & Toxicity Control Arrangements										
Fire Water & Other sources	Nos. of Reservoir	00 (U/G water reservoir)	Nos. of Tanks	04 (O/H water storage tank)	Total Quantity				2200 KL	Nos. of CO ₂ Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reels & Total Length	No. of fire tenders and capacity	No. of Monitors 215 nos.				Alternative power arrangement	
					Fixed [213]		Portable [02]			
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada Water	Reservior capacity is 2200 KL Nos. of Hydrant 278	<u>Diesel pump:</u> 02 no. – 273 M ³ /hr <u>Electric pump:</u> 04 no. – 273 M ³ /hr <u>Jockey pump:</u> 02 no. – 10.8 M ³ /hr 02 no. – 20 M ³ /hr	60 mtr lengths – 81 nos.& 300 nos hoses	01 no. <u>Capacity:</u> 1) 5 KL water	30 mtr head	7 kg/cm ²	20 mtr head	7 kg/cm ²	Diesel Generator backup	271 nos

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	<hr/>		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	


Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipment			
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Respiratory		Non-respiratory	
								Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23
Sodium bicarbonate; 500 kg	312 nos	AFFF 1000 liter	12 nos	163 cm X 152 cm 04 nos.	Nil	Nil	Nil	Self-Contained Breathing Apparatus Set	03 no	<ul style="list-style-type: none"> Safety Helmet Gumboot 	25 no. 20 no.

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	<hr/>		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

Mutual Aid Arrangement											
Name & Address of the factories & Fire stations	Approx. distance	Contact		FFE available		PPE available		No. of experts & trained persons available	Decontamination substances available	Gas detectors available	Other equipments available
		Person	Phone No.	Type	Quantity	Type	Quantity				
24	25	26	27	28	29	30	31	32	33	34	35
Indian Oil Corporation Limited, Mundra-Panipat Pipeline, Post Box No. – 1, P.O. Mundra, Old Port Road, Mundra, District – Kutch, Gujarat, PIN-370421.	12 km	Mr. Aswanth / Mr. Aditya Parmar	76370 01443 / 96444 43150	--	--	--	--	--	--	--	--
Hindustan Petroleum Corporation Limited, Mundra-Delhi Pipeline, P.O. Mundra, IOCL Link Road, Mundra, District – Kutch, Gujarat, PIN-370421.	06 km	M R Chauhan / Mr. Surabh bhatt	99201 73377 / 96876 06093	--	--	--	--	--	--	--	--
Jindal SAW Ltd. (IBU), Village – Samaghoga, Taluka – Mundra, District – Kutch, Gujarat, PIN-370421.	28 km	Mr Girish Kumar / Mr Dipak Kumar	90059 58965 / 96876 78052	--	--	--	--	--	--	--	--

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022	

Adani Power Limited, Adani Power Site, Tunda-Wandh, Mundra-Mandvi Highway, Siracha, Mundra, District – Kutch, Gujarat, PIN-370435.	25 km	Mr. Anil C Datar / Mr. Dinesh Mishra	96876 60356 / 78944 06485	--	--	--	--	--	--	--	--	--
Costal Gujarat Power Limited, Ultra Mega Power Project, Tunda Vandh Road, Tunda Village, Mundra, District – Kutch, Gujarat, PIN-370435.	28 km	Mr. Pramod Singh /Mr. Jignesh Kumar	92272 95495 / 90999 95701	--	--	--	--	--	--	--	--	--
Hindustan Mittal Energy Limited Plot no.06 (2), Old port road, Mundra, District -Kutch Gujarat, PIN-370435.	06 km	Mr Partha Chakrvab orty / Mr. Vipin Yadav	98996 00434 / 70690 02406	-	-	-	-	-	-	-	-	-
GSPC (LNG) South Port-Mundra	5.5 km	Mr.Ranjit Daimry/ Mr.Shaile sh Patel	99090 38955/ 98255 40044									
Mundra LPG Terminal Pvt Ltd APSEZ	3 km	Mr.Abdul Rahman	63599 30007									


	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022	

Annexure – 22												
Medical Arrangements												
First-aid Centers / Ambulance room / OHC / Hospital							Ambulance van or alternate arrangement					
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipments	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
					Phone	Addresses						
1	OHC – NR. LT APSEZ LTD	02838 25571 0 89800 15070	On Duty Dr.	8511078 199	Samdra Township	All equipments as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. LT APSEZ LTD	4 Bed capacity	All equipments as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasi nh

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4th January 2022	

Rev : 09
Date: 4th January 2022

2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838 - 25589 9	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095
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	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 22B (West Basin)												
Medical Arrangements												
First-aid Centers / Ambulance room / OHC / Hospital							Ambulance van or alternate arrangement					
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipment	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
					Phone	Address						
1	OHC – Nr. SS-1 Building	02838-255984 8980015155	Medical Officer	96876 39281	Samudra Township	All equipmen t as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Ashok K. Soni 3. Subash Moond 4. Gulam Khatri 5. Radheshyam 6. Deepu Sharma 7. Dindayal Sharma	OHC – Nr. SS-1 Building	consulti ng	All equipme nt as per Factory Act 1948	1.Bharat Dhafada (Gundala- Mundra- 9925203405) 2.Bhaves h L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhaves h A Maheshwari 9.Yogendras inh

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

Rev : 09
Date: 4th January 2022


2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838-255899	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095
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	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022 		


Annexure – 23									
TRANSPORT & EVACUATION ARRANGEMENT									
Type of siren, if any, for evacuation				Steam & Electrical hooter type siren					
Own Transport Center					Own Vehicles				
Name of Location	Phone No.	In charge person			Sr. No.	Type & No.	Capacity	No & Type of public warning instruments	Driver's name & Address
		Name & Designation	Residence						
			Phone	Address					
Mundra	9909927251	Mr. Archan Bhat	9909927251	Mundra	During Day Time (0730 hrs. to 1830 hrs.)				
					1	HMV	56 seater x 8 54 Seater x 13	Nil	All drivers available
					2	LMV	7 seater x 25 (Available at different location)		
					During Night Time (1830 hrs. to 0700 hrs.)				

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN	
Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4 th January 2022	

					1	HMV	56 Seater x 3 (at SVC)	Nil	Naran, Rupsinh, Tulsi
					2	HMV	13 Seater x 2 (at CT 2 & CT3)		Vijay raj, Mulji, Mintoo,
					3	LMV	7 seater x 30 (Dry Cargo – 01, LT – 02, CT 2 – 04, Engg. Service – 01, Marine-03, Safety-01, Fire-01, Railway-01, Security-16)		Satendra, Pravin, Kapil, (All available at Port, SVC and Drivers Rest room)
					4	Ambulance	05 (02 at Port, 01 WP, 01 SEZ, 01 at SVC)		

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022 	

Outside shelters for evacuated persons							
Sr. No .	Name, address & distance	Phone. No.	In charge Person			Accommodation capacity	Facilities available
			Name & Designating	Residence			
				Phone	Address		
11	12	13	14	15	16	17	18
1	Shantivan Colony	09727721638	Mr. Shashikant Patyal	987111 0840	Shantivan Colony	1500	Open ground available at SV Colony (Cricket ground and Rang Manch), Shopping Complex available
2	Samundra Township	09727721638	Mr. Shashikant Patyal	987111 0840	Samundra Township	2500	Open ground available at Samundra Township(Children Park and utility park), Shopping Complex available

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 24											
POLLUTION CONTROL ARRANGEMENTS											
Water Pollution Control				Air Monitoring							
Type & Capacity of effluent treatment plant	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	Type & parameters of tests	Wind direction	Instrument available.	In charge person's name, address & Phone No.				
1	2	3	4	5	6	7	9				
265 KLD	2 sample per month	Mr. Gaurang Chudasama CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)	Twice a Week	<u>Type</u> Ambient Air Monitoring <u>Parameters</u> PM 10, PM 2.5, SO ₂ , NO _x , CO, Hydrocarbon, Benzene	Wind vane	Respirable Dust Sampler & Fine Particulate Dust Sampler	Mr. Gaurang Chudasama CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)				
Stack Monitoring				Scrubbers, Incinerators etc.				Land Pollution Controls		Pollution control Board	
No. of sample monitoring & its frequency	Type & parameters of tests	Instrument available.	In charge person's name, address & Phone No	Location	Type & Capacity	For What	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	Permission obtained?	Conditions fulfilled?

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4th January 2022	


11 sample per month	SO ₂ , NO _x , SPM	Stack Monitoring kit.	As above	----- N A -----	2 sample per month	As above	Yes (As per CC&A)	Yes (As per CC&A)
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	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022 	


Annexure –26

ALARMS & SIRENS


Sr. No.	Plant wise alarm points						The alarm (signal) is heard (seen) at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	2	3	4	5	6	7	8	9	10	11	12
1	Liquid Terminal	1) LT Control room, 2) Ground floor of LT office	1 & 2	Roof of the first floor	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
2	Dry Cargo area	Ground floor	3	Roof of fire pump house	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
3	Marine Control Room T-1	First floor	4	Roof of Marine Terminal building	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
4	Adani House	Ground floor	5	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN		
	Authorized by: AGM (QHSE) Issue No. : 04	Rev : 09 Date: 4th January 2022	

5	PUB Building	Ground floor	6, 7 & 8	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
6	ES - Building	Ground floor	9	Roof of ES building	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
7	AMCT / CT2	Ground floor fire P/H	10	Ground floor	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
8	Terminal-2	Ground floor fire P/H	11	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hand Operated	02 minute (all clear)	Wailing
9	AICTPL / CT3	CT3 Building Ground Floor	10	Ground floor	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
10	ACMTPL / CT4	RMU	10	Ground floor	Wailing	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing


	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4 th January 2022		

Annexure –26B (West Basin)											
ALARMS & SIRENS											
Sr. No.	Plant wise alarm points						The alarm (signal) is heard at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	2	3	4	5	6	7	8	9	10	11	12
1	SS-1	Top floor	1	Top floor	Wailing (Electric)	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
2	SS-3	Ground floor	2	Ground floor	Wailing (Electric)	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
3	Fire Dept.	Ground floor	3	Ground floor	Wailing (Electric)	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
4	Adani Store	Ground floor	4	Ground floor	Wailing (Electric)	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
5	Crew Store	Ground floor	5	Ground floor	Wailing (Electric)	Twice in a month	3 km range	All Type of Emergency	Electrical Operated	02 minute (all clear)	Wailing
6	Jetty	Ground floor	6	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hand Operated	02 minute (all clear)	Wailing
Code of Siren: <ul style="list-style-type: none">● Emergency : Wailing Siren continuous for one minute with gap Siren for one minute followed by five second gap. Repeated four times.● Testing : Continuous Siren for one minute (4th and 19th of Every Month at 1100 hrs.).● All Clear : Continuous Siren for two minutes.											

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022 	

Annexure – 27
INTERNAL PHONES


Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Name	Designation	Designation or duty under on-site / offsite emergency plan, if any.	Residence	
						Phone No. (Internal)	Address
1	2	3	4		6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4258	SHANTIVAN COLONY
2	FIRE CONTROL ROOM	52801	SHIFT INCHARGE	FIRE OPERATOR	MR. RAKESH CHATURVEDI	4731	SAMUDRA TOWNSHIP
3	MEDICAL	52710	INCHARGE	MEDICAL OFFICER	MEDICAL OFFICER	--	--
4	SECURITY	52300	DUTY OFFICER	OFFICER	MR. NEERAJ KAUSHIK	4504	SHANTIVAN COLONY
5	MARINE CONTROL	52761	SHIFT INCHARGE	HEADMARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY
6	SAFETY OFFICER	52777	SAFETY OFFICER	SAFETY OFFICER	MR. SHIVARAMAN LVC	--	SAMUDRA TOWNSHIP
7	LT CONTROL ROOM	52744	SHIFT INCHARGE	AGM	MR. GAURANG CHUDASAMA	4459	SHANTIVAN COLONY
8	DRY CARGO	52932	SHIFT INCHARGE	HEAD-DC	MR. BHAGWAT UPADHAYE	--	SAMUDRA TOWNSHIP
9	ELECTRICAL & ISTR.	52826	SHIFT INCHARGE	AGM	MR. MAVJI VAGHAMSHI	4506	SHANTIVAN COLONY
10	PORT OFFICE CONTROL	52762	SHIFT INCHARGE	HEAD MARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04	
		Rev : 09 Date: 4 th January 2022

Annexure – 27B (West Basin)							
INTERNAL PHONES							
Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Designation or duty under on-site / offsite emergency plan, if any.	Designation	Name	Residence	
						Phone No. (Internal)	Address
1	2	3	4	5	6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4181	Shantivan Colony
2	FIRE CONTROL ROOM	52900	SHIFT INCHARGE	AGM	MR. RAKESH CHATURVEDI	4731	Samudra Township
3	MEDICAL	52984	INCHARGE	MEDICAL OFFICER	---	4460	Shantivan Colony
4	SECURITY	52939, 52900	DUTY OFFICER	SR.MANAGER	MR. NEERAJ KAUSHIK	--	Shantivan Colony
5	MARINE CONTROL	52933	SHIFT INCHARGE	GM	CAPT. SACHIN SRIVASTAVA	4726	Shantivan Colony
6	LT CONTROL ROOM		SHIFT INCHARGE	AGM	MR. GAURANG CHUDASAMA	4459	Shantivan Colony
7	DRY CARGO	52936	SHIFT INCHARGE	MANAGER	MR. BIBHUDATTA RAY	4439	Samudra Township
8	ELECTRICAL & INS.	52932	SHIFT INCHARGE	SR MANAGER	MR. KASHYAP PANDYA	4506	Shantivan Colony
9	CENTRAL CONTROL ROOM	52932	SHIFT INCHARGE	SR MANAGER	MR. KASHYAP PANDYA	4044	Shantivan Colony

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
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Annexure – 28				
EXTERNAL PHONES				
Sr. No.	Name & Address of the dept. / Service / Person (including external emergency services)	Phone No. (External)	Person available	
			Designated person	Services Expected Under On-site / off –site Emergency plan
1.	Bhuj Fire Station	02832 – 222590, 101	Fire Officer	Fire fighting Service
2.	Gandhidham Fire Station	02836-231610, 101	Fire officer	Fire fighting Service
3.	Fire & Ambulance serv.	108	Medical Off.	Fire fighting Service
4.	Kandla Fire Station	02836 - 270176, 270178	Chief Fire Off.	Fire fighting Service
5.	Factory Inspector	02836 – 260020, 260262	Asst. Director	Legal Advisory Service
6.	Collector Office	02832 – 250020, 251805	Collector	Administration Service
7.	Civil Defense	02832-220703	Dy. Collector	Evacuation Service
8.	Hospital, Bhuj	02832 – 221610, 250150	Civil Surgeon	Medical Service
9.	KPT- Hospital, Kandla	02836- 270205, 270633	Medical officer	Medical Service
10.	Police	02832 -250511, 250444	DSP	Law & Order
11.	Police control City	100	Control room	Law & Order
12.	Gujarat Maritime Board	02838-22136	Port Off.	Marine Service
13.	Indian Navy, Porbandar	0286-2240954	Navy Officer	Security service (WAR)
14.	Indian Coast Guards	02831-286430,31(Jhakhau) 0286-2240958 (Porbandar)	Cost Guard officer	Security service

	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED	
	EMERGENCY ACTION PLAN Authorized by: AGM (QHSE) Issue No. : 04 Rev : 09 Date: 4th January 2022 	

Annexure – 29						
NOMINATED PERSONS TO DECLARE MAJOR EMERGENCY						
Sr. No .	Name of the plant, department or location	Name & Designation of the nominated persons to declare major emergency	Duty of designation given, if any, under the onsite / off-site emergency plan	Phone No.	Residence	
					Phone No.	Address
1	Mr. Douglas Charles Smith	CEO	Site Main Controller	02838 – 255002	63571 60100	Shantivan colony
2	Mr. Rakesh Mohan	COO	Site Main Controller	02838 – 255404	80180 59999	Shantivan colony

Annexure – 11



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

FAX : (02838) 289170 / 289270

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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Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
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OIL SPILL CONTINGENCY RESPONSE PLAN

[illegible]Page 569 of 762

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Section 03: Strategy

1 Introduction

- 1.1 Authorities and responsibilities
- 1.2 Coordinating committee
- 1.3 Statutory requirements
- 1.4 Mutual aid agreements
- 1.5 Geographical limits of plan
- 1.6 Interfaces with ROSDCP and NOSDCP

2 Risk assessment

- 2.1 Identification of activities and risks
- 2.2 Types of oil likely to be spilled
- 2.3 Probable fate of spilled oil
- 2.4 Development of oil spill scenarios including worst case discharge
- 2.5 Shoreline sensitivity mapping
- 2.6 Shoreline resources, priorities for protection
- 2.7 Special local considerations

3 Response strategy

- 3.1 Philosophy and objectives
- 3.2 Limiting and adverse conditions
- 3.3 Oil spill response in offshore zones
- 3.4 Oil spill response in coastal zones
- 3.5 Shoreline oil spill response
- 3.6 Storage and disposal of oil and oily waste

4 Equipment

- 4.1 Marine oil spill response equipment
- 4.2 Inspection, maintenance and testing
- 4.3 Shoreline equipment, supplies and services

5 Management

- 5.1 Crisis manager and financial authorities
- 5.2 Incident organization chart
- 5.3 Manpower availability (on-site, on call)
- 5.4 Availability of additional manpower
- 5.5 Advisors and experts – spill response, wildlife and marine environment
- 5.6 Training / safety schedules and drill / exercise programme

6 Communications

- 6.1 Incident control room and facilities
- 6.2 Field communications equipment
- 6.3 Reports, manuals, maps, charts and incident logs

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 5 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

Action and operations

7 Initial procedures

- 7.1** Notification of oil spill to concerned authorities,
- 7.2** Preliminary estimate of response tier
- 7.3** Notifying key team members and authorities
- 7.4** Manning Control Room
- 7.5** Collecting information (oil type, sea / wind forecasts, aerial surveillance, beach reports)
- 7.6** Estimating fate of slick (24, 48, 72 hours)
- 7.7** Identifying resources immediately at risk, informing parties

8 Operations planning

- 8.1** Assembling full response team
- 8.2** Identifying immediate response priorities
- 8.3** Mobilizing immediate response
- 8.4** Media briefing
- 8.5** Planning medium-term operations (24, 48 and 72 hour)
- 8.6** Deciding to escalate response to higher tier
- 8.7** Mobilizing or placing on standby resources required
- 8.8** Establishing field command post communications

9 Control of operations

- 9.1** Establishing a Management team with experts and advisors
- 9.2** Updating information (sea, wind, weather forecasts, aerial surveillance, beach reports)
- 9.3** Reviewing and planning operations
- 9.4** Obtaining additional equipment, supplies, manpower
- 9.5** Preparing daily incident log and management reports
- 9.6** Preparing operations accounting and financial reports
- 9.7** Preparing releases for public and press conferences
- 9.8** Briefing local and government officials

10 Termination of operations

- 10.1** Deciding final and optimal levels of beach clean-up
- 10.2** Standing down equipment, cleaning, maintaining, replacing
- 10.3** Preparing formal detailed report
- 10.4** Reviewing plans and procedures from lessons learnt

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 6 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Data Directory

Maps / Charts

1. Coastal facilities, access roads, telephones, hotels etc.
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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 7 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Annexures

Annexure 1	Initial Oil Spill Report
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
Annexure 7	Responsibilities: SPM Pilot
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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 8 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 9 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

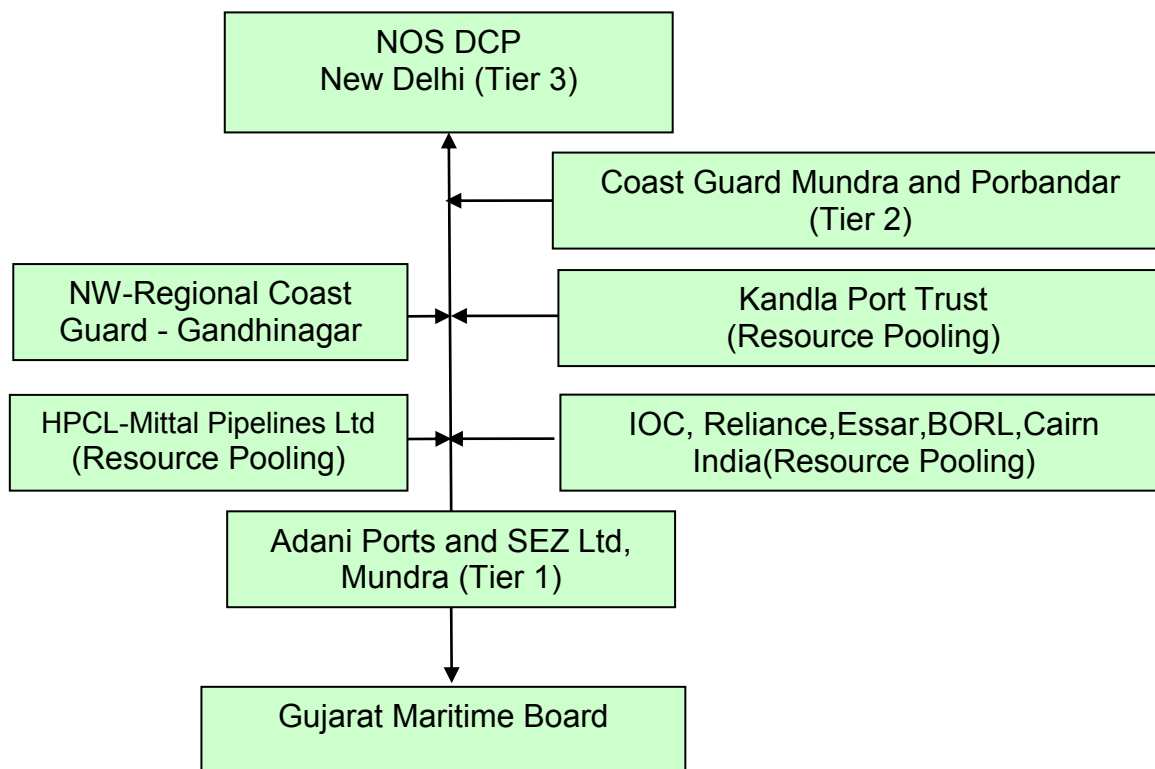
It is a strategic plan to quickly call on additional resources in a systematic manner firstly from Adani port and subsequently from other ports.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 10 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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:

- 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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 11 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 12 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

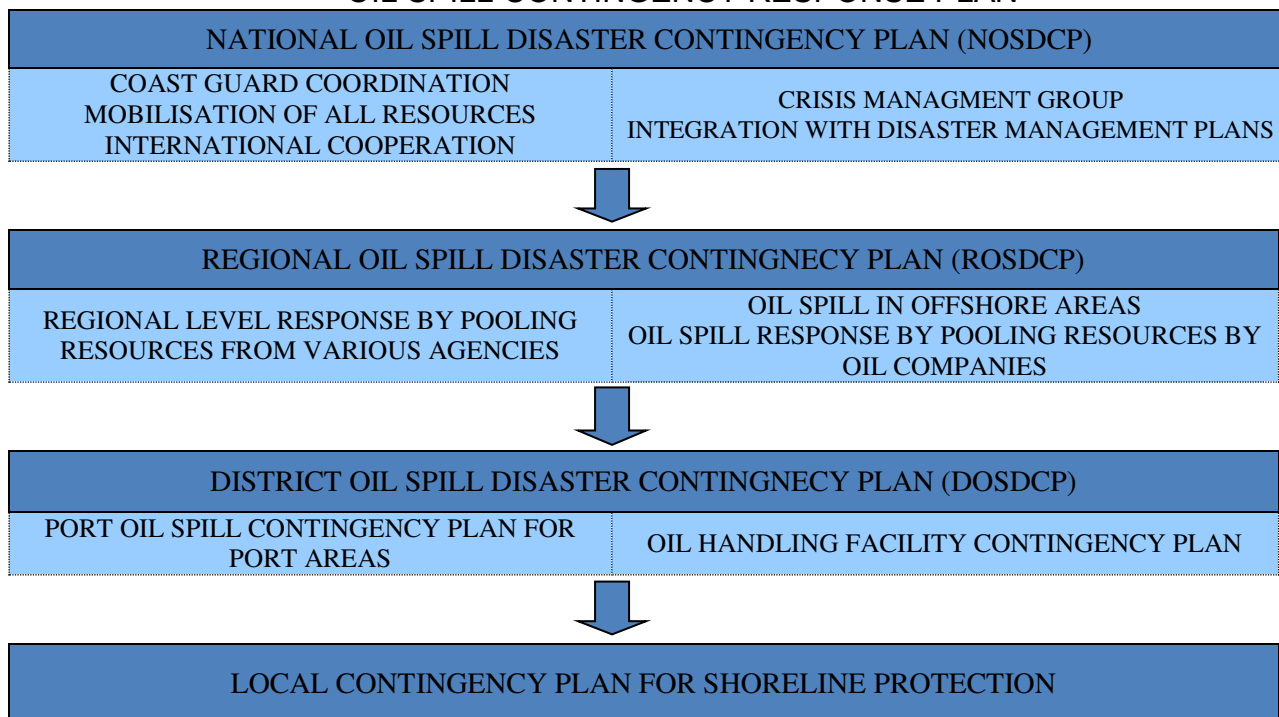


Figure 1 - Contingency Plan hierarchy

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).

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 13 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 14 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 15 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 16 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 17 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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	▪	▪	•

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 18 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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: ○ 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: ○ 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	■	■	●

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 19 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 20 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 21 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

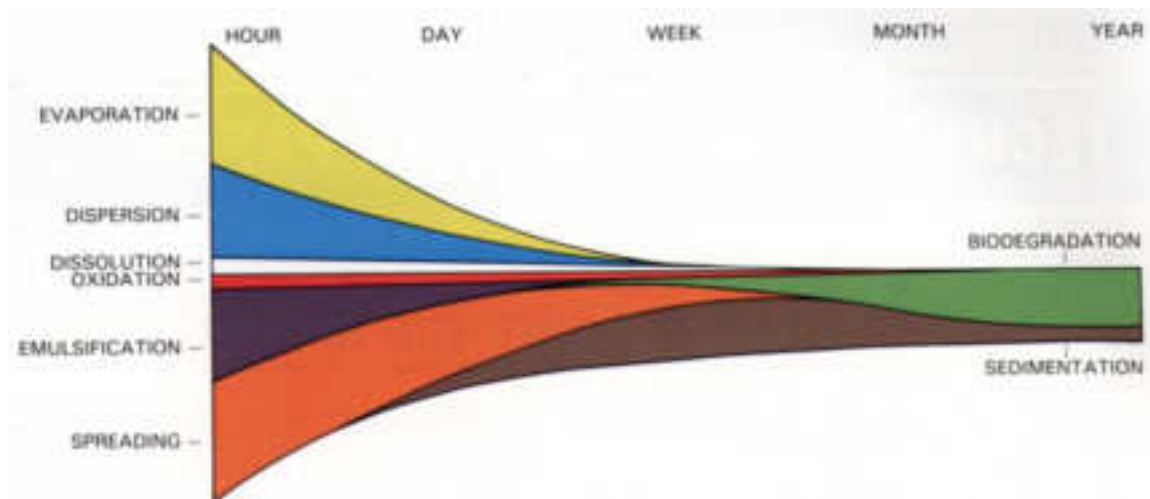
OIL SPILL CONTINGENCY RESPONSE PLAN

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.



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 22 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN
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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 23 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 24 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

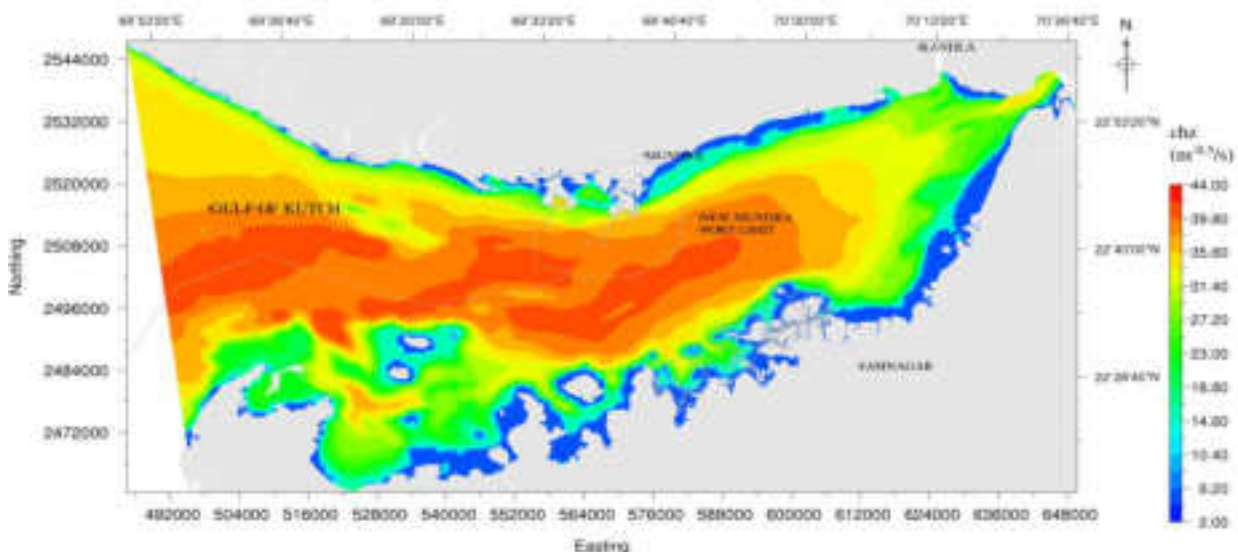


Fig.A1.4 Chezy's coefficient

For Shoreline sensitivity mapping refer Volume 2 (Annexure-V, VI and VII) of Oil Spill Risk Assessment.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 25 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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 m ³ / hr)	05 nos.
Sorbent Boom Pack(12.5cm x 4 M)	500 mtr
Slurry Pump (60 m ³ / 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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 26 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

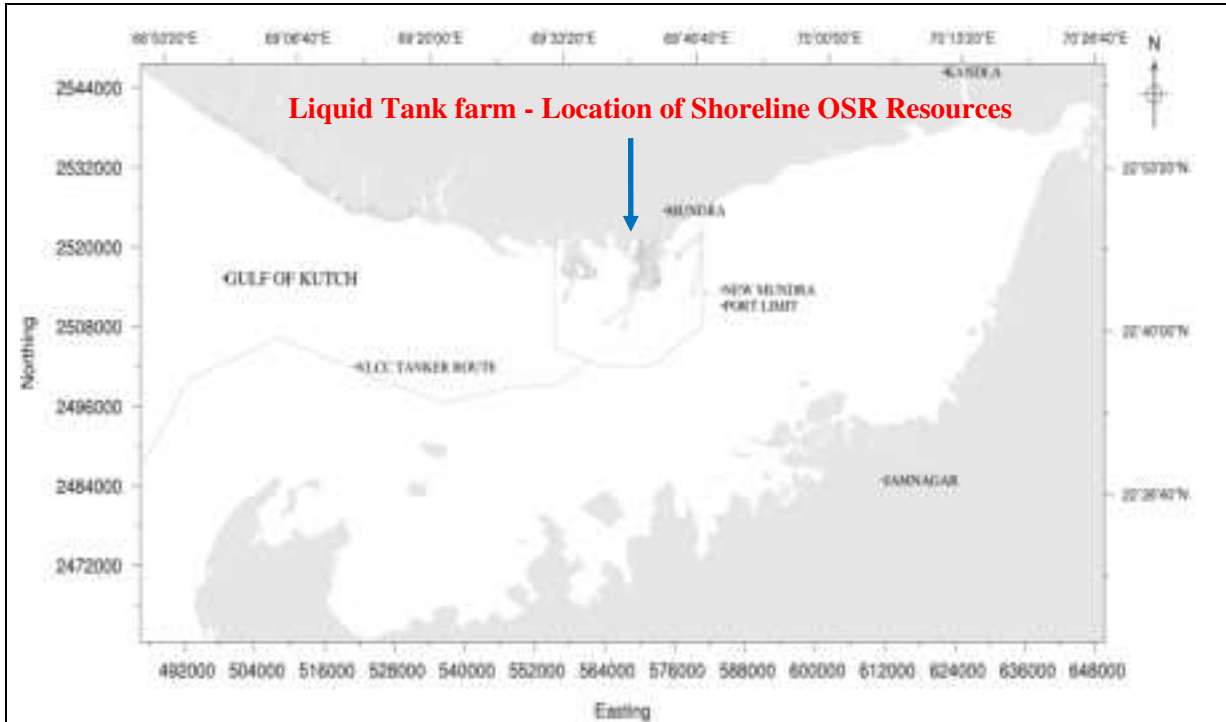


Fig.1.1 :General Arrangement of the marine facilities at Mundra port showing the VLCC route and facilities within the new Mundra port limit considered for carrying out the oil spill risk assessment studies.

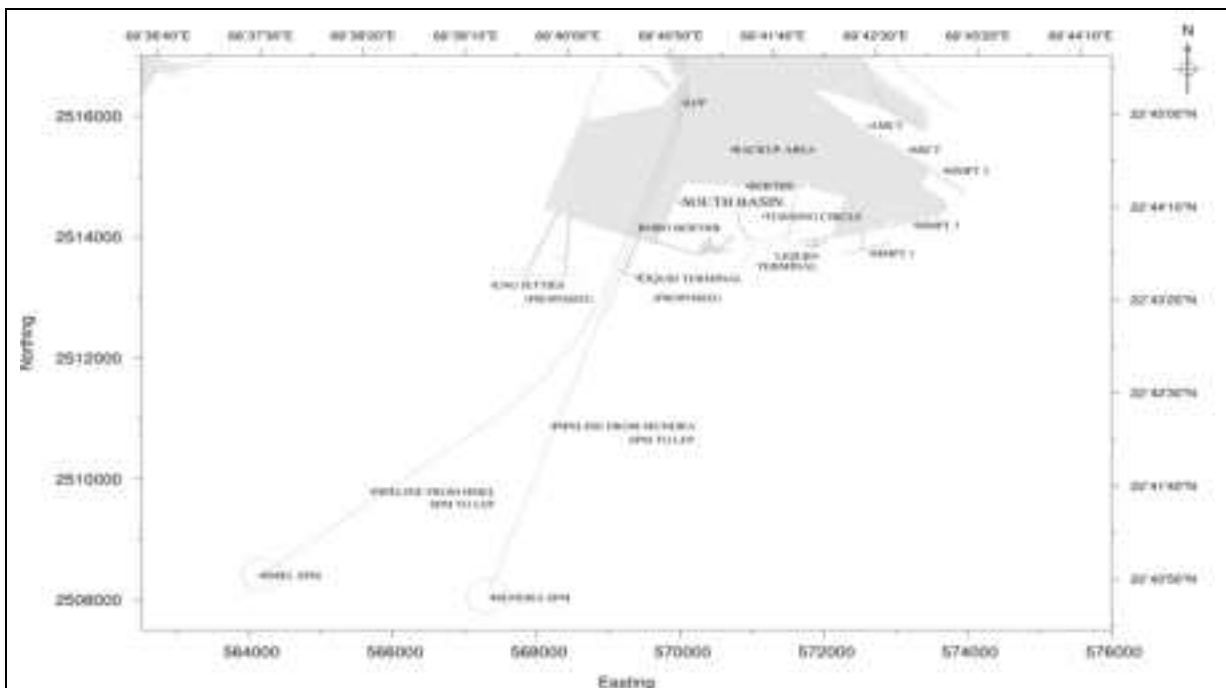


Fig1.2: Zoomed up portion of the South Basin showing the berths, turning circle, LNG jetty and existing berths as well as SPMs.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 27 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

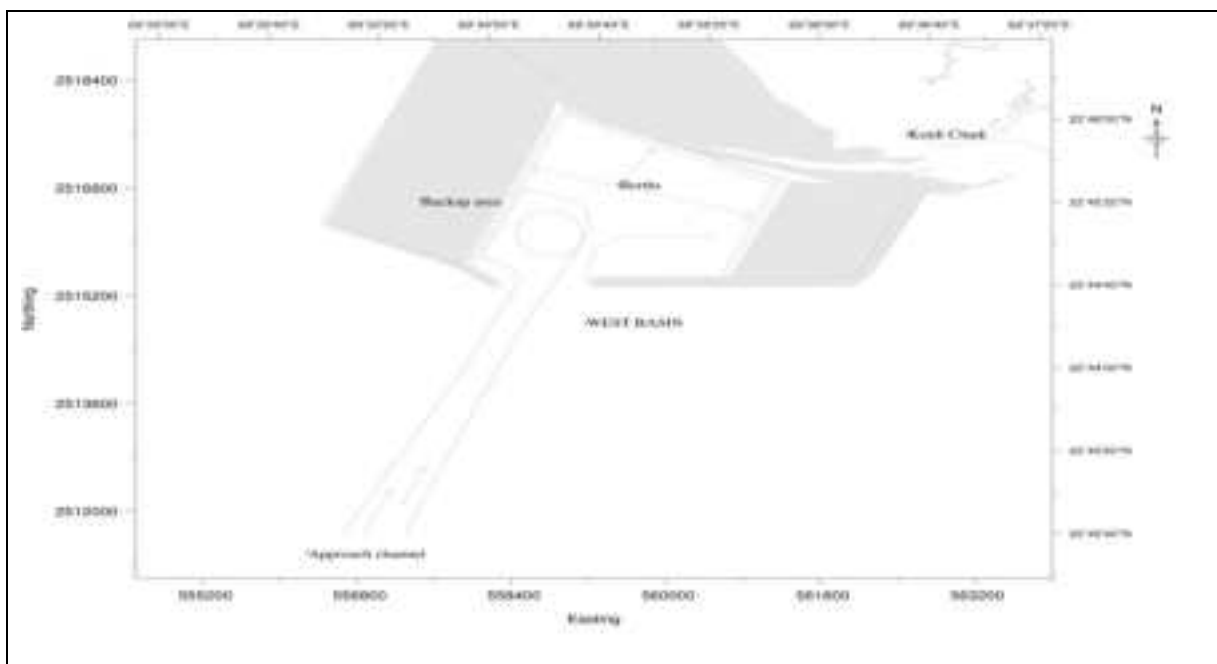


Fig.1.3 Zoomed up portion of the West Basin showing the berth locations and the approach channel for the vessels

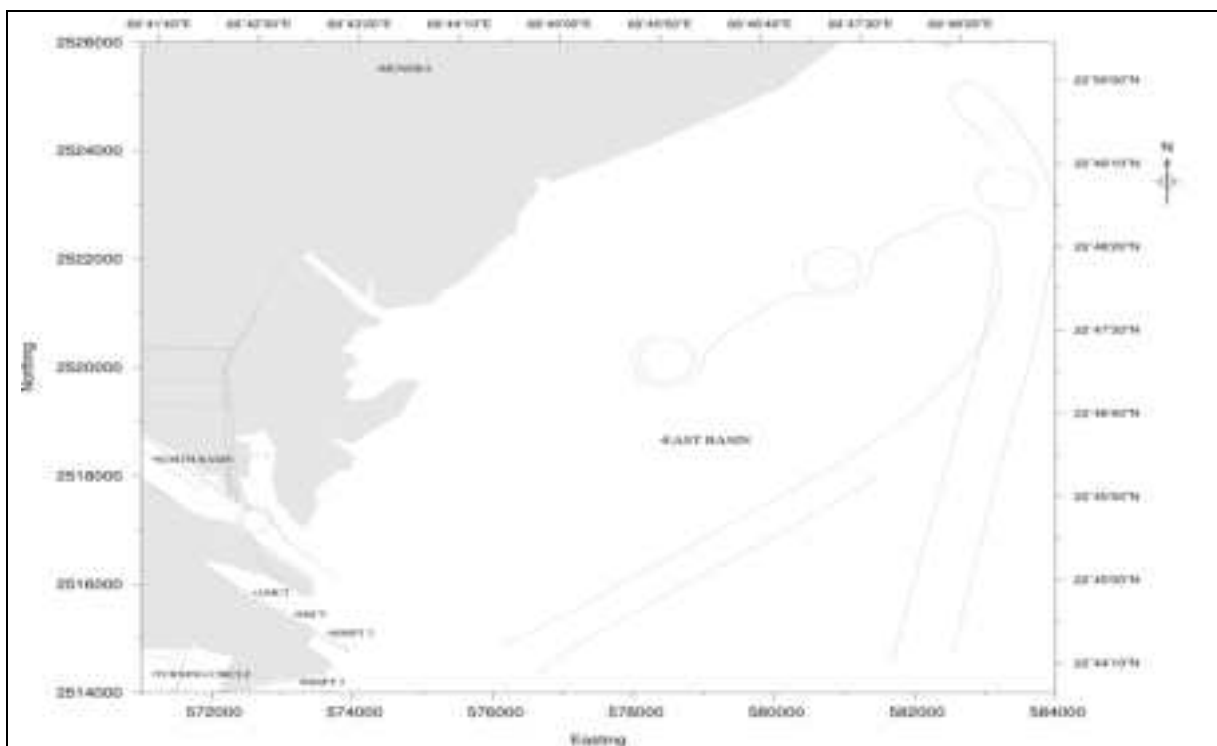


Fig.1.4 Zoomed up portion showing the East Basin & North Basin

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 28 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 29 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 30 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 31 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 32 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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*, *Lynghya* 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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 33 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 34 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 35 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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 (*Balanoptera* 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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 36 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

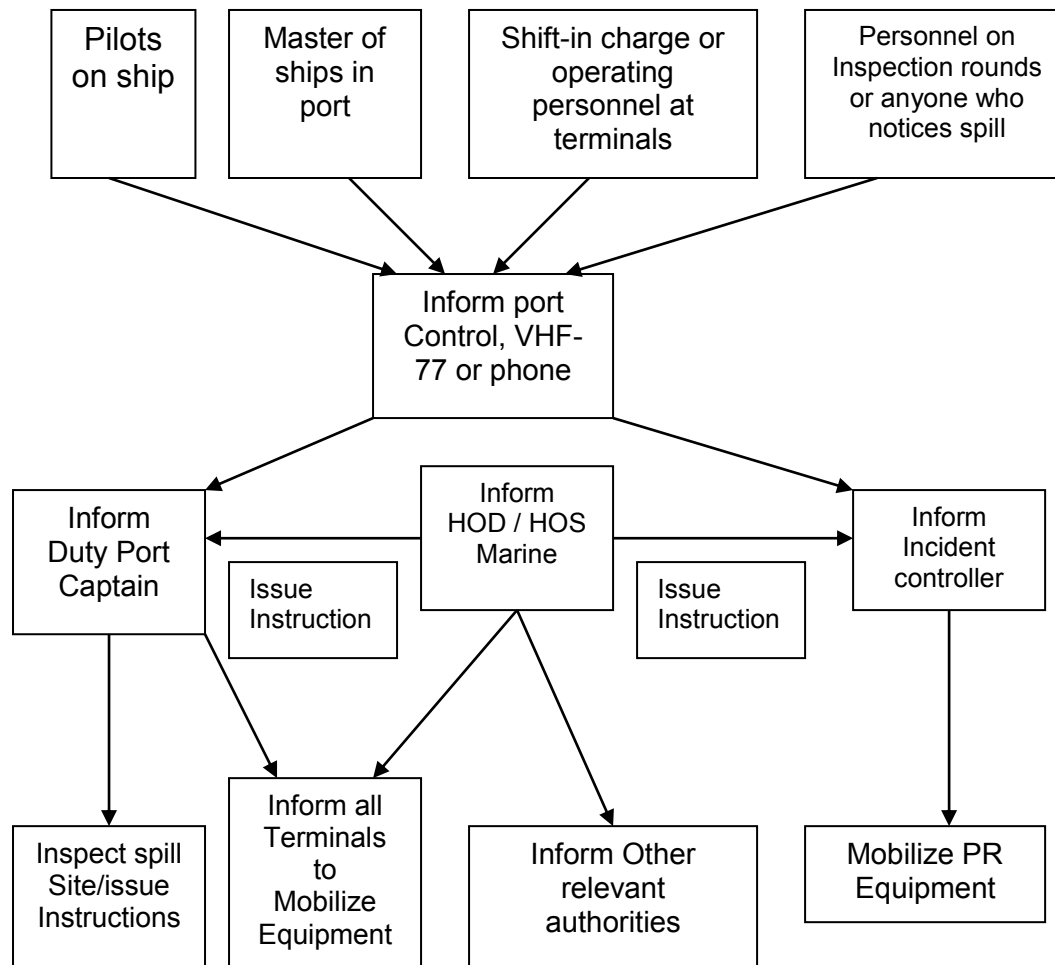
Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZL has already having facilities for combating a Tier-1 spill.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 37 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 38 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 39 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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 rescues 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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 40 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

- 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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 41 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 42 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 43 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 44 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 45 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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:

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 46 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 47 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 48 of 98

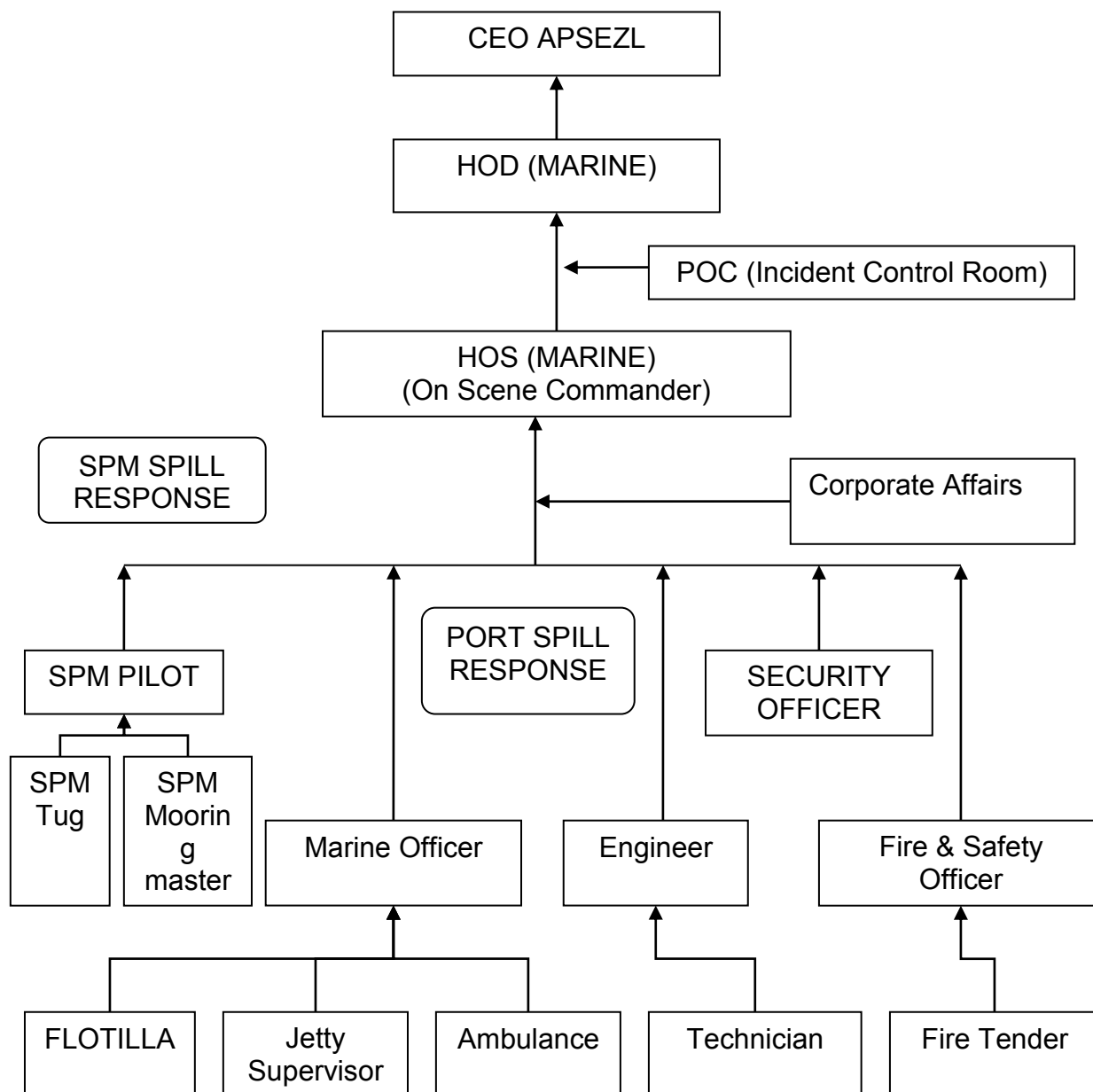
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MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 49 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 50 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 51 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 52 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 53 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

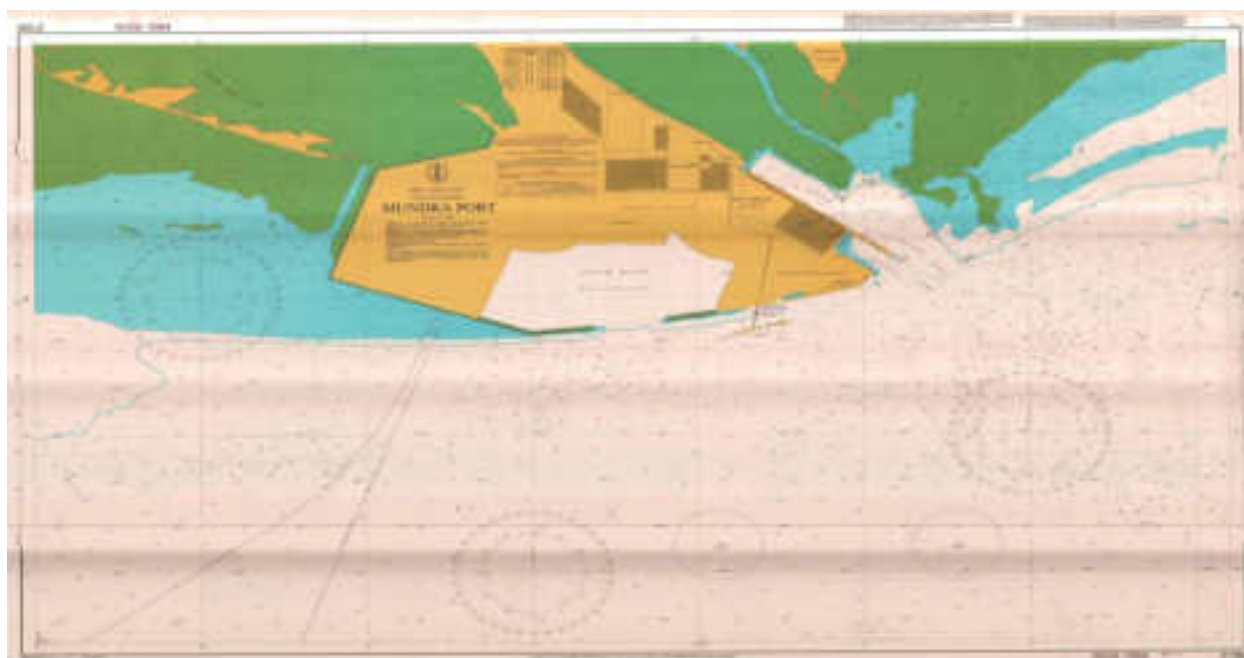
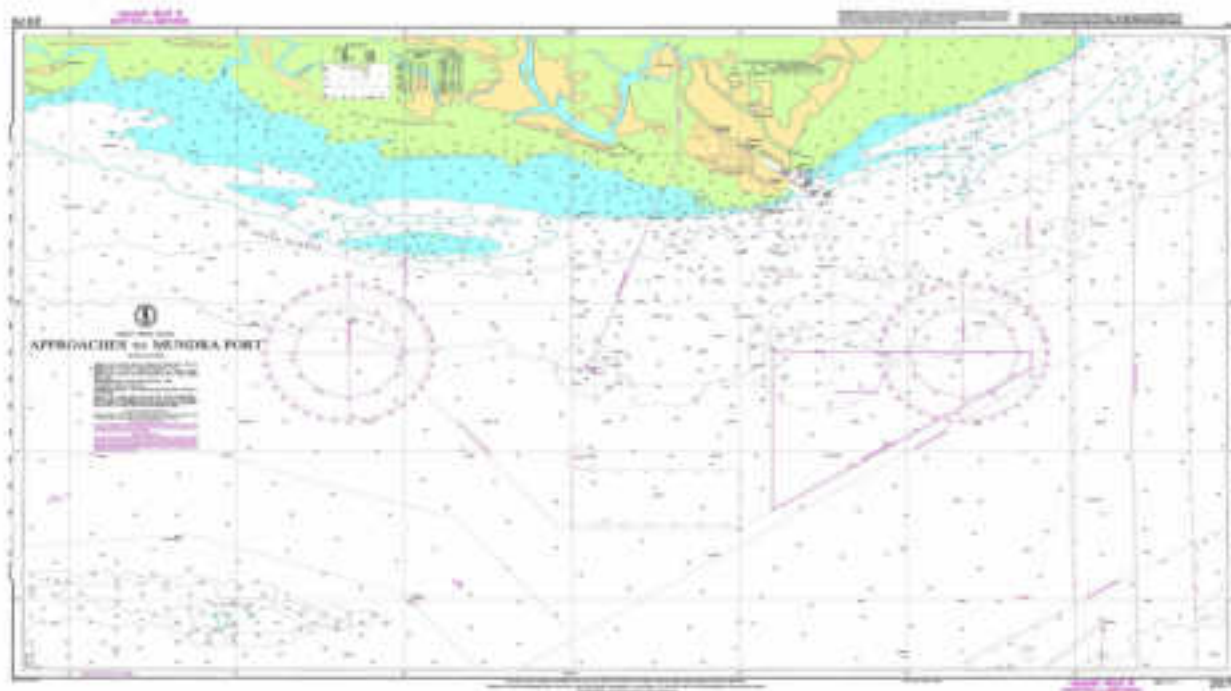
Such a report will also be prepared by the marine manager after each drill or training session and requisite modification(s) incorporated to the plan in order to enhance the overall efficacy of the same.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 54 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

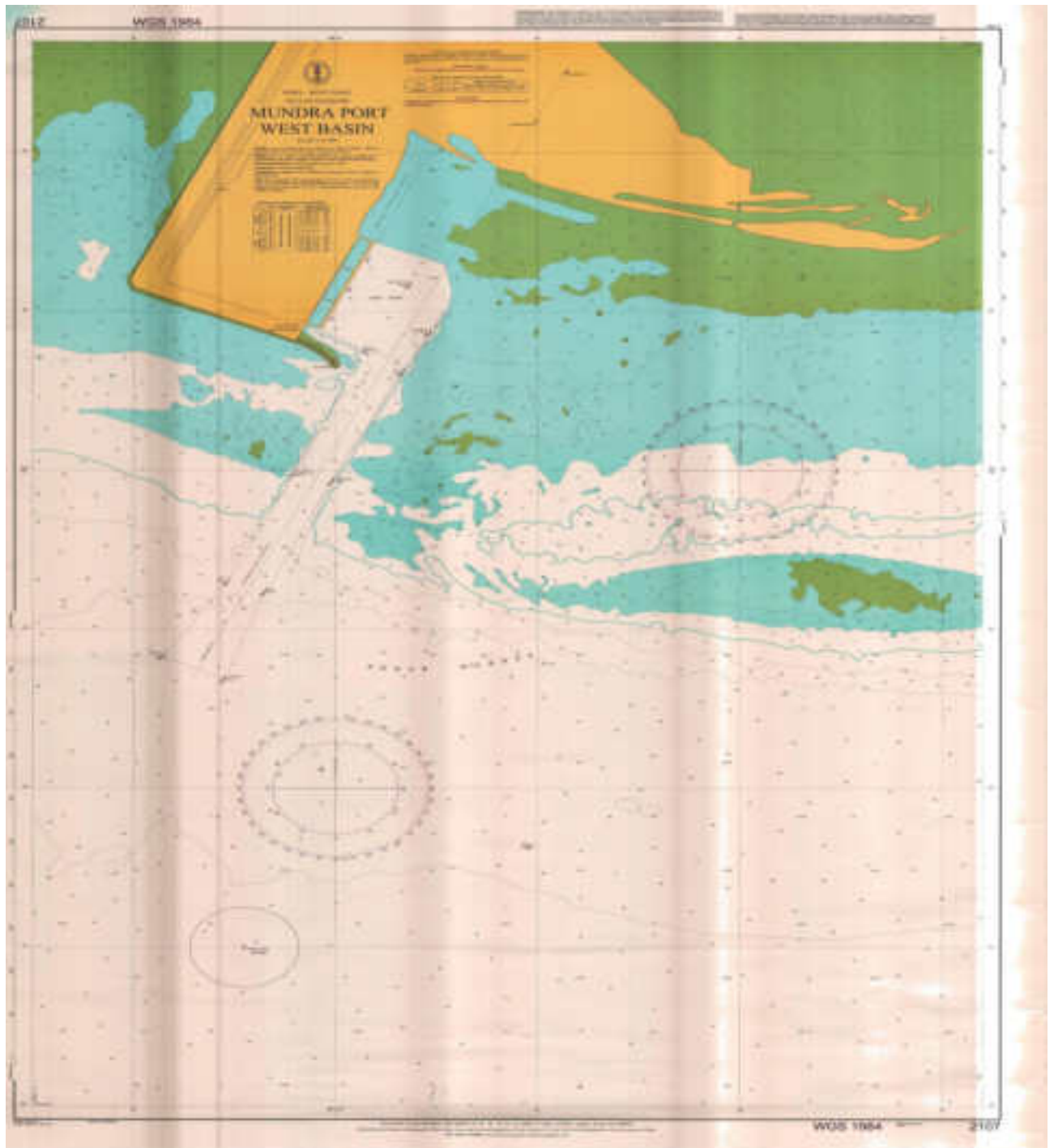
2. Coastal charts, currents, tidal information (ranges and streams), prevailing winds

Currents, tidal information (ranges and streams) : Detailed in Annexure- II, Annexure- III and Annexure- IV (Volume 2) of Oil Spill Risk Assessment



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 56 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 57 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

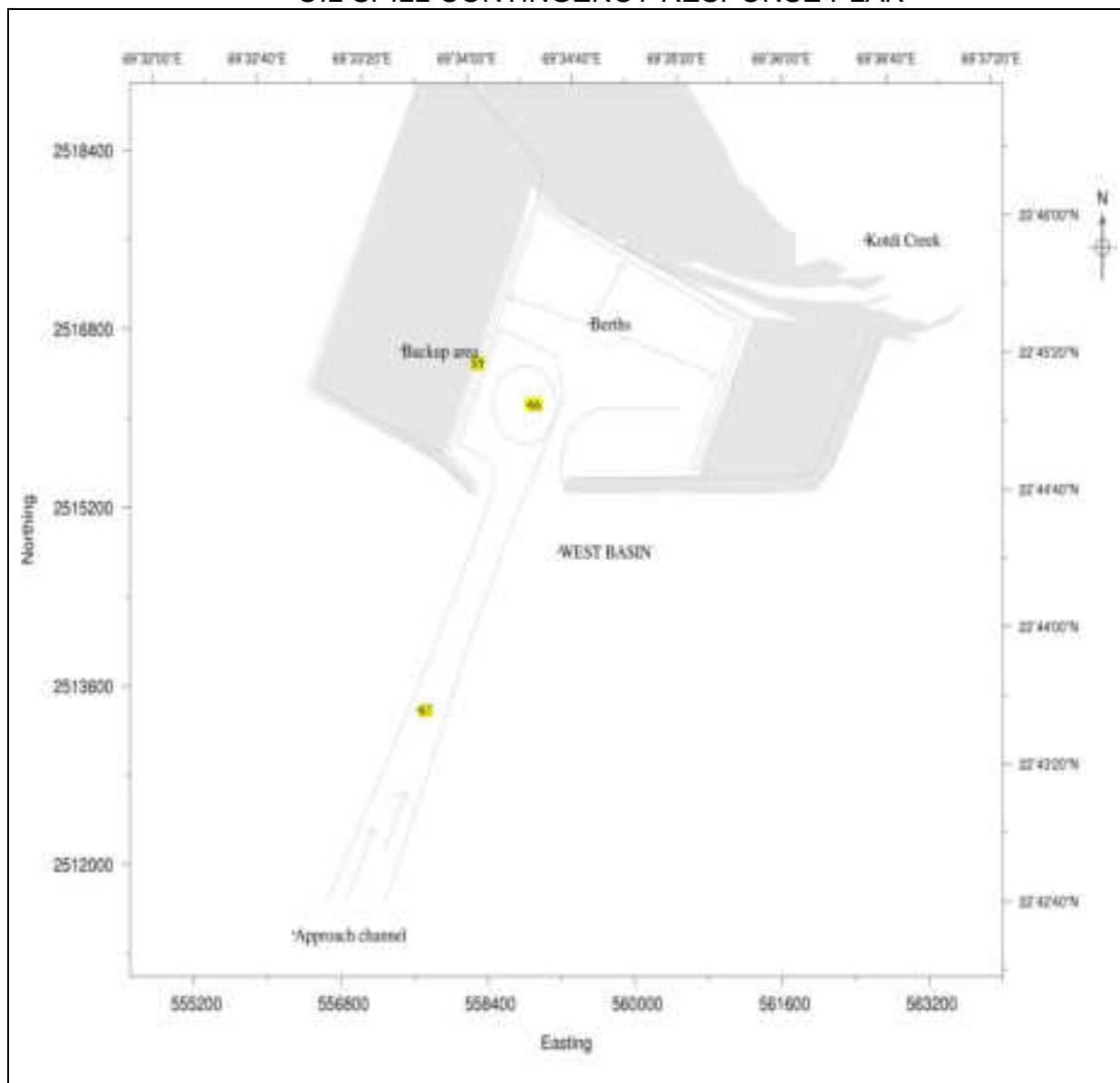


Fig.2: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for West Basin

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 59 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

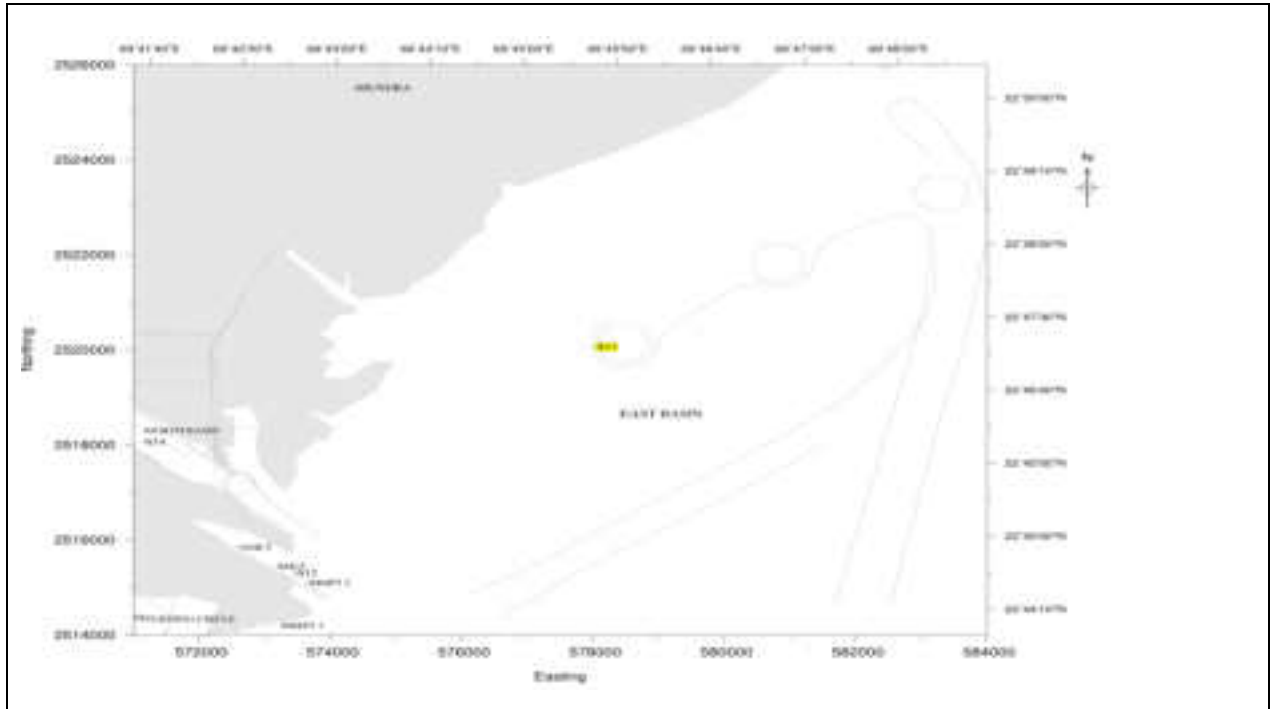
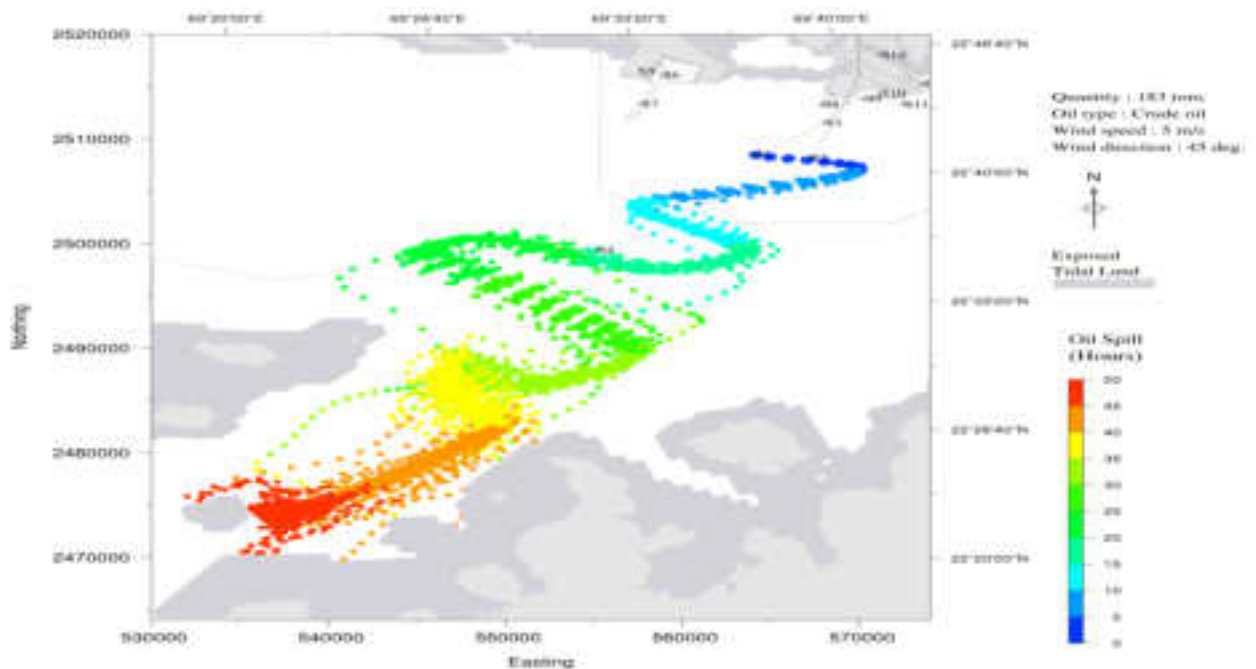


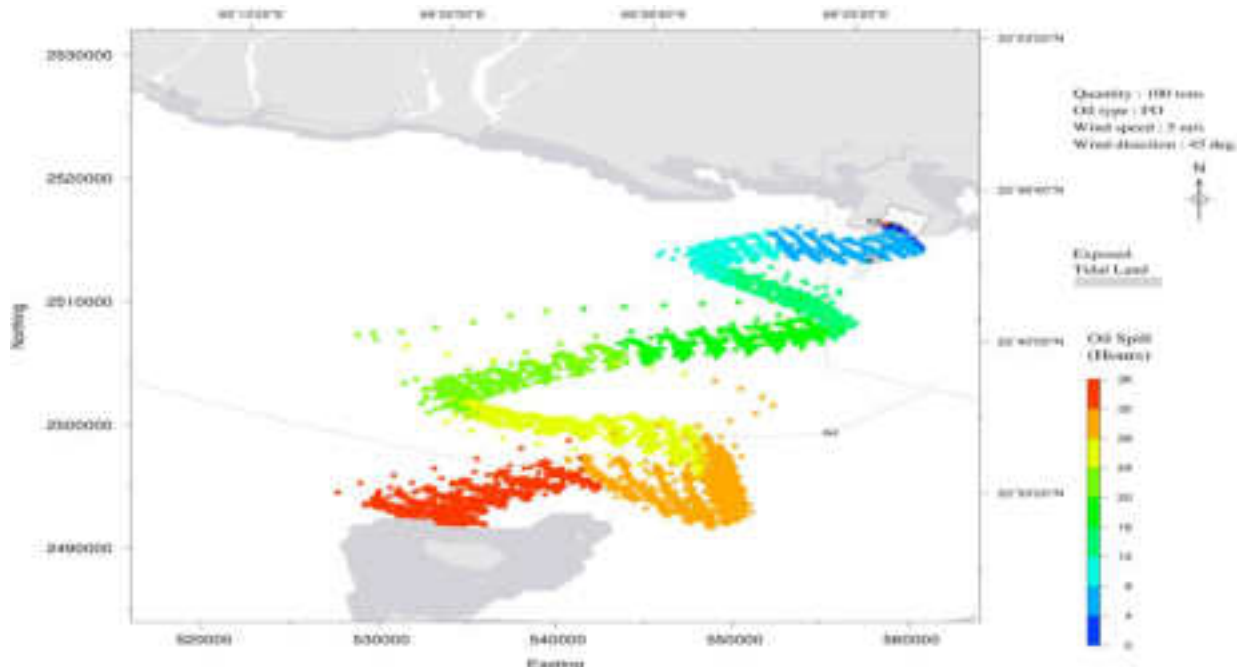
Fig.3: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for North Basin & East Basin



Oil Spill trajectory due to instantaneous crude oil leakage of 700 t (due to collision) at spill point S1 (HMEL SPM) after 50 hours during flood condition of the neap tide

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 60 of 98

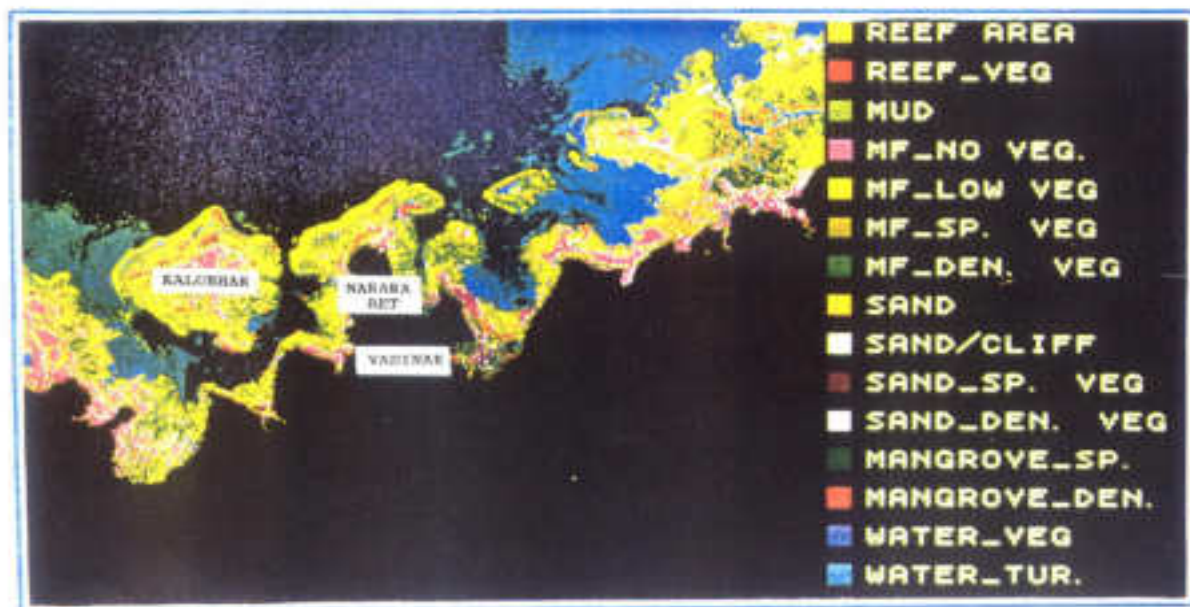
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MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



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



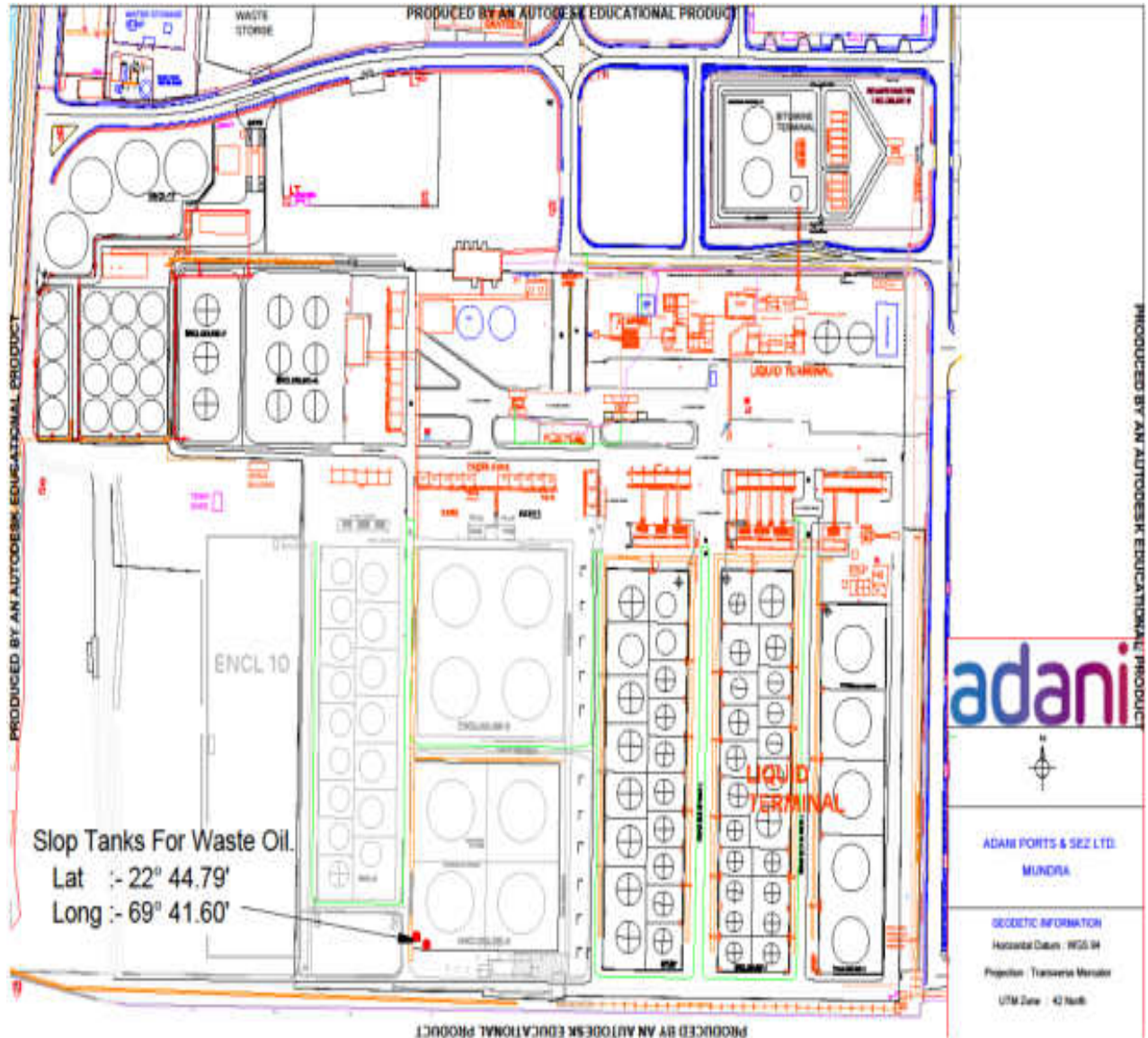
Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 61 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

Oil and Waste Storage / Disposal sites

Oil and Waste storage / Disposal tank No. 46, 109 and 110 are available within Liquid Tank farm.



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 62 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Sensitivity Maps/ Atlas

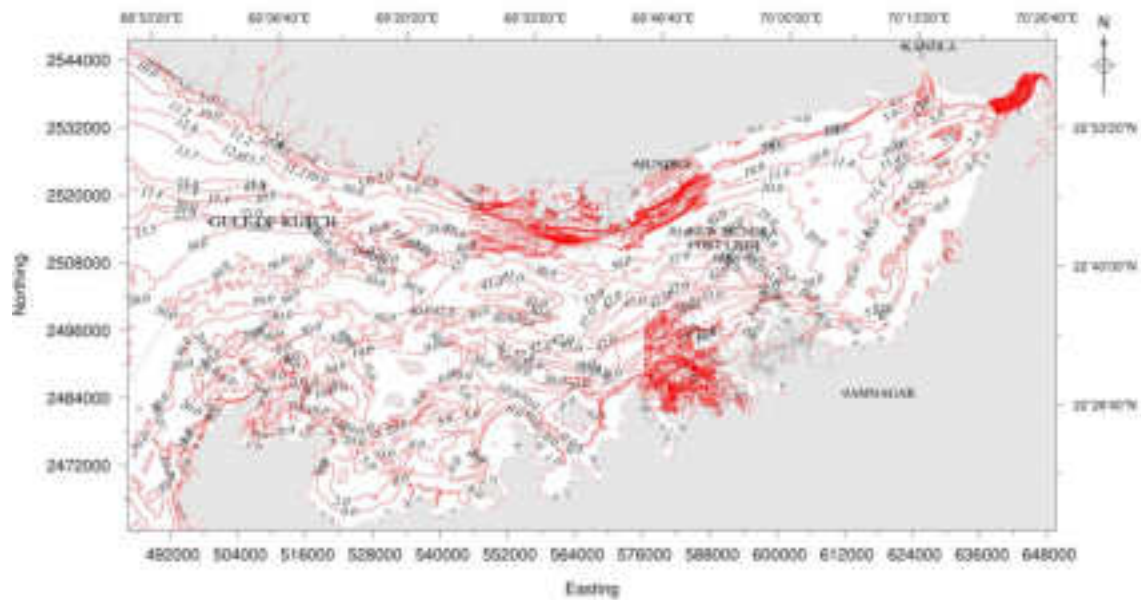


Fig.A1.1 Terrain features of study domain.

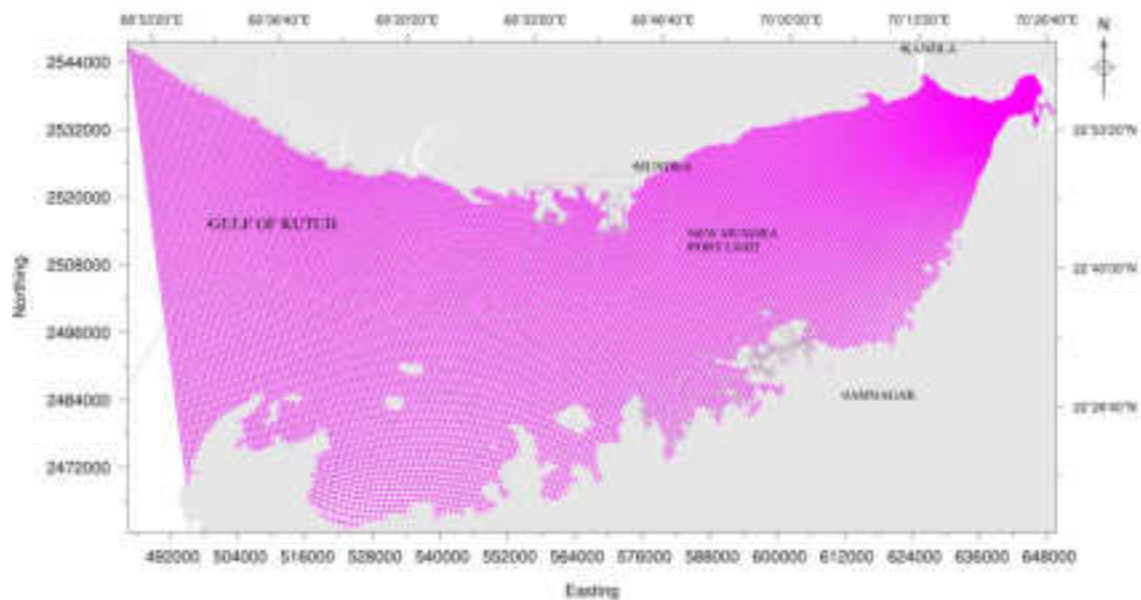


Fig.A1.2 Computational grid

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 63 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

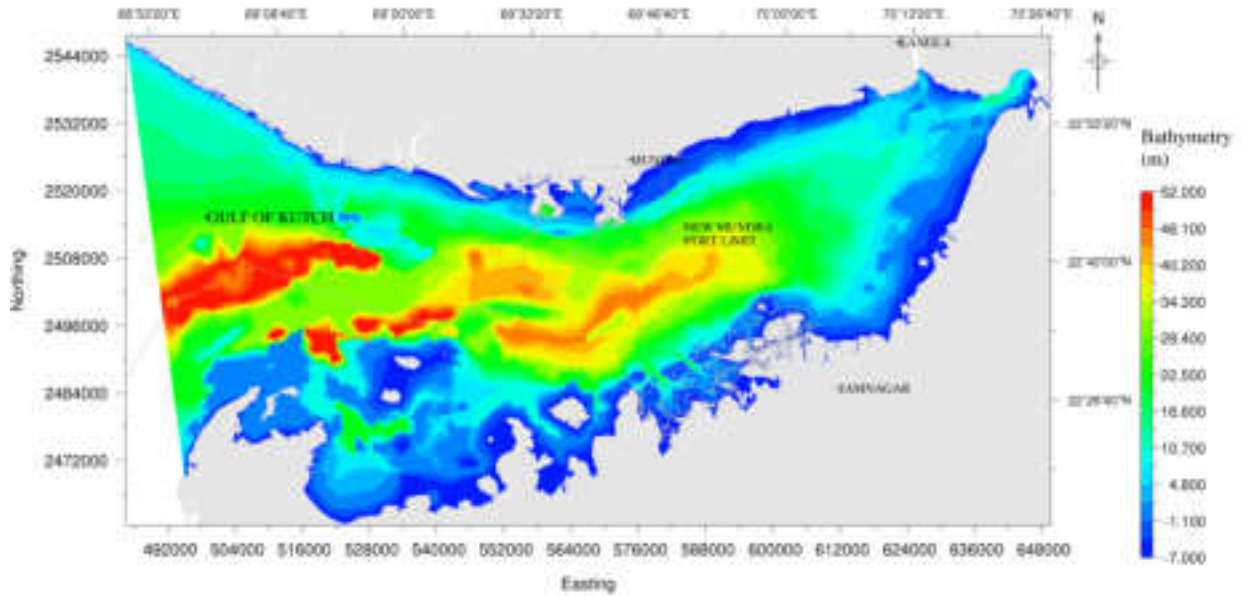


Fig.A1.3 Interpolated depth contours

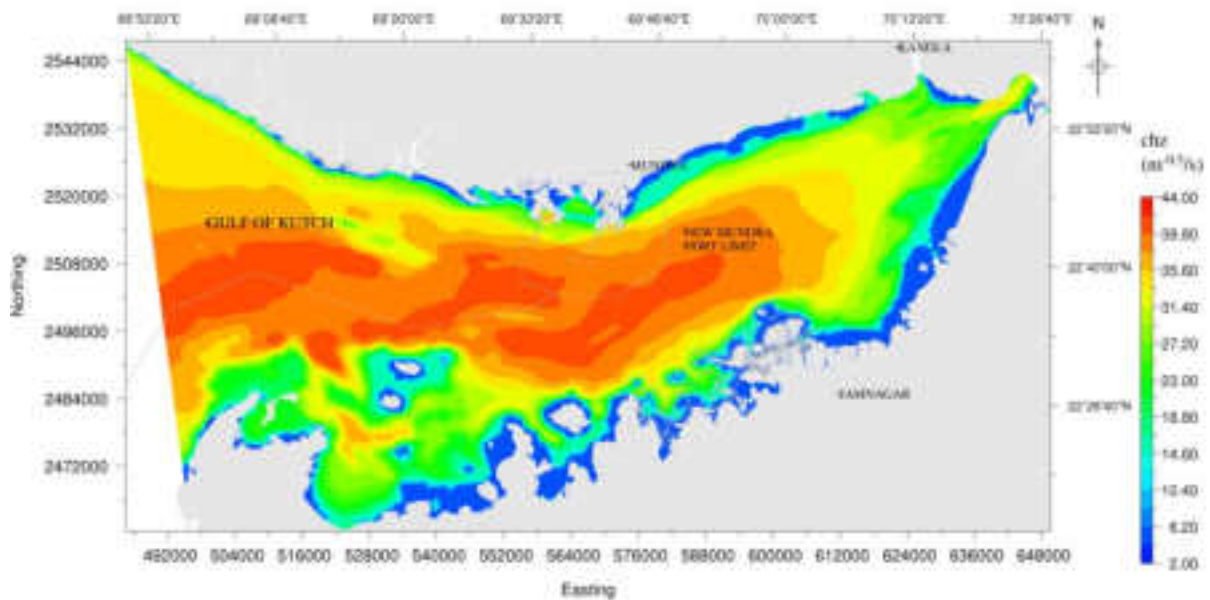


Fig.A1.4 Chezy's coefficient

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 64 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 65 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 66 of 98

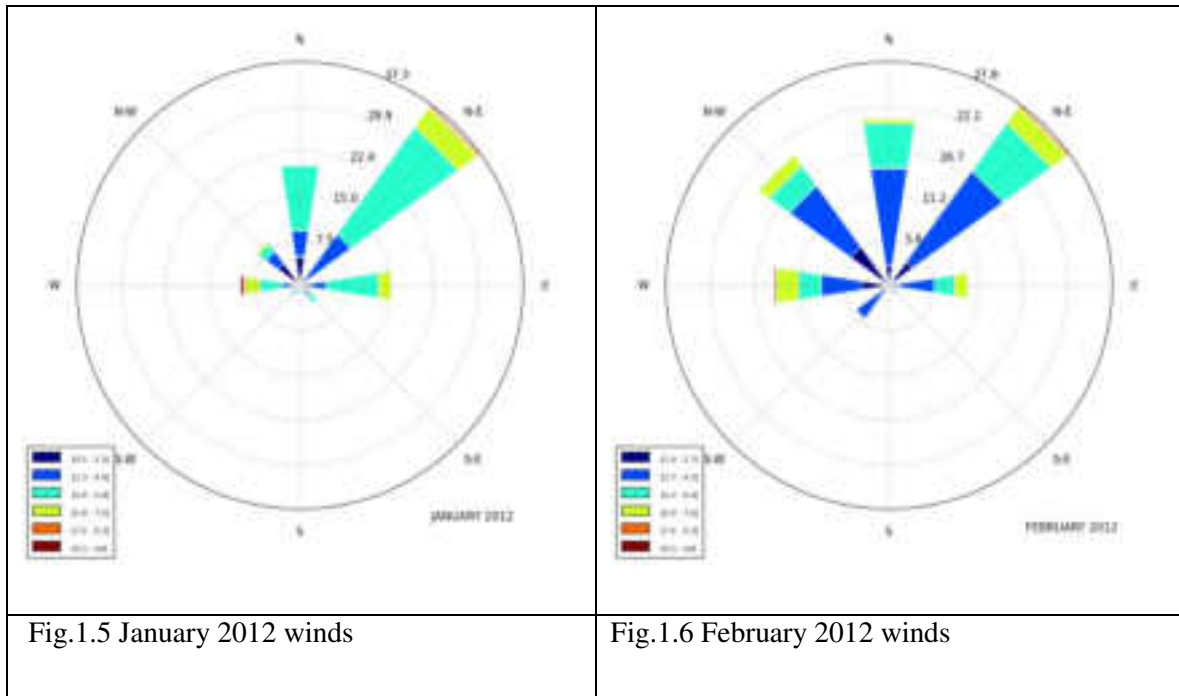
**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 67 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

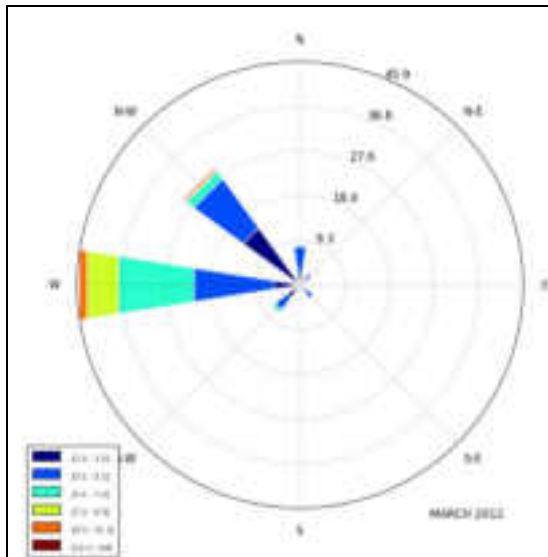


Fig.1.7 March 2012 winds

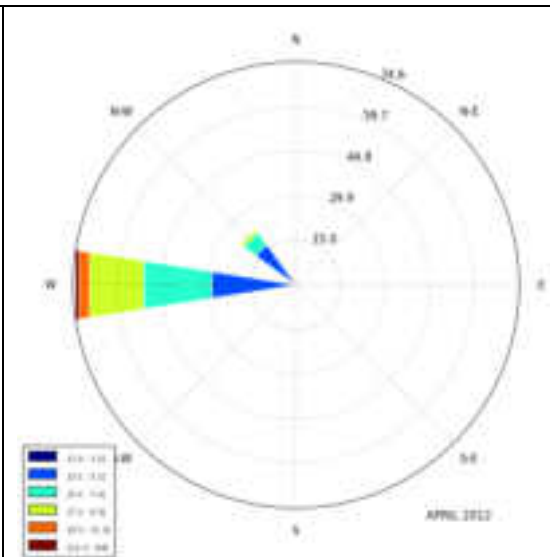


Fig.1.8 April 2012 winds

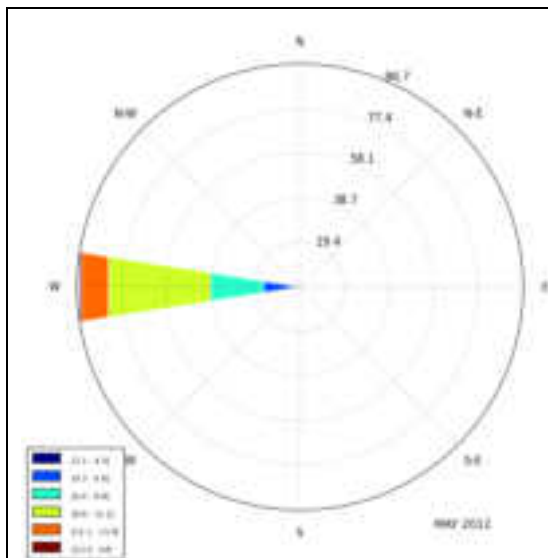


Fig.1.9 May 2012 winds

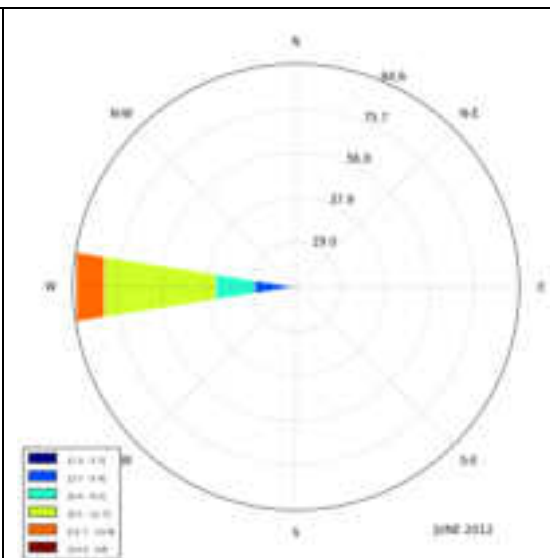
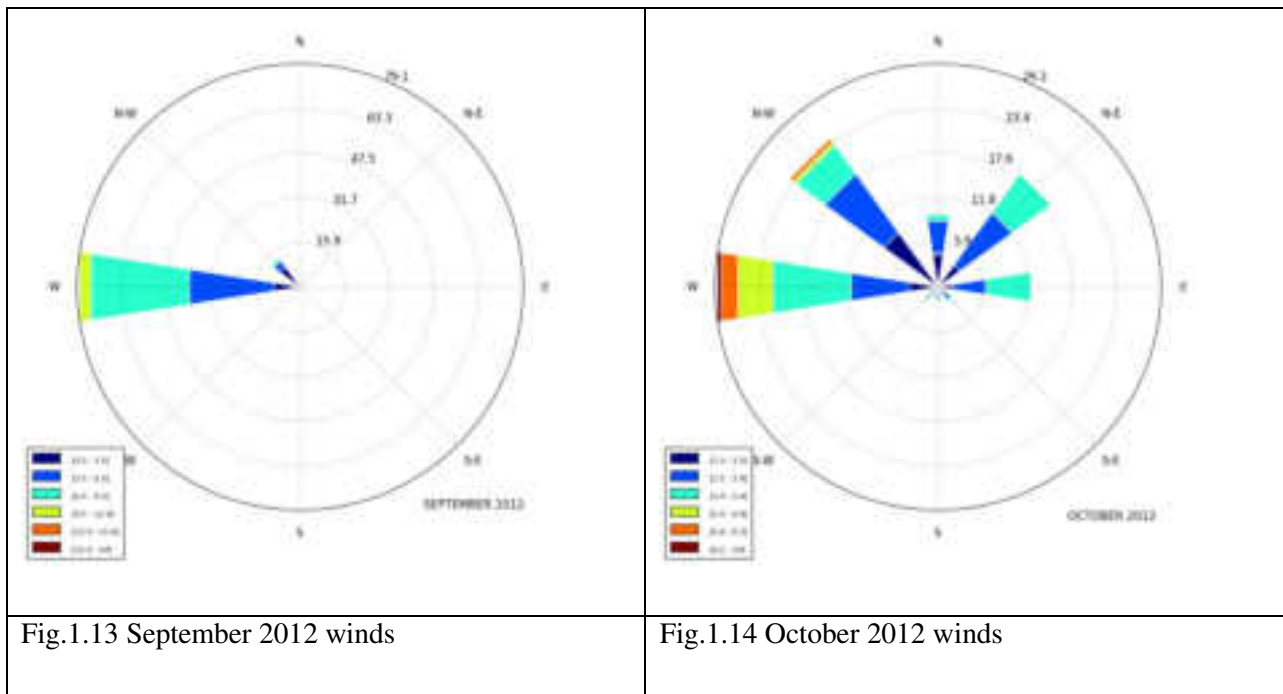
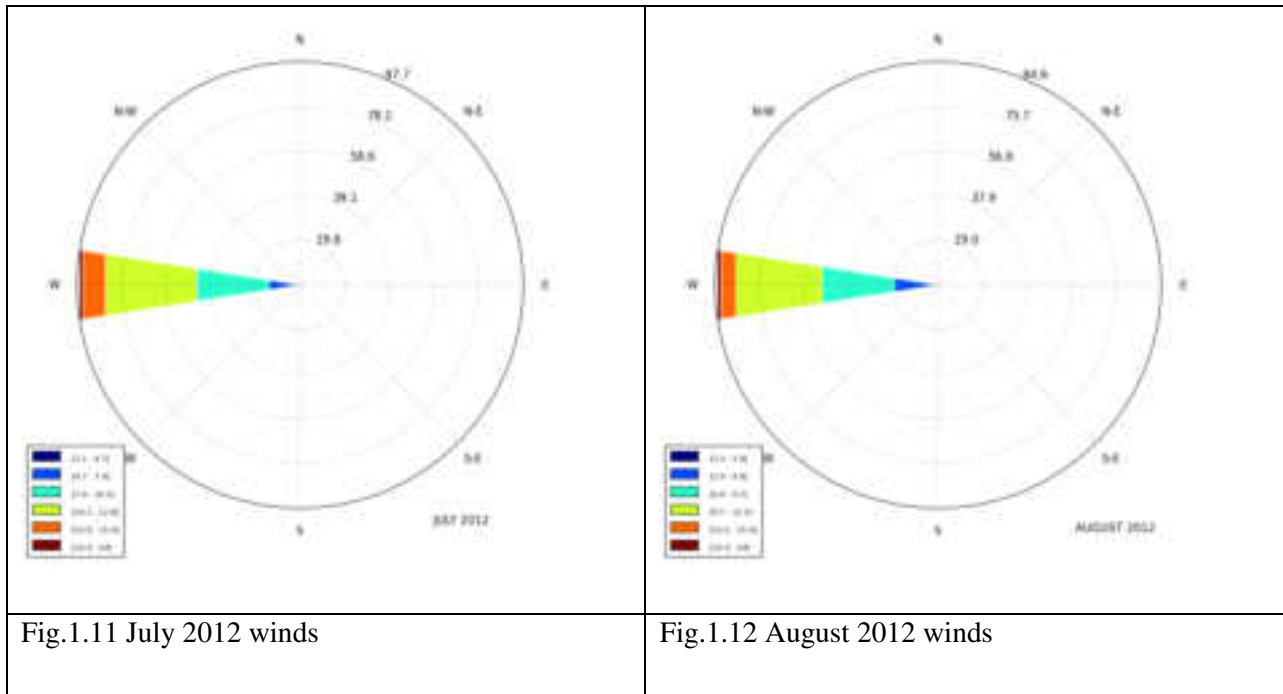


Fig.1.10 June 2012 winds

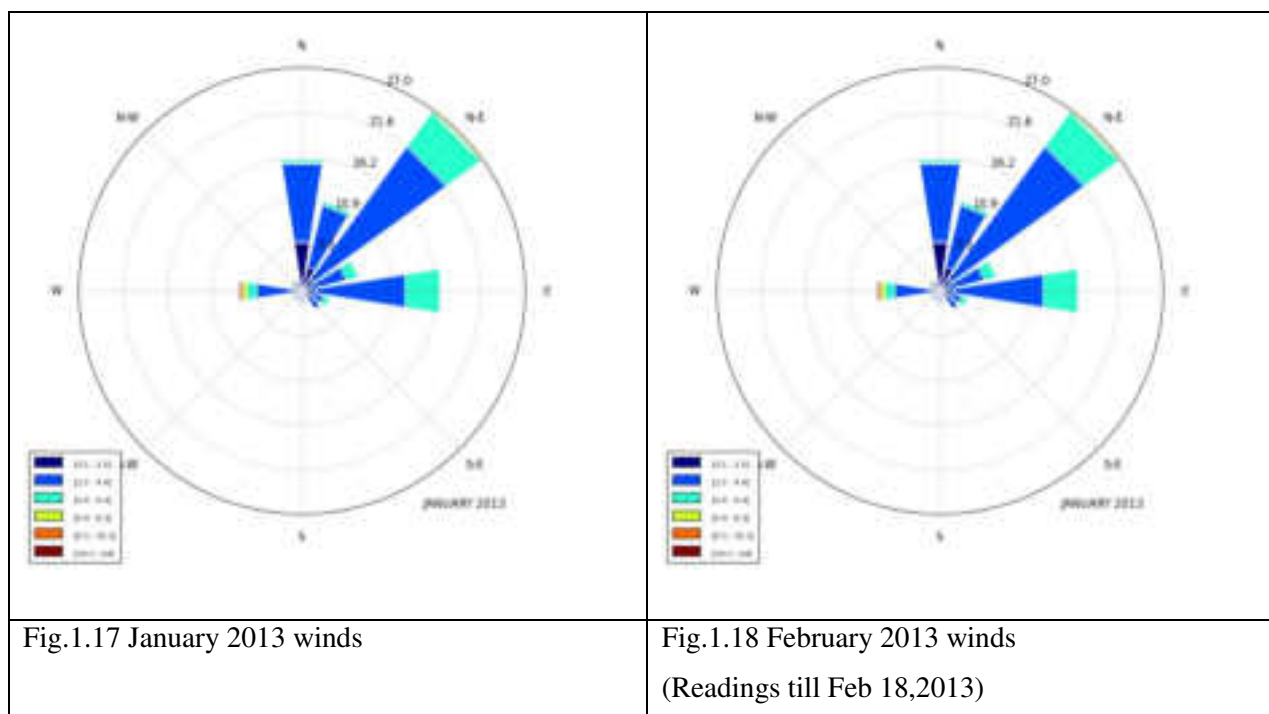
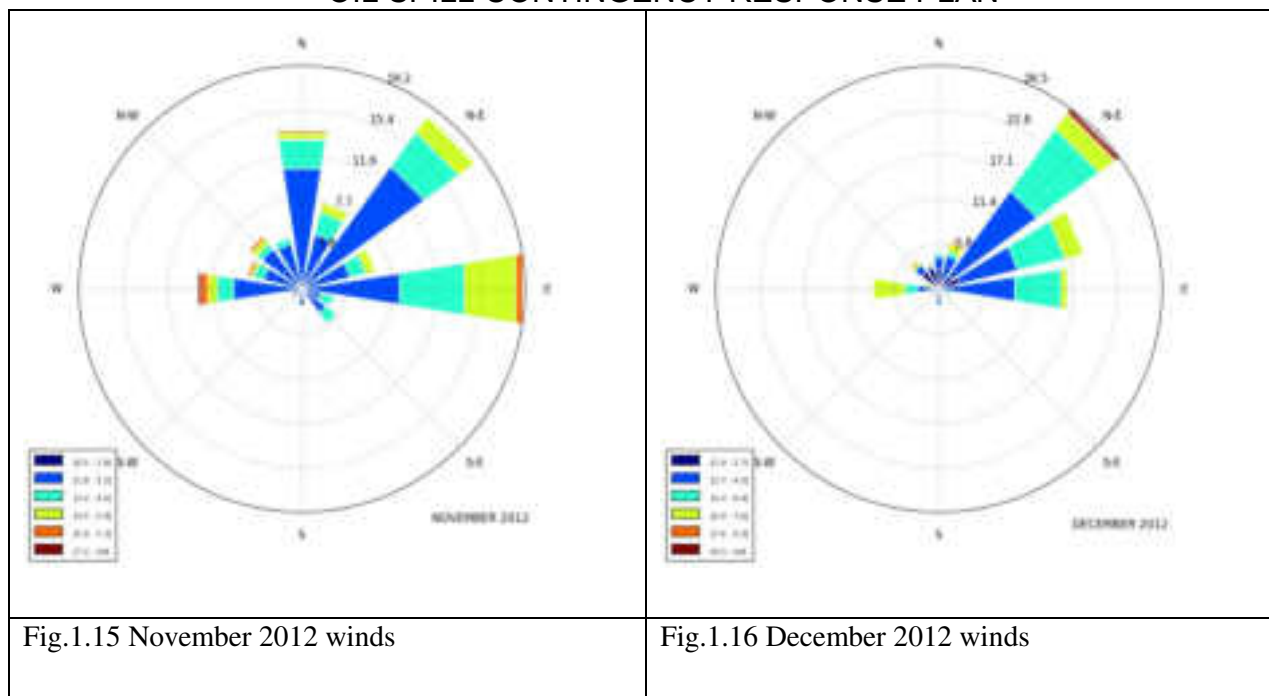
Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 68 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 69 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 70 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 71 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 72 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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)		

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 73 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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 :		

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 74 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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>						

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 75 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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.

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 76 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 77 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

		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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 78 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
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	

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 79 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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	

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 80 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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	VHF Channel 73 / 77	
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	Stopped or ongoing	
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		

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 81 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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	

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 82 of 98

OIL SPILL CONTINGENCY RESPONSE PLAN

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			

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 83 of 98

OIL SPILL CONTINGENCY RESPONSE PLAN

[illegible]

Control Room Officer

HOD – Marine

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 84 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Classification of Oil

ANNEXURE 11

Group 1 oils

A: *API > 45 (Specific gravity < 0.8)

B: Pour point °C

C: Viscosity @ 10–20°C: less than 3 CSt

D: % boiling below 200°C: greater than 50%

E: % boiling above 370°C: between 20 and 50%

	A	B	C	D	E
Asgard	49	-28	2 @ 10°C	58	14
Arabian Super Light	51	-39	2 @ 20°C		
Cessack	48	-18	2 @ 20°C	51	18
Corlear	47	-13	2 @ 20°C	57	17
F3 Condensate	54	<43	1 @ 10°C	81	0
Gopland	52	-13	1.5 @ 20°C	63	8
Hedra	52	-61	2.5 @ 10°C	60	11
Terengganu condensate	73	-14	0.5 @ 20°C	195	0
Wahyunt	49	-53	2 @ 20°C	55	4
Gasoline	58		0.5 @ 15°C	100	0
Kerosene	45	-35	2 @ 15°C	50	0
Naptha	55		0.5 @ 15°C	100	0

Group 3 oils

A: *API 17.5–35 (Specific gravity 0.85–0.95)

B: Pour point °C

C: Viscosity @ 10–20°C: between 8 CSt and semi solid

D: % boiling below 200°C: between 10 and 35%

E: % boiling above 370°C: between 30 and 65%

Low pour point <6°C

	A	B	C	D	E
Alaska North Slope	28	-18	32 @ 15°C	32	41
Arabian Heavy	28	-40	55 @ 15°C	21	56
Arabian Medium	30	-21	25 @ 15°C	22	51
Arabian Light	33	-40	14 @ 15°C	25	45
Bonny Light	35	-11	25 @ 15°C	26	30
Iranian Heavy	31	-36	25 @ 15°C	24	48
Iranian Light	34	-32	15 @ 15°C	26	43
Khatji	28	-57	80 @ 15°C	21	55
Simi	33	-12	18 @ 10°C	32	38
Thunder Horse	35	-27	10 @ 10°C	32	39
Tia Juana Light	32	-42	500 @ 15°C	24	45
Troll	33	-9	14 @ 10°C	24	35
IFO 180	18–20	10–30	1,500–3,000 @ 15°C		–

High pour point >5°C

	A	B	C	D	E
Cabinda	33	12	Semi-solid	18	56
Coco	32	21	Semi-solid	21	46
Gamba	31	23	Semi-solid	11	54
Mandji	30	9	70 @ 15°C	21	53
Minas	35	18	Semi-solid	15	58

Group 2 oils

A: *API 35–45 (Specific gravity 0.8–0.85)

B: Pour point °C

C: Viscosity @ 10–20°C: between 4 Cst and semi-solid

D: % boiling below 200°C: between 20 and 50%

E: % boiling above 370°C: between 15 and 50%

Low pour point <6°C

	A	B	C	D
Arabian Extra Light	38	-30	3 @ 15°C	26
Azeri	37	-3	8 @ 20°C	29
Brent	38	-3	7 @ 10°C	37
Draugen	40	-15	4 @ 20°C	37
Dukhan	41	-49	9 @ 15°C	36
Liverpool Bay	45	-21	4 @ 20°C	42
Sokol (Sakhalin)	37	-27	4 @ 20°C	45
Rio Negro	35	-5	23 @ 10°C	29
Umm Shaif	37	-24	10 @ 10°C	34
Zakum	40	-24	6 @ 10°C	36
Marine Gas oil (MGO)	37	-3	5 @ 15°C	

High pour point >5°C

	A	B	C	D
Amna	36	19	Semi-solid	25
Boatrice	38	18	32 @ 15°C	25
Bintulu	37	19	Semi-solid	24
Escravos	34	10	9 @ 15°C	35
Sarir	38	24	Semi-solid	24
Statfjord	40	6	7 @ 10°C	38

Group 4 oils

A: *API <17.5 (Specific gravity >0.95) or

B: Pour point >30°C

C: Viscosity @ 10–20°C: between 1500 CSt and semi-solid

D: % boiling below 200°C: less than 25%

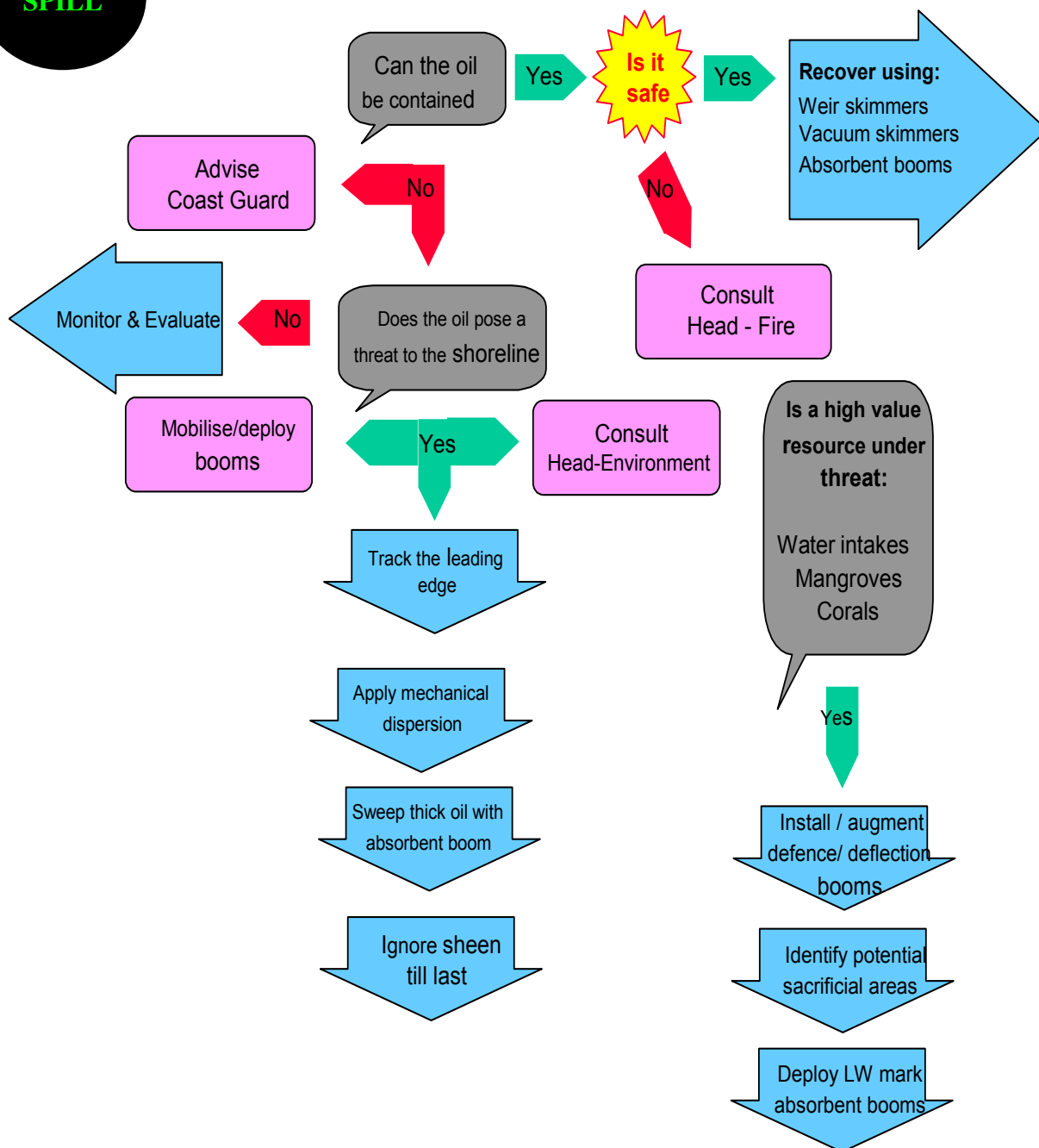
E: % boiling above 370°C: greater than 30%

	A	B	C	D	E
Bachuquero T2	16	-29	3,000 @ 15°C	10	60
Boscan	10	15	Semi-solid	4	80
Cinta	33	43	Semi-solid	10	54
Handil	33	35	Semi-solid	23	33
Merey	17	-21	7,000 @ 15°C	7	70
Nile Blend	34	33	Semi-solid	13	59
Pilon	14	-3	Semi-solid	2	92
Shengji	24	21	Semi-solid	9	70
Taching	31	35	Semi-solid	12	49
Tia Juana Pesado	12	-1	Semi-solid	3	78
Widuri	33	46	Semi-solid	7	70
IFO 380	11–15	10–30	3,000–35,000 @ 15°C		

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 85 of 98

**OIL
SPILL**

Light Oil Response Guidelines



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 86 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Heavy Oil Response Guidelines



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 87 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

Site Specific Health and Safety Plan

ANNEXURE 13

Assessment Form

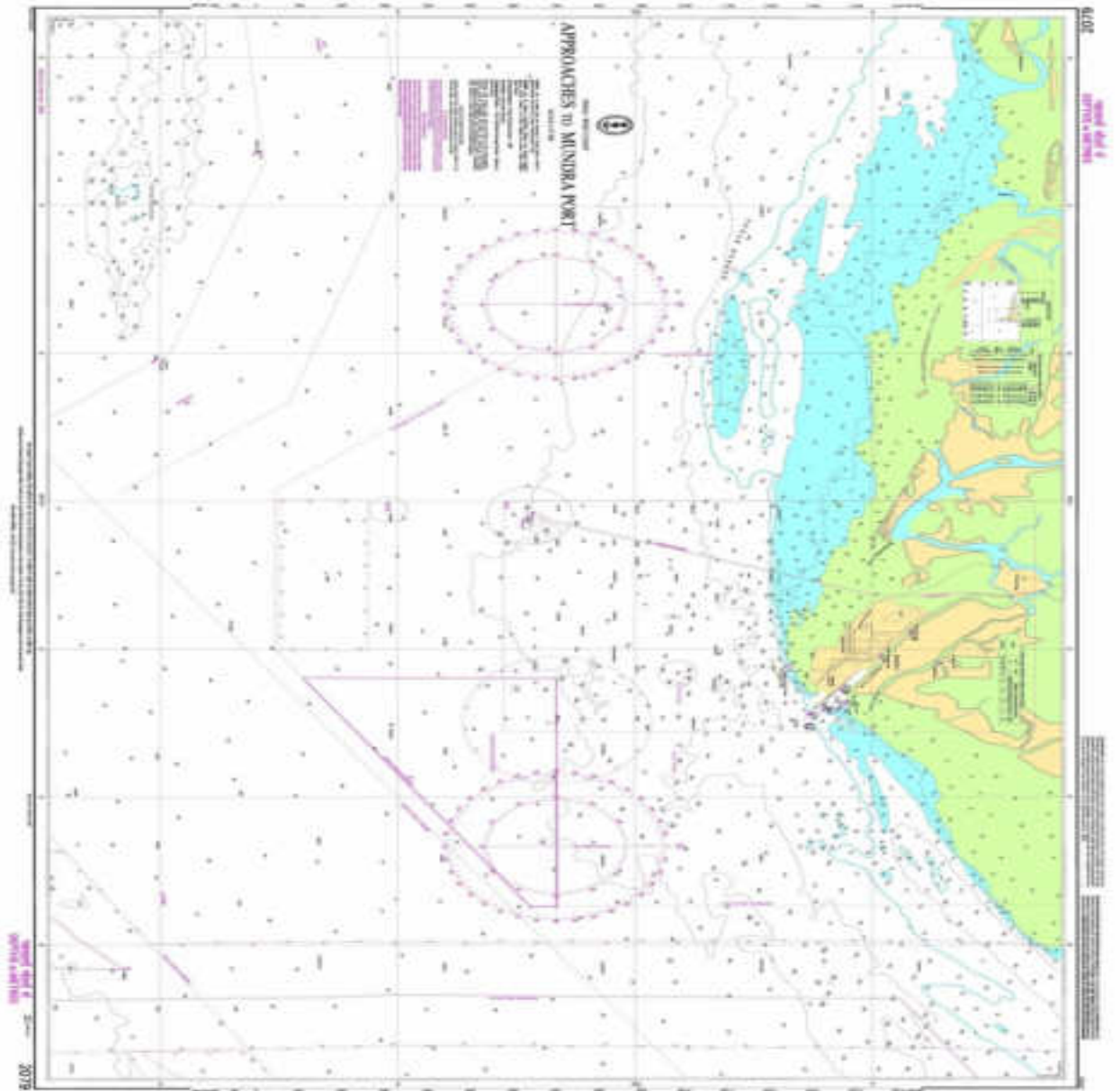
1. APPLIES TO SITE :					
2. DATE :		3. TIME :		4. INCIDENT :	
5. PRODUCT(S) :					(Attach MSDS)
6. Site Characterization					
6a. Area	<input type="checkbox"/> Open water	<input type="checkbox"/> Inshore water	<input type="checkbox"/> River / Creek	<input type="checkbox"/> Salt marsh	<input type="checkbox"/> 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"/>	<input type="checkbox"/> Boat safety	<input type="checkbox"/> Fire, explosion, in-situ burn	<input type="checkbox"/> Slips, trips and falls		
<input type="checkbox"/>	<input type="checkbox"/> Chemical hazards	<input type="checkbox"/> Heat stress	<input type="checkbox"/> Steam and hot water		
<input type="checkbox"/>	<input type="checkbox"/> Drum handling	<input type="checkbox"/> Helicopter operations	<input type="checkbox"/> Tides		
<input type="checkbox"/>	<input type="checkbox"/> Equipment operations	<input type="checkbox"/> Lifting	<input type="checkbox"/> Trenches, excavations		
<input type="checkbox"/>	<input type="checkbox"/> Electrical hazards	<input type="checkbox"/> Motor vehicles	<input type="checkbox"/> Visibility		
<input type="checkbox"/>	<input type="checkbox"/> Fatigue	<input type="checkbox"/> Noise	<input type="checkbox"/> Weather		
<input type="checkbox"/>	<input type="checkbox"/> Others	<input type="checkbox"/> Overhead/buried utilities	<input type="checkbox"/> Work near water		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Pumps and hoses			
8. Air Monitoring					
<input type="checkbox"/>	<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"/>	<input type="checkbox"/> Foot Protection	<input type="checkbox"/> Coveralls			
<input type="checkbox"/>	<input type="checkbox"/> Head Protection	<input type="checkbox"/> Impervious suits			
<input type="checkbox"/>	<input type="checkbox"/> Eye Protection	<input type="checkbox"/> Personal Floatation			
<input type="checkbox"/>	<input type="checkbox"/> Ear Protection	<input type="checkbox"/> Respirators			
<input type="checkbox"/>	<input type="checkbox"/> Hand Protection	<input type="checkbox"/> Other			
10. Site Facilities					
<input type="checkbox"/>	<input type="checkbox"/> Sanitation	<input type="checkbox"/> First Aid	<input type="checkbox"/> Decontamination		
11. Contact details :					
<input type="checkbox"/>	<input type="checkbox"/> Doctor	Phone			
<input type="checkbox"/>	<input type="checkbox"/> Hospital	Phone			
<input type="checkbox"/>	<input type="checkbox"/> Fire	Phone			
<input type="checkbox"/>	<input type="checkbox"/> Police	Phone			
<input type="checkbox"/>	<input type="checkbox"/> Other	Phone			
12. Date Plan Completed					
13. Plan Completed by					

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 88 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

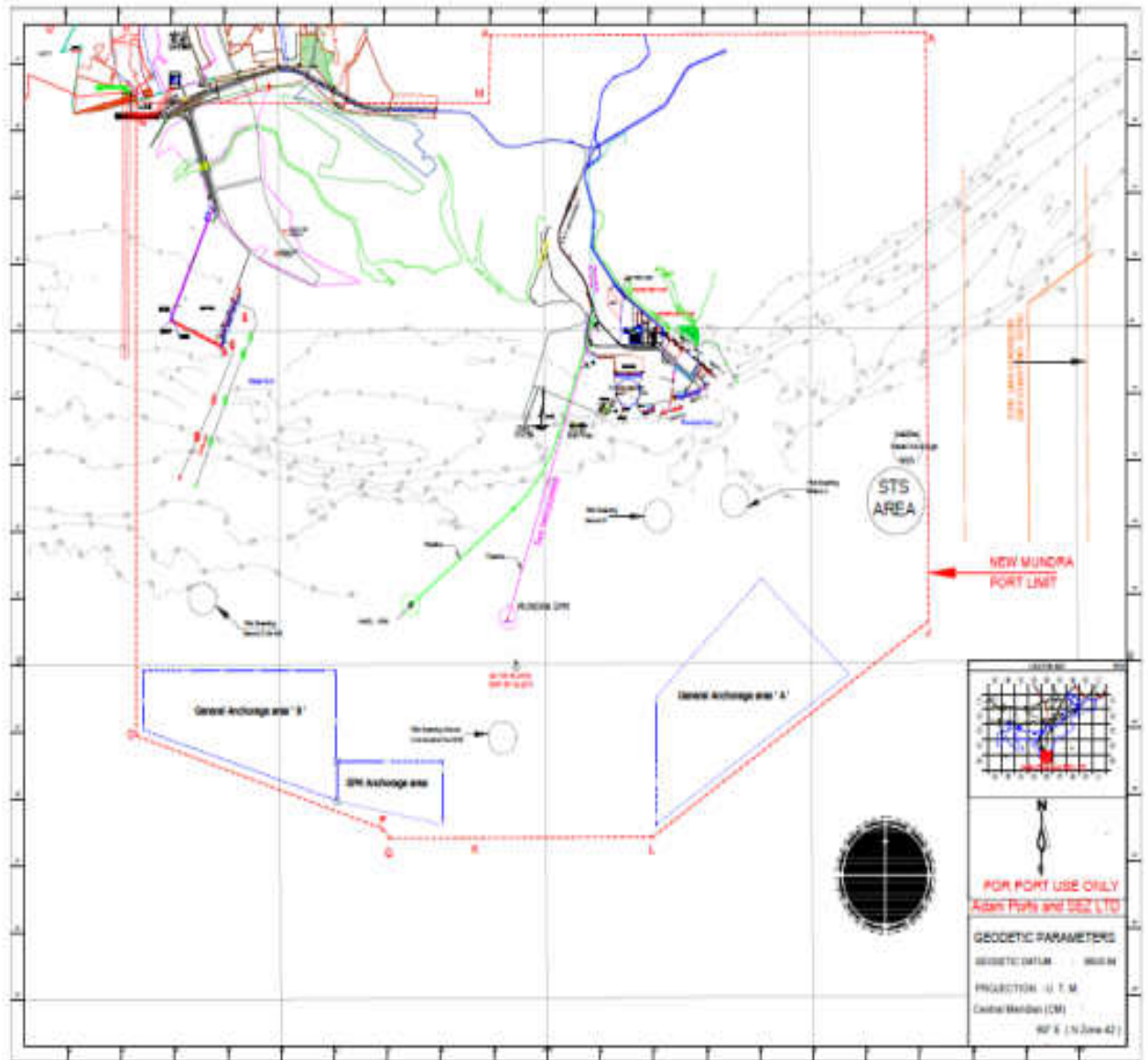
Indian Chart 2079

ANNEXURE 14



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 89 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 90 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 91 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 92 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 93 of 98

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
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

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 94 of 98

**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
--	--

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)

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 95 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA**

OIL SPILL CONTINGENCY RESPONSE PLAN

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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Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 96 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

			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

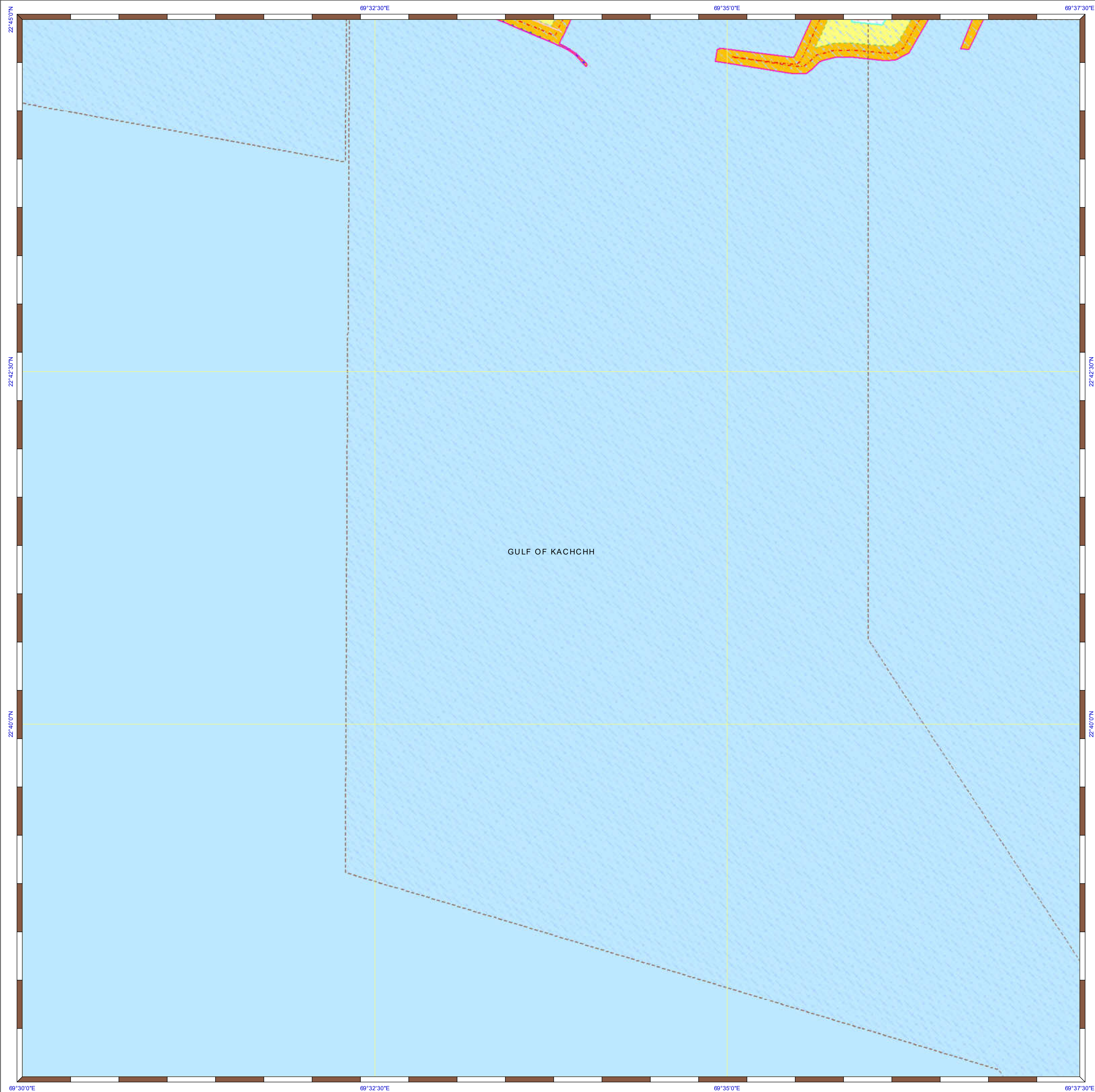
Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 97 of 98

**ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN**

	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>			

Reviewed By : Capt. Divya Gupta	Issue No. : 01	Issued On : 01.11.2021
Approved By : Capt. Sachin Srivastava	Revision No. : 06	Page 98 of 98

Annexure – 12



HTL AND CRZ BOUNDARY MAP PREPARED AS PER THE APPROVED CZMP MAP OF GUJARAT STATE (CRZ NOTIFICATION, 2011)

Legend

- Port
- Fish Landing Centre
- Road
- Railway Line
- Bund
- High Tide Line
- Low Tide Line
- Village Boundary
- Taluk Boundary
- 22 Survey Plots
- Port Limit
- Breakwater or Jetty
- Diversion of Reserved Forest
- AP&SEZ Boundary- Provided by Project Proponent

CRZ Lines & Boundary

- Hazard Line
- 100 m Line in CRZ III Area
- 200 m CRZ Line - NDZ
- CRZ Boundary
(500m Line, 100m for Bay, 100 m or width of the creek whichever is less along the tidal influenced water bodies)

CRZ CATEGORY

CRZ - I

- CRZ - IA
- 50 m Mangrove Buffer Zone - CRZ IA
- CRZ - IB

CRZ - III

- No Development Zone
- 200 to 500 m from HTL

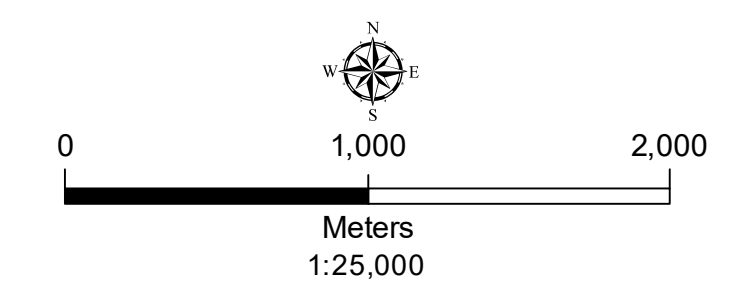
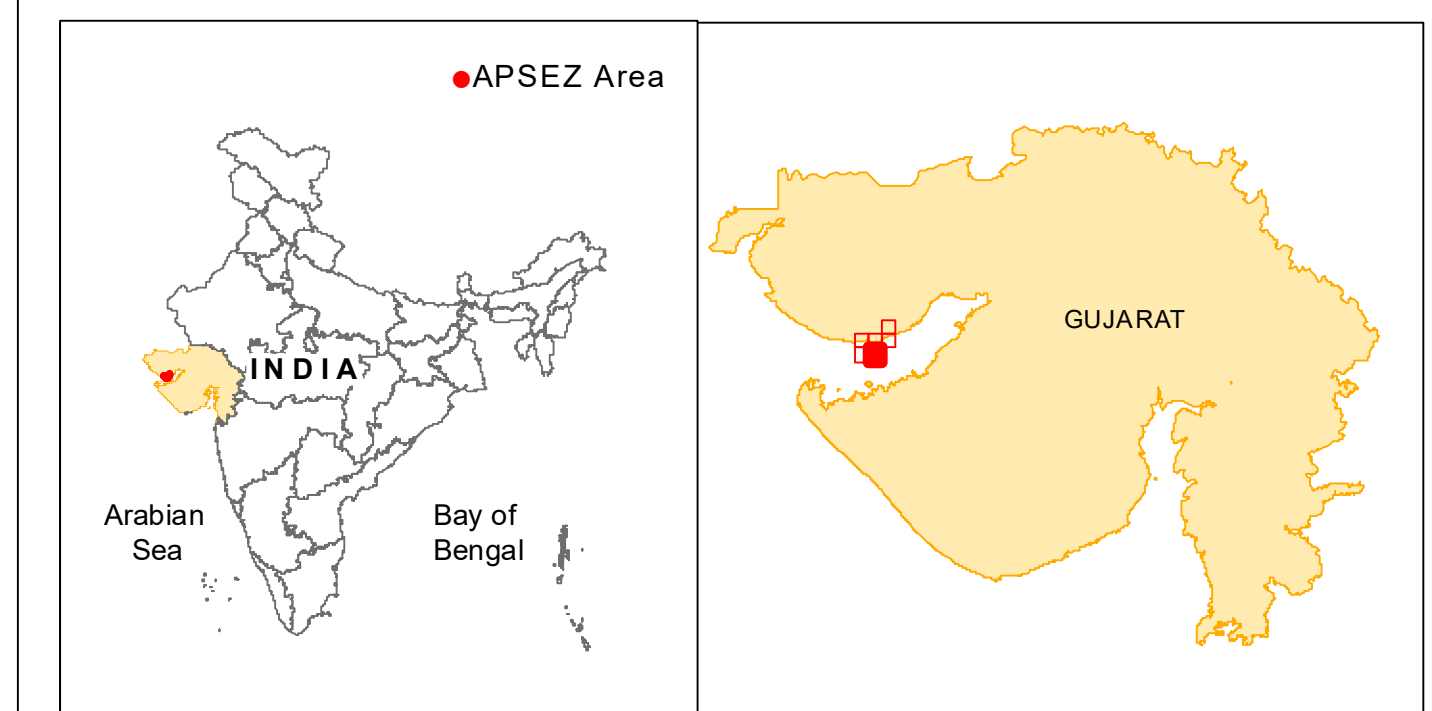
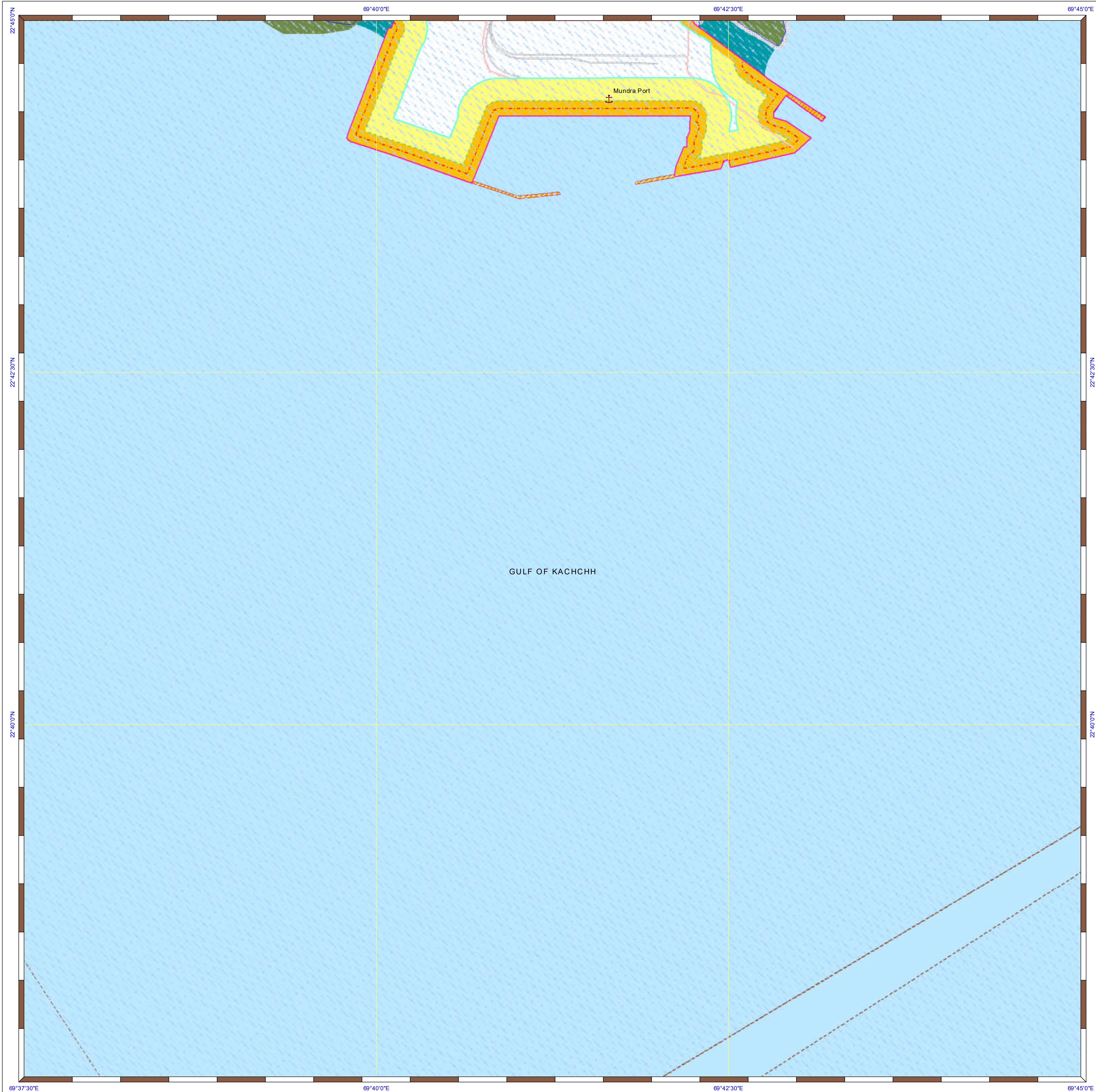
CRZ - IV

- CRZ - IVA
- CRZ - IVB

Prepared by










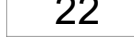




National Centre for Sustainable Coastal Management
(Ministry of Environment, Forest & Climate Change)
Chennai - 25

08-04-2022







**HTL AND CRZ BOUNDARY MAP PREPARED AS PER THE
APPROVED CZMP MAP OF GUJARAT STATE
(CRZ NOTIFICATION, 2011)**

Legend




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|  | AP&SEZ Boundary- Provided by Project Proponent |

CRZ Lines & Boundary



-
-  Hazard Line
 100 m Line in CRZ III Area
 200 m CRZ Line - NDZ
 CRZ Boundary
 (500m Line, 100m for Bay, 100 m or width of the creek
 whichever is less along the tidal influenced water bodies)

CRZ CATEGORY


CRZ - I

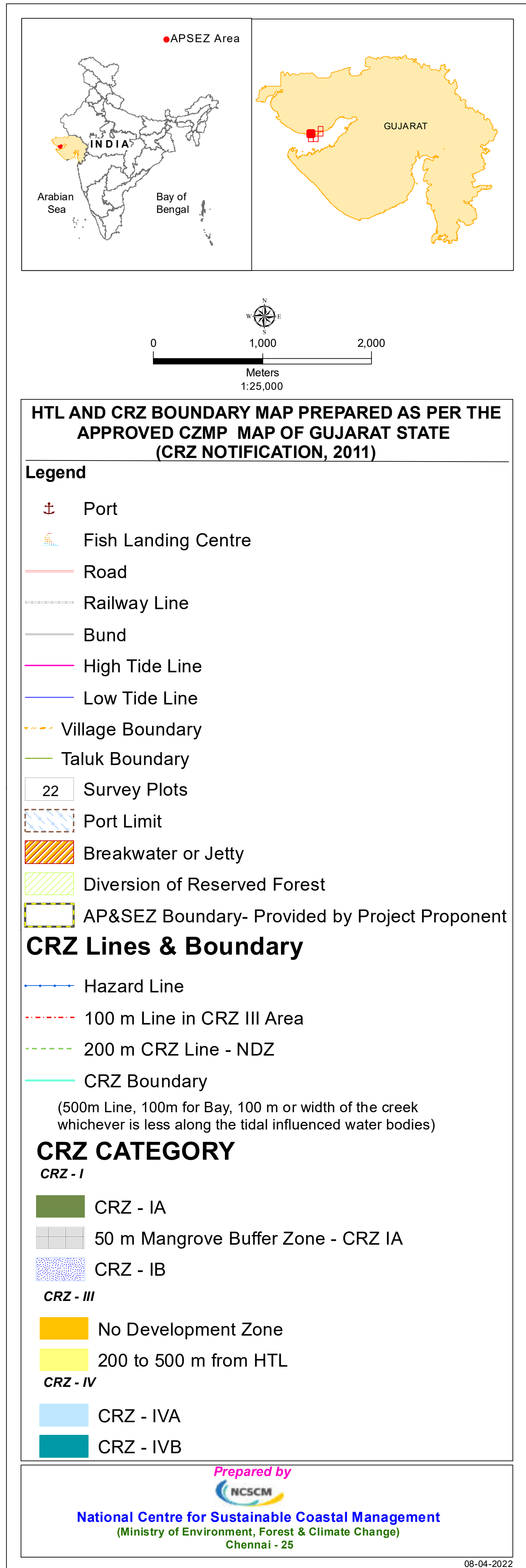
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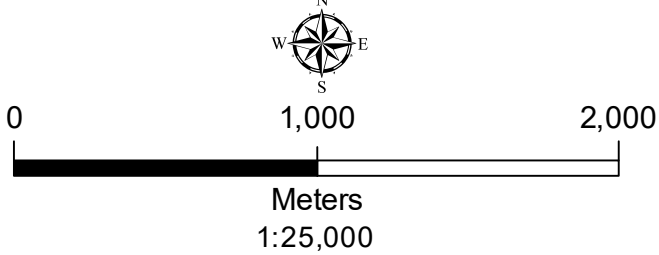
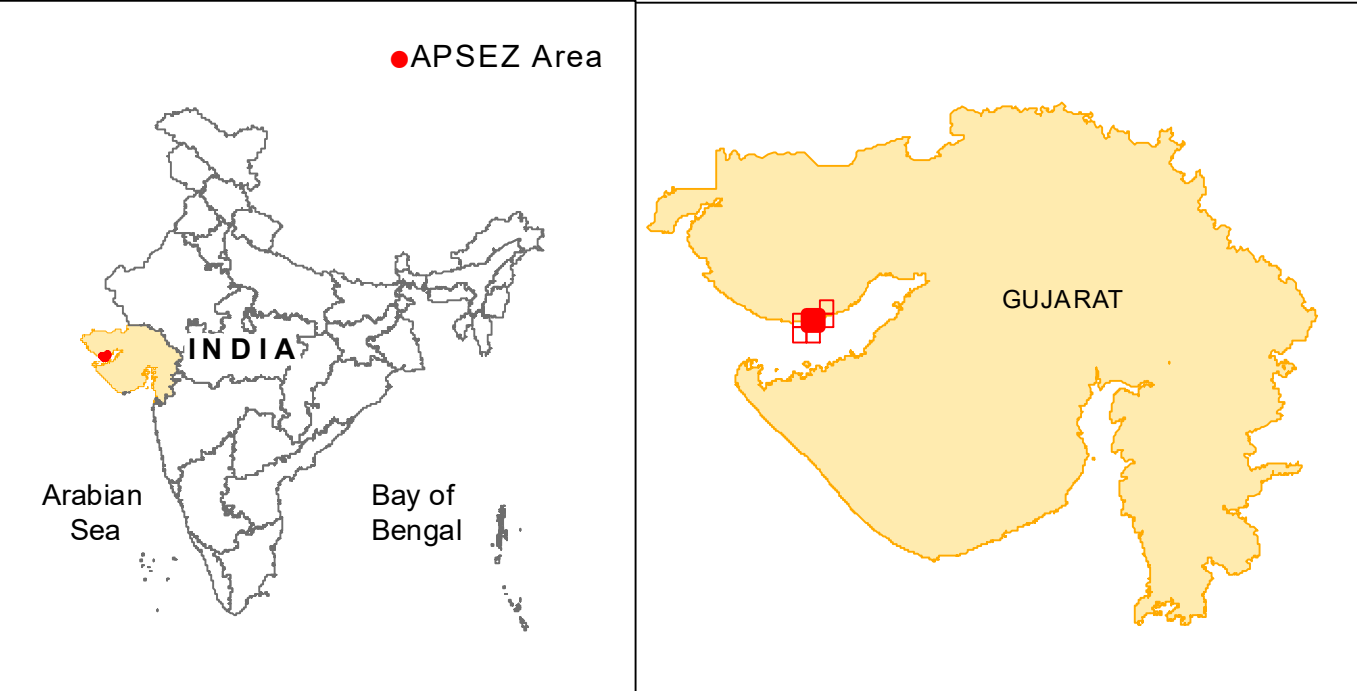
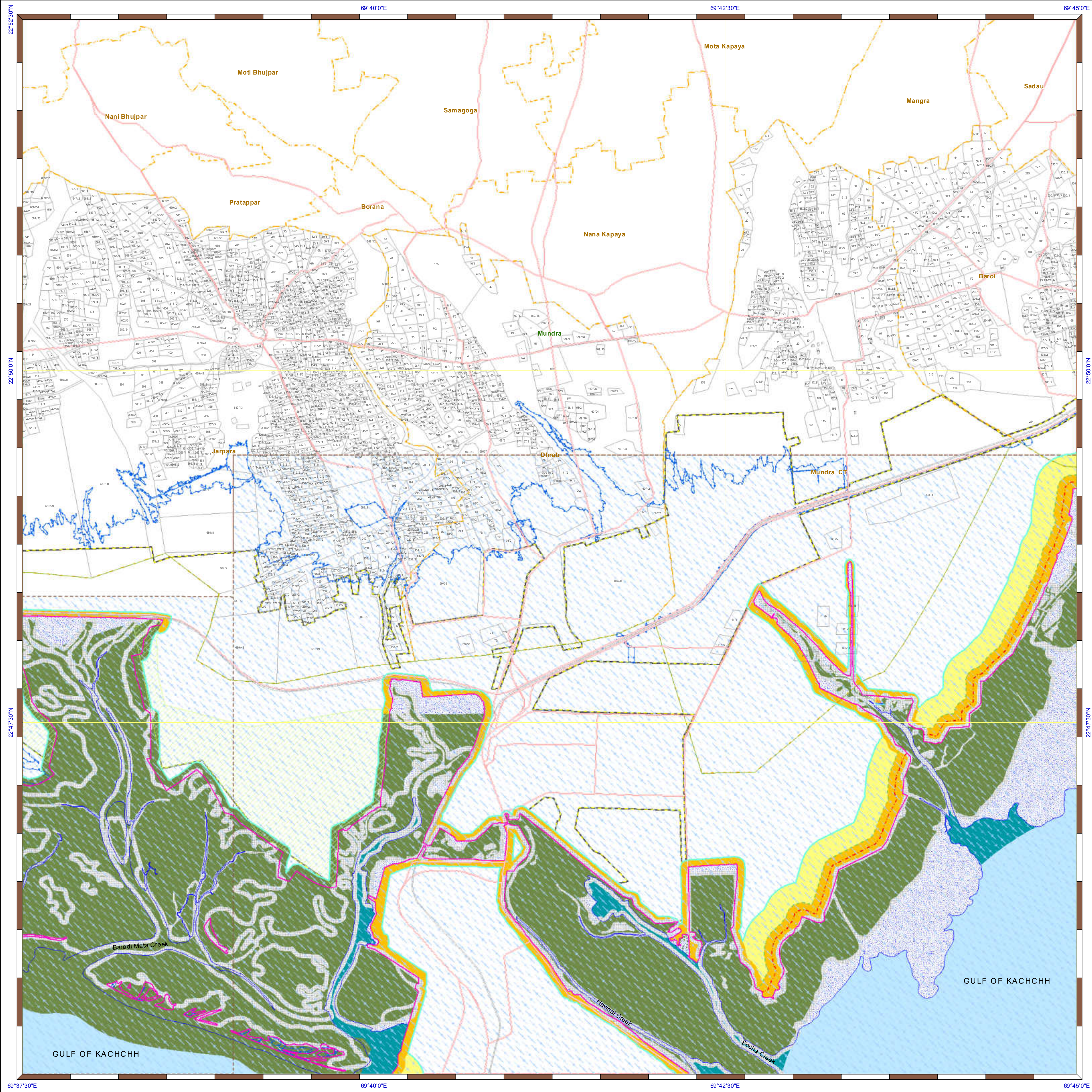
CRZ - III

-  No Development Zone
 200 to 500 m from HTL

CRZ - IV

-  CRZ - IVA
 CRZ - IVB





HTL AND CRZ BOUNDARY MAP PREPARED AS PER THE APPROVED CZMP MAP OF GUJARAT STATE (CRZ NOTIFICATION, 2011)

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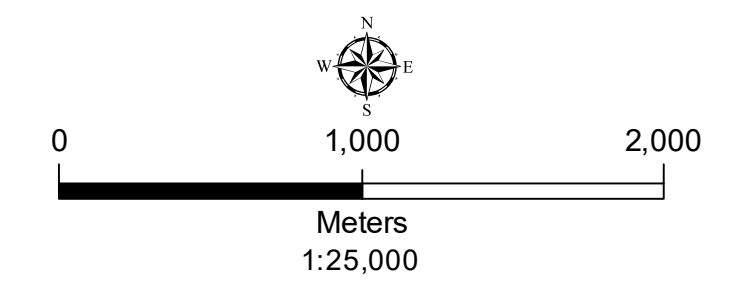
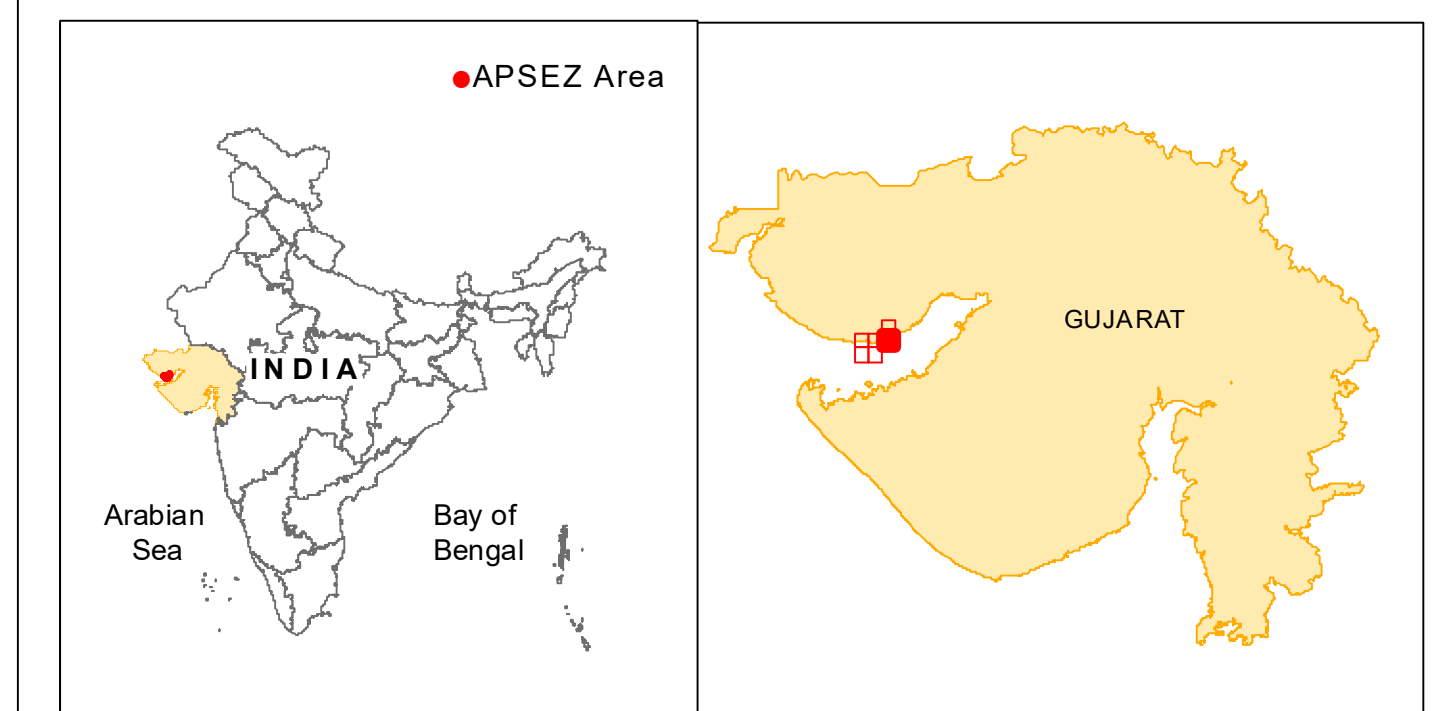
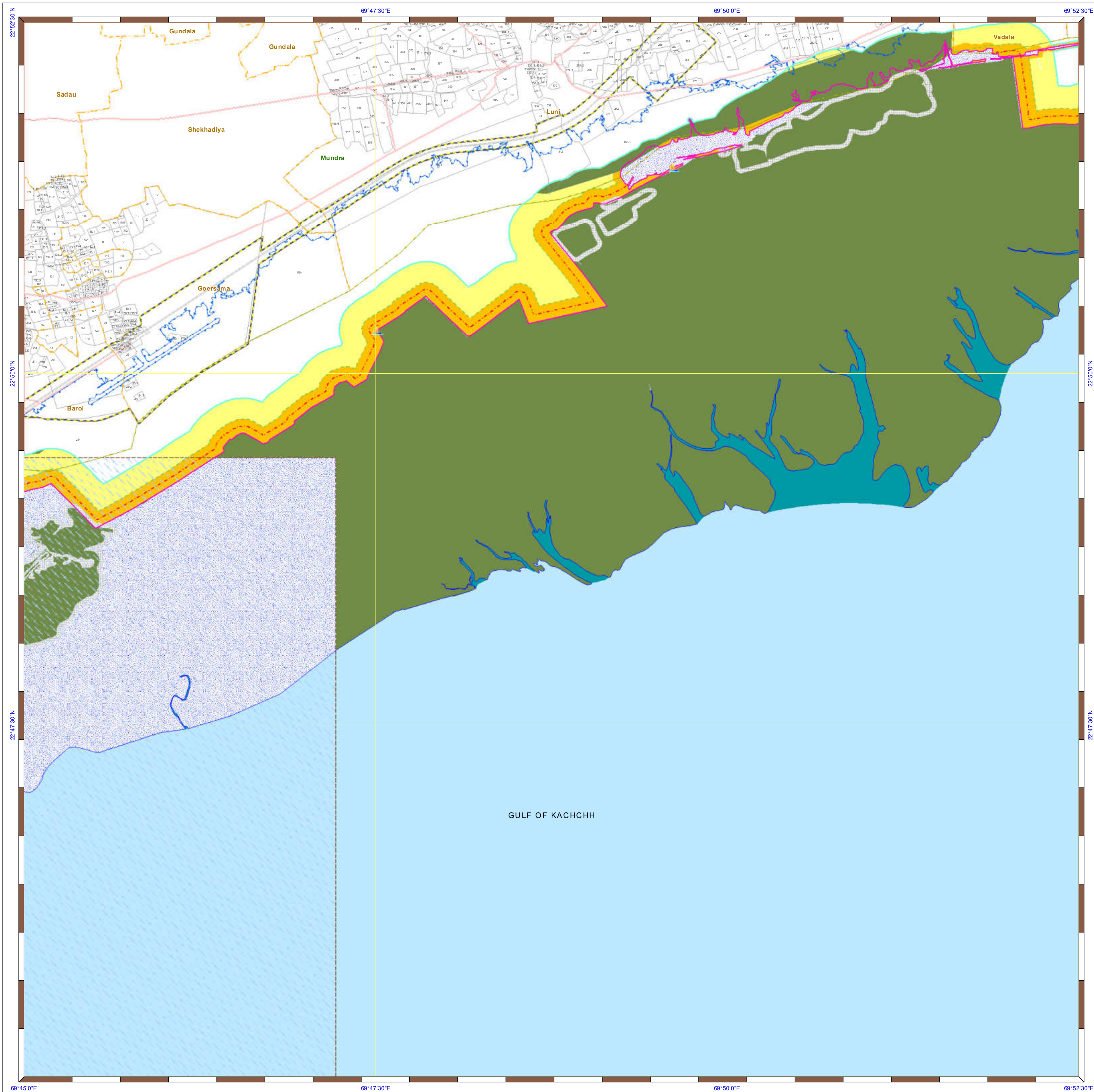
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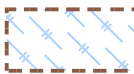

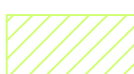

CRZ CATEGORY

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 - CRZ - IA
 - 50 m Mangrove Buffer Zone - CRZ IA
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- CRZ - III
 - No Development Zone
 - 200 to 500 m from HTL
- CRZ - IV
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**HTL AND CRZ BOUNDARY MAP PREPARED AS PER THE
APPROVED CZMP MAP OF GUJARAT STATE
(CRZ NOTIFICATION, 2011)**

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|  | Taluk Boundary |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">22</div> | Survey Plots |
|  | Port Limit |
|  | Breakwater or Jetty |
|  | Diversion of Reserved Forest |
|  | AP&SEZ Boundary- Provided by Project Proponent |

CRZ Lines & Boundary



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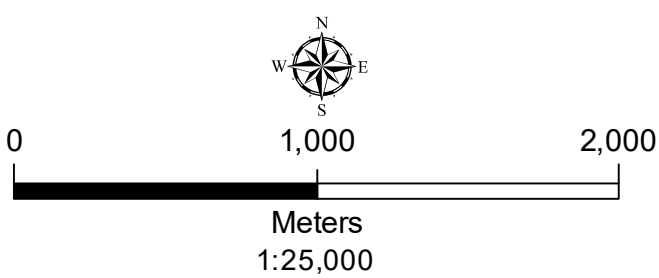
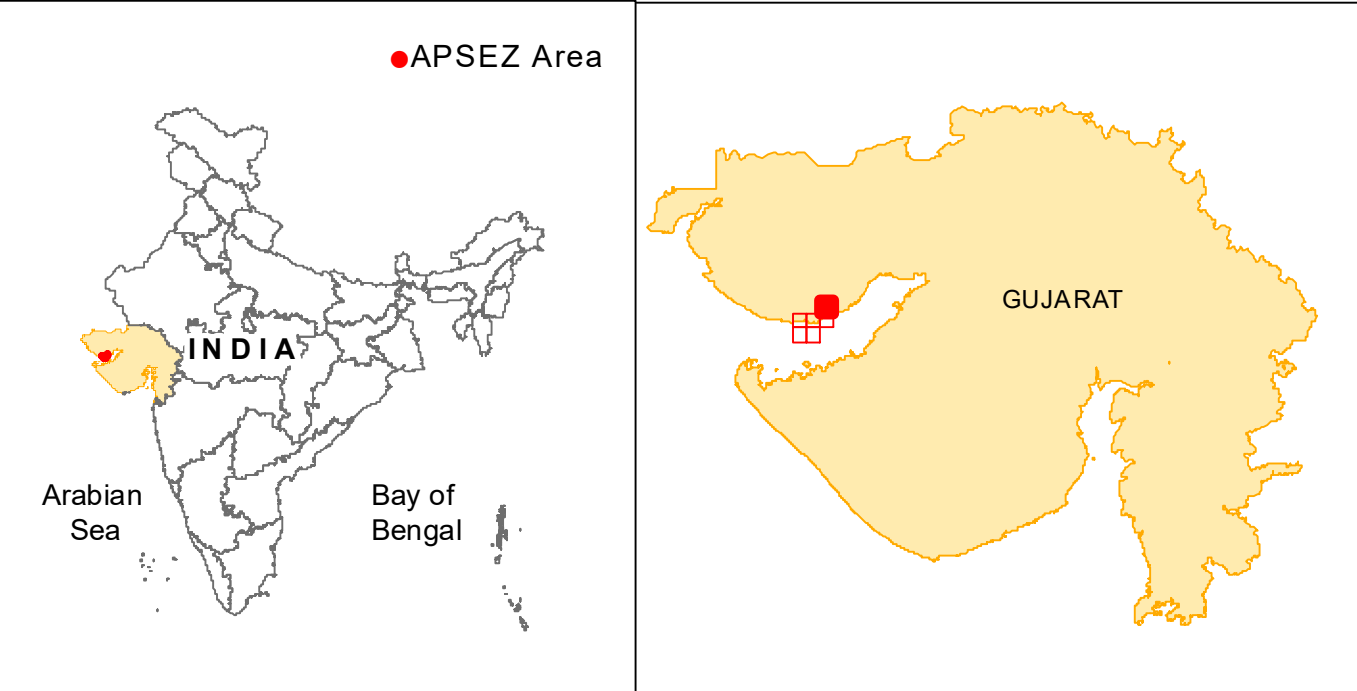
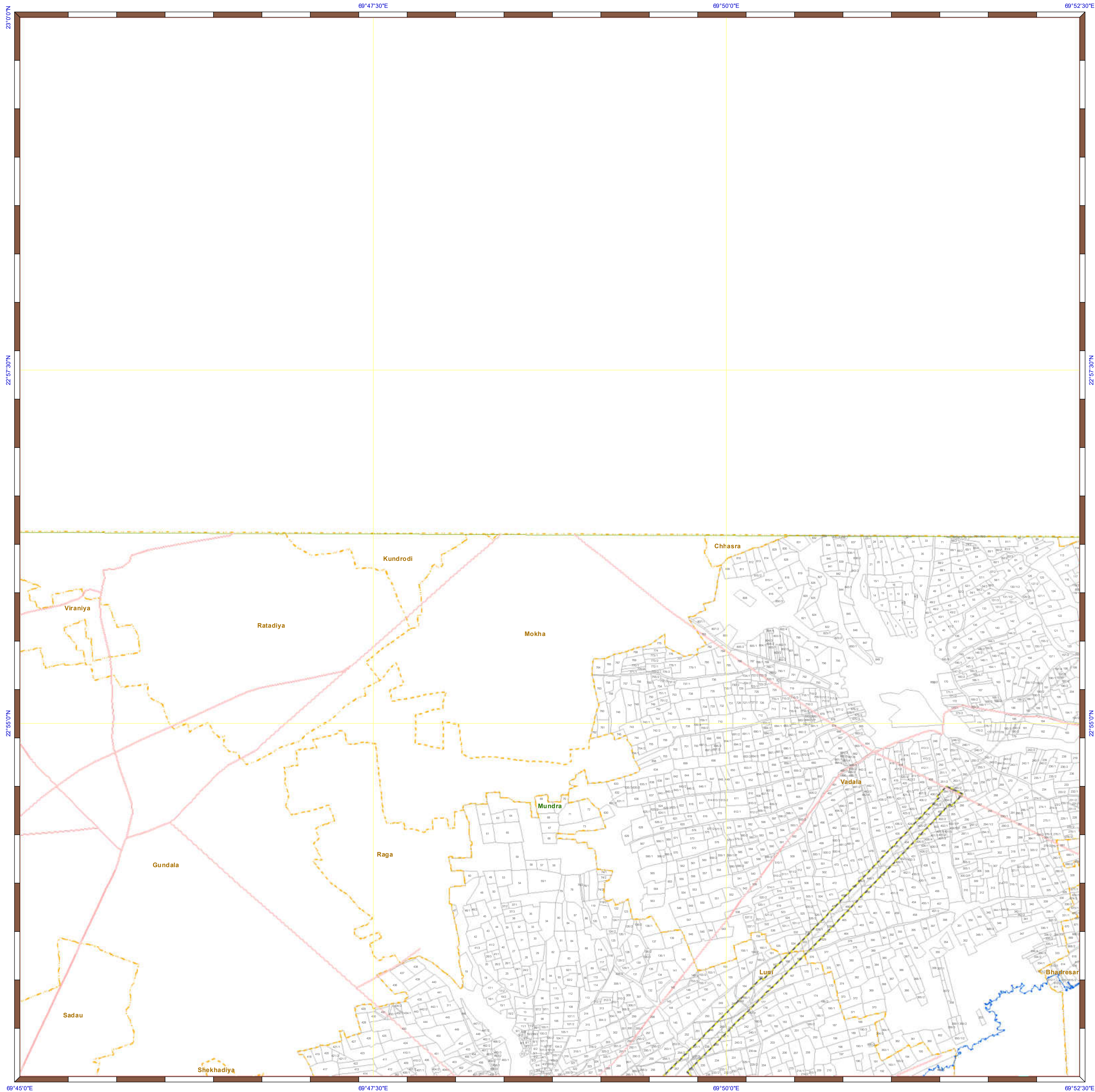
CRZ - IV

-  CRZ - IVA
 CRZ - IVB

Prepared by
NCSCM

National Centre for Sustainable Coastal Management
(Ministry of Environment, Forest & Climate Change)
Chennai - 25

08-04-2022



HTL AND CRZ BOUNDARY MAP PREPARED AS PER THE APPROVED CZMP MAP OF GUJARAT STATE (CRZ NOTIFICATION, 2011)

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 - CRZ - IVA
 - CRZ - IVB

Prepared by
NCSM
National Centre for Sustainable Coastal Management
(Ministry of Environment, Forest & Climate Change)
Chennai - 25

Annexure – 13



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

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 & Other Waste (Management & Transboundary Movement) Rules-2016, framed under the Environmental (Protection) Act-1986.

And whereas Board has received application inward No.123578 dated 22/08/2017 for the **Consolidated Consent and Authorization (CC&A)** of the Board under the provisions / rules of the aforesaid Acts. Consents & Authorization are hereby granted Consent to operate for Development of Multi Product SEZ for SEZ (1st Phase) at Mundra. Dist-Kutch as under:

CONSENTS AND AUTHORISATION:

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

To

✓ Adani Ports & SEZ Limited

Notified SEZ area,

Tal: Mundra, Dist: Kutch- 370421

1. Consent Order No. AWH- 88998 Date of Issue: 26/10/2017

The consent shall be valid up to 21/08/2022 for Development of Multi Product SEZ (Phase-I) for common infrastructure facilities like Processing-Non processing zone, Ware housing zones, Road & Rail networks (trunk as well as Internal), Bridges or culverts, IT-Telecommunication, Electric network, Effluent collection network & utilities & supporting infrastructure, Sewage Treatment Plant (150 KL/ Day), two DG sets (750 KVA and 500 KVA) within Multiproduct SEZ of 8481.27 Hectares of SEZ (at Mundra), Dist-Kutch.

2. SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS:

- 2.1 Unit shall comply with all conditions stipulated by MoEF & CC in order of Environment Clearance vide. F.NO. 10-138/2008-IA.III dated 15/07/2014.
- 2.2 Unit shall apply for Necessary permission for your proposed common infrastructure facilities like Desalination plant (150 MLD), sea water intake & out fall facility (375 MLD Intake & 241 MLD out fall) CETP-50 MLD, STP-62 MLD as well as Municipal solid waste site & free trade & ware house zone (FTWZ) before installation & commissioning of plant.

Amber

Page 1 of 5

Clean Gujarat Green Gujarat

ISO-9001-2008 & ISO-14001 - 2004 Certified Organisation

- 2.3 All industrial Units located in Mundra SEZ limited shall be given separate treatment for generated their ww in their plant & dispose of treated industrial waste water as per consent granted by board to individual respective unit.
- 2.4 Unit shall adhere to all consent conditions granted to their existing common effluent treatment facilities (CETP) (2.5 MLD) (ID-10605), sewage treatment plant (total capacity 2.5 MLD) ((D-10602) & dispose treated water as per consent granted to them by board.
- 2.5 Unit shall adhere to the final judgment of Hon'ble High Court vide Write Petition (PIL) No 122 of 2013 & others linked petitions with it.
- 2.6 Unit shall adhere to all conditions of CTE issued vide order No GPCB/CCA-KUTCH-1044/ ID-31463/ 109800 dated 16.4.2012.
- 2.7 Unit shall comply all conditions of CRZ Clearance Recommended by Department of Forest and Environment, Government of Gujarat vide letter number ENV-10-2010-1601-E dated 27-03-2012.
- 2.8 Unit shall adhere to all conditions of Free Trade Ware housing Zone (FTWZ) issued by Ministry of commerce and Industry, Department of commerce (SEZ section) vide order No F-1/16/2011-SEZ dated 4.1.2012.

3. CONDITIONS UNDER WATER ACT 1974:

- 3.1 Total domestic water requirement for horticulture is 500 KLD shall be used within SEZ area having 96 ha area.
- 3.2 The quantity of Sewage effluent shall not exceed 150 KL/day & is sent to STP for its treatment.
- 3.3 The quality of the sewage shall conform to the following standards:

PARAMETERS	GPCB NORMS
pH	6.5 to 9
BOD (5 days at 20° C)	30 mg/L
Suspended solids	100 mg/L
Fecal Coliform	1000

- 3.4 Treated domestic effluent conforming to the prescribed norms shall be utilized on land for gardening and plantation within premises through fixed pipeline network in SEZ area.
- 3.5 The unit shall install meters at utilities for measuring category wise (Category as given in Schedule II of "Water (Prevention & Control of Pollution) Cess Act-1977") consumption of water.

4. CONDITIONS UNDER AIR ACT 1981:

- 4.1 The following shall be used as fuel in D G Sets respectively.

Sr. No.	Fuel	Quantity
1.	HSD	200 Ltr/ hr

- 4.2 The applicant shall install & operate air pollution control system in order to achieve flue gas emission norms as prescribed below;

Sr. No.	Stack attached to	Stack height in Meter	Parameter	Permissible Limit
1	D. G. sets (750 KVA & 500 KVA) (standby)	11 each	PM SO ₂ NO _x	150 mg/Nm ³ 100 ppm 50 ppm

Handwritten signature

4.3 There shall be no process gas emission from manufacturing process and other ancillary operations.

4.4 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 16th November-2009.

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

4.5 The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection. 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.

4.6 The concentration of Noise in ambient air within the premises of industrial unit shall not exceed following levels:

Between 6 A.M. to 10 P.M.: 75 dB (A)

Between 10 P.M. to 6 A.M.: 70 dB (A)

5. Authorization under Hazardous and other waste [Management, Transboundary Movement] Rules, 2016 & amended.

5.1 Authorization Number: AWH – 88998 and shall valid up to 21/08/2022.

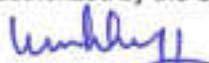
5.2 Adani Ports & SEZ Limited, Notified SEZ area, Tal: Mundra, Dist: Kutch– 370421 is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at, Plot No- Notified SEZ area, Tal: Mundra, Dist: Kutch– 370421

Sr. No.	Waste	Quantity per Month	Category	Mode of Disposal
1.	Used Oil	0.5 MT	5.1	Collection, storage and Reuse as a lubricant within a unit premises and / or sold out to registered recyclers.

6.3 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.

6. GENERAL CONDITIONS OF AUTHORIZATION:

1. The authorized person 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 State Pollution Control Board.



3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.
5. Hazardous Waste generated shall be disposed off in accordance with the Hazardous Waste & other waste (Management & Transboundary Movement) Rules, 2016 as amended and unit shall have to obtain authorization of the Board for all applicable categories of Hazardous wastes.
 - (a) Used oil / spent oil shall be disposed off by selling it to registered re-refiner units only.
 - (b) Oily sludge from separators shall be disposed off or selling it to registered re-refiners unit only.
 - (c) ETP sludge shall be disposed of at TSDF approved by the Board.
 - (d) Used batteries shall be sold to the GPCB authorized dealers.
6. 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;
7. It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
8. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
9. The record of consumption of hazardous and other wastes shall be maintained.
10. The hazardous and other waste 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.
11. An application for the renewal of an authorization shall be made as laid down under these Rules.
12. Annual return shall be filed by June 30th for the period ensuring 31st March of the year.

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 The waste generator shall be totally responsible for (i.e. Collection, storage, transportation and ultimate disposal) of the wastes generated.
- 7.3 Records of waste generation, its management and annual return shall be submitted to Gujarat Pollution Control Board in Form – 4 by 31st January of every year.
- 7.4 In case of any accident, details of the same shall be submitted in Form – 5 to Gujarat Pollution Control Board.
- 7.5 Applicant shall comply relevant provision of "Public Liability Insurance Act – 91".
- 7.6 Empty drums and containers of toxic and hazards 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.
- 7.7 Adequate plantation shall be carried out all along the periphery of the industrial premises and a green belt of 10 meters width is developed.
- 7.8 The applicant shall however, not without the prior consent of the Board bring into use any new or altered outlet for the discharge of effluent or gaseous emission or sewage waste from the proposed industrial plant. The applicant is required to make applications to this Board for this

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purpose in the prescribed forms under the provisions of the Water Act-1974, the Air Act-1981 and the Environment (Protection) Act-1986.

- 7.9 The over all noise level in and around the plant area shall be kept well within the standards by providing noise control measures including engineering control like acoustic insulation hoods, silencers, enclosures etc on all sources of noise generation. The ambient noise level shall conform to the standards prescribed under the Environment (Protection) Act, 1986 & Rules.
- 7.10 The concentration of Noise in ambient air within the premises of industrial unit shall not exceed following levels:
- Between 6 A.M. and 10 P.M.: 75 dB (A)
Between 10 P.M. and 6 A.M.: 70 dB (A)
- 7.11 In case of transport of hazardous waste to a facility for (i.e. Treatment, Storage and disposal) existing in a state other than the state where hazardous waste are generated, the occupier shall obtain "No Objection certificate" from the state pollution Control Board, the Committee of the concerned state or Union territory Administration where the facility exists.
- 7.12 Unit shall take all concrete measures to show tangible results in waste generation reduction, avoidance, reuse and recycle. Action taken in this regards shall be submitted within 03 months and also along with Form 4.
- 7.13 You shall have to display the relevant information with regard to hazardous waste as indicated in the Hon. Supreme Court's order in W.P. No.657 of 1995 dated 14th October 2003.
- 7.14 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 waste generated within the factory premises.

**For and on behalf of
Gujarat Pollution Control Board**



(P.J. Vachhani)

Senior Environmental Engineer

NO: PC/ CCA- KUTCH- 1044/GPCB ID: 31463/ 428772 Date: 23/11/17

ISSUED TO:

Adani Ports & SEZ Limited

Notified SEZ area,

Tal: Mundra, Kutchh,

Dist: Kutch- 370421



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

By R.P.A.D.

AMENDMENT TO CONSOLIDATED CONSENT AND AUTHORIZATION (CC&A)

No. PC/CCA-KUTCH-1044(2)/GPCB ID 31463/ 480505

Date: 31/12/2018

To,
Adani Port and Special Economic Zone Limited,
Notified SEZ area, Mundra,
Tal.:Mundra,
Dist.: Kutch

Subject : Amendment to Consolidated Consent and Authorisation (CC&A).

Reference :

1. CCA of the Board issued to your unit vide order No.AWH-88998 dated 26/10/2017 vide letter no: PC/ CCA- KUTCH- 1044/GPCB ID: 31463/428772 Date:23/11/2017
2. Your CCA Amendment Application Inward ID No.144293, dated 03/10/2018.

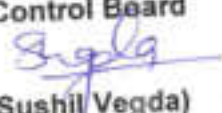
Sir,

In exercise of the power conferred under section-27 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 & Other Waste (Management & Transboundary Movement) Rules-2016 & as amended framed under the Environmental (Protection) Act-1986 and without reducing your responsibility under the said Acts/Rules in anyway; this Board is empowered to amend consent order conditions. Accordingly, the Consolidated Consent and Authorisation (CC&A) issued vide letter no. Consent order no. No. AWH-88998 dated 26/10/2017 vide letter no: PC/ CCA- KUTCH- 1044/GPCB ID: 31463/428772 Date:23/11/2017 Which is valid up to 21/08/2022 under reference (1) stands amended in respect of the following conditions;

1. **Consent Order No.: AWH-97361 Date of Issue: 27/11/2018.**
2. The consent order shall be valid up to **21/08/2022** for Additional common infrastructure facilities like agro product storage Godowns ,Administration building including, port user Building ,water supply conversion and drainage network ,Air Strip and Social infrastructure etc
3. There shall be no change in water consumption and waste water generation, and Air Emission and Hazardous waste quantity due to proposed expansion.

4. All other terms and conditions of Consolidated Consent (CC&A) order No. AWH-88998 dated 28/10/2017 vide letter no: PC/ CCA- KUTCH- 1044/GPCB ID: 31463/428772 Date: 23/11/2017 shall remains unchanged.

**For and on behalf of
Gujarat Pollution Control Board**


**(Sushil Vegda)
Senior Environmental Engineer**

Annexure – 14



“Half Yearly Environmental Monitoring Reports “

For,



M/S. ADANI PORTS & SEZ Limited.

Notified SEZ area, 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



RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	PUB ADANI HOUSE STP OUTLET				GPCB Permissible Limit	TEST METHOD
			NOVEMBER 2021		DECEMBER 2021			
			08/11/2021	24/11/2021	08/12/2021	20/12/2021		
1.	pH @ 25 ° C	--	8.74	8.24	7.04	7.74	6.5 to 9	APHA 23 rd Ed.,2017,4500- H ⁺ B
2.	Total Suspended Solids	mg/L	22	24	26	18	100	APHA 23 rd Ed.,2017,2540 -D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	22	20	14	12	30	APHA 23 rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.8	0.8	0.9	0.6	0.5 Min.	APHA 23 rd Ed.,2017,4500- Cl-B
5.	Fecal Coliform	MPN Index/100ml	<2(Absent)	12	<2(Absent)	<2(Absent)	1000	IS 1622: 1981

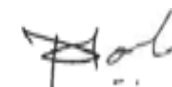
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RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	PUB ADANI HOUSE STP OUTLET						GPCB Permissible Limit	TEST METHOD
			JANUARY 2022		FEBRUARY 2022		MARCH 2022			
			10/01/2022	19/01/2022	10/02/2022	28/02/2022	10/03/2022	22/03/2022		
1.	pH @ 25 ° C	--	7.12	7.66	7.28	7.32	7.55	7.44	6.5 to 9	APHA 23 rd Ed.,2017,4500-H ⁺ B
2.	Total Suspended Solids	mg/L	22	16	24	18	19	16	100	APHA 23 rd Ed.,2017,2540-D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	16	14	12	14	14	11	30	APHA 23 rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.6	0.8	0.8	0.7	0.6	0.6	0.5 Min.	APHA 23 rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	<2(Absent)	<2(Absent)	<2(Absent)	<2(Absent)	<2(Absent)	<2(Absent)	1000	IS 1622: 1981



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Results of Ambient Air Quality Monitoring

Name of Location		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...

Name of Location		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...

Name of Location		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 Ambient Air Quality Monitoring

Name of Location		Adani Guest 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
1.	03-02-2022	84.35	23.56	13.18	20.17	--
2.	07-02-2022	85.12	27.21	10.21	22.34	--
3.	10-02-2022	68.94	24.18	14.13	19.21	--
4.	14-02-2022	89.14	27.15	14.21	22.19	--
5.	16-02-2022	84.53	31.16	12.19	22.10	--
6.	21-02-2022	78.25	27.15	14.23	23.14	--
7.	23-02-2022	89.18	30.15	11.18	20.16	--
8.	28-02-2022	76.84	24.19	13.24	24.15	--
9.	03-03-2022	85.34	32.13	10.67	17.84	--
10.	07-03-2022	81.45	29.15	15.23	24.51	--
11.	10-03-2022	78.20	26.34	12.19	20.47	--
12.	14-03-2022	83.45	30.15	16.23	25.35	
13.	17-03-2022	80.15	27.89	15.10	20.18	
14.	21-03-2022	70.25	25.64	10.38	17.85	

Continue...

Name of Location		Adani Guest 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
15.	24-03-2022	84.51	32.89	14.56	21.35	--
16.	28-03-2022	80.24	35.18	11.15	18.90	--
17.	30-03-2022	85.22	30.15	15.33	23.47	--
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10



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
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 Guest House	
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time	
		24-02-2022	21-03-2022
1	06:00 to 07:00	61.24	60.21
2	07:00 to 08:00	65.23	64.84
3	08:00 to 09:00	62.89	63.58
4	09:00 to 10:00	65.12	64.36
5	10:00 to 11:00	63.89	62.96
6	11:00 to 12:00	59.76	60.32
7	12:00 to 13:00	61.23	59.43
8	13:00 to 14:00	60.98	58.36
9	14:00 to 15:00	61.43	60.87
10	15:00 to 16:00	61.34	62.34
11	16:00 to 17:00	60.98	59.39
12	17:00 to 18:00	65.23	64.32
13	18:00 to 19:00	59.76	60.28
14	19:00 to 20:00	60.12	59.32
15	20:00 to 21:00	56.78	55.39
16	21:00 to 22:00	59.65	58.74
Day Time		<75 dB (A)	

Continue...

Location Name		Adani Guest House	
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time	
		24-02-2022	21-03-2022
1	22:00 to 23:00	57.12	56.27
2	23:00 to 24:00	56.89	56.28
3	24:00 to 01:00	54.12	51.21
4	01:00 to 02:00	59.87	53.47
5	02:00 to 03:00	52.45	49.54
6	03:00 to 04:00	52.98	48.28
7	04:00 to 05:00	56.43	54.11
8	05:00 to 06:00	59.87	56.38
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 Stack Monitoring

Monitoring Period: **October - 2021 to March - 2022**

Sr. No.	Parameter	Unit	Adani House D.G.Set No. S-1 (750 KVA)	GPCB LIMIT	Method of Test
			Feb-22		
			24-02-2022		
1	Particulate Matter	mg/Nm ³	18.4	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	5.3	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	27.8	50	IS 11255 (Part - 7)

Sr. No.	Parameter	Unit	PUB Building D.G.Set No. S-1 (500 KVA)	GPCB LIMIT	Method of Test
			Feb-22		
			24-02-2022		
1	Particulate Matter	mg/Nm ³	16.3	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.4	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	29.12	50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)



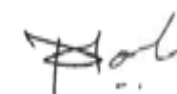

Jaivik S. Tandel
(Manager - Operations)

RESULTS OF BORE HOLE WATER

SR.NO.	TEST PARAMETERS	UNIT	PUB	FLYOVER BRIDGE	DHRUB	TEST METHOD
			10/12/2021	10/12/2021	10/12/2021	
1.	pH @ 25 ° C	--	7.37	7.41	7.77	IS 3025(Part 11)1983
2.	Salinity	ppt	5.49	5.69	22	APHA 23 rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
4.	Hydrocarbon	mg/L	Not Detected	Not Detected	Not Detected	GC/GCMS
5.	Lead as Pb	mg/L	BDL	BDL	0.061	IS 3025 (PART 47) 1994
6.	Arsenic as As	mg/L	BDL	BDL	BDL	APHA 23 rd Ed.,2017,3114-C
7.	Nickel as Ni	mg/L	0.089	0.168	0.074	IS 3025 (PART 54) 2003
8.	Total Chromium as Cr	mg/L	BDL	0.067	BDL	IS 3025 (PART 52) 2003
9.	Cadmium as Cd	mg/L	BDL	0.097	BDL	IS 3025(PART 41) 1992
10.	Mercury as Hg	mg/L	BDL	BDL	BDL	APHA 23 rd Ed.,2017, 3112-B
11.	Zinc as Zn	mg/L	0.261	0.168	0.386	IS 3025(PART 49) 1994
12.	Copper as Cu	mg/L	BDL	BDL	BDL	IS 3025 (PART 42) 1992
13.	Iron as Fe	mg/L	BDL(MDL:0.1)	0.383	0.109	IS 3025(PART 53) 2003
14.	Insecticides/Pesticides	µg/L	Absent	Absent	Absent	USEPA 8081 B
15.	Depth of Water Level from Ground Level	meter	2.2	2.2	2.3	--



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/m ³	5 µg/m ³
2	Particulate Matter (PM10)	µg/m ³	5 µg/m ³
3	Sulphur Dioxide (SO ₂)	µg/m ³	4 µg/m ³
4	Nitrogen Dioxide (NO ₂)	µg/m ³	5 µg/m ³
5	Carbon Monoxide (CO)	mg/m ³	1-30 mg/m ³
6	Ammonia (NH ₃)	µg/m ³	5 µg/m ³
7	Ozone (O ₃)	µg/m ³	5 µg/m ³
8	Lead (Pb)	µg/m ³	0.5 µg/m ³
9	Nickle (Ni)	ng/m ³	1 ng/m ³
10	Arsenic (As)	ng/m ³	1 ng/m ³
11	Benzene	µg/m ³	1µg/m ³
12	Benzo(o)Pyrene	ng/m ³	0.1 ng/m ³
14	Hydro Carbon	µg/m ³	1 µg/m ³

Stack Emission Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Suspended particulate matter	mg/Nm ³	2 mg/Nm ³
2	Sulphur Dioxide SO ₂	mg/Nm ³	4 mg/Nm ³
3	Oxides of Nitrogen NO _x	mg/Nm ³	5 mg/Nm ³

CETP water			
Sr. No.	Test Parameter	Unit	MDL
1	pH @ 27 ° C	--	2
2	Temperature	OC	5
3	Colour	Pt. Co. Scale	5
4	Total Suspended Solids	mg/L	4
5	Oil & Grease	mg/L	2
6	Phenolic Compound	mg/L	0.1
7	Fluoride	mg/L	0.2
8	Iron as Fe	mg/L	0.1
9	Zinc as Zn	mg/L	0.05
10	Trivalent Chromium	mg/L	0.05
11	Sulphide	mg/L	0.05
12	Ammonical Nitrogen	mg/L	2
13	BOD (3 days at 27 OC)	mg/L	1
14	COD	mg/L	2
15	Chloride (as Cl) ⁻	mg/L	1
16	Sulphate (as SO ₄)	mg/L	1
17	Total Dissolved Solids	mg/L	4
18	Total Residual Chlorine	mg/L	0.1
19	Copper as Cu	mg/L	0.05
20	Bio Assay test (%)	%	--

STP OUTLET

Sr. No.	Test Parameter	Unit	MDL
1	pH @ 25 ° C	--	2
2	Total Suspended Solids	mg/L	4
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	1
4	Residual chlorine	mg/L	0.1
5	Fecal Coliform	MPN Index/100ml	

RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	SAMUNDRA TOWNSHIP STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Nov-21		Dec-21		Jan-22			
			09-11-2021	24-11-2021	08-12-2021	20-12-2021	10-01-2022	19-01-2022		
1	pH @ 25 ° C	--	8.04	7.44	7.68	7.62	7.56	7.52	6.5 to 9	APHA 23 rd Ed.,2017,4500- H ⁺ B
2	Total Suspended Solids	mg/L	10	8	12	8	14	12	100	APHA 23 rd Ed.,2017,2540 -D
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	12	10	16	14	12	10	30	APHA 23 rd Ed,2017,5210- B 5-6
4	Residual chlorine	mg/L	0.7	0.8	0.7	0.6	0.8	0.7	0.5 Min.	APHA 23 rd Ed.,2017,4500- Cl-B
5	Fecal Coliform	MPN Index/100ml	170	140	80	130	110	80	1000	IS 1622: 1981

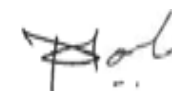
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RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	SAMUNDRA TOWNSHIP STP OUTLET				GPCB Permissible Limit	TEST METHOD
			Feb-22		Mar-22			
			08-02-2022	28-02-2022	10-03-2022	22-03-2022		
1	pH @ 25 ° C	--	7.51	7.46	7.45	7.58	6.5 to 9	APHA 23 rd Ed.,2017,4500- H ⁺ B
2	Total Suspended Solids	mg/L	16	14	18	18	100	APHA 23 rd Ed.,2017,2540 -D
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	13	10	10	17	30	APHA 23 rd Ed,2017,5210- B 5-6
4	Residual chlorine	mg/L	0.7	0.6	0.8	0.9	0.5 Min.	APHA 23 rd Ed.,2017,4500- Cl-B
5	Fecal Coliform	MPN Index/100ml	140	110	140	110	1000	IS 1622: 1981



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Results of Ambient Air Quality Monitoring

Name of Location		SAMUDRA TOWNSHIP – STP				
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
1.	01-11-2021	65.78	27.51	7.12	17.50	--
2.	02-11-2021	56.78	23.25	6.14	15.83	--
3.	08-11-2021	51.60	20.48	10.23	21.34	--
4.	09-11-2021	70.34	33.18	8.76	19.45	--
5.	15-11-2021	66.45	27.16	9.15	17.32	--
6.	16-11-2021	62.78	23.85	6.70	18.15	--
7.	22-11-2021	55.44	21.90	6.94	21.20	--
8.	23-11-2021	69.32	28.45	9.12	17.25	--
9.	29-11-2021	47.84	19.45	11.23	19.28	--
10.	30-11-2021	59.21	23.18	8.70	17.45	--
11.	05-12-2021	55.78	21.30	5.15	12.60	--
12.	06-12-2021	61.20	22.65	5.67	10.34	--
13.	13-12-2021	68.34	19.26	7.54	16.80	--
14.	14-12-2021	60.32	22.30	6.15	15.21	--
15.	20-12-2021	65.25	17.30	5.14	13.21	--
16.	21-12-2021	56.82	20.16	7.13	12.19	--

Continue...

Name of Location		SAMUDRA TOWNSHIP – STP				
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
17.	27-12-2021	40.36	14.56	5.15	12.36	--
18.	28-12-2021	46.23	18.32	6.15	13.45	
19.	03-01-2022	60.50	19.45	8.12	15.21	0.07
20.	04-01-2022	52.70	15.80	6.10	14.50	0.14
21.	10-01-2022	72.90	23.50	9.15	17.30	0.11
22.	11-01-2022	65.70	20.80	7.14	12.15	0.10
23.	17-01-2022	60.50	24.60	6.18	16.23	0.06
24.	18-01-2022	52.60	19.80	9.11	15.43	0.09
25.	24-01-2022	66.80	21.50	7.20	18.42	0.13
26.	25-01-2022	70.30	23.40	5.11	15.17	0.11
27.	31-01-2022	85.10	20.50	8.13	16.25	0.06
28.	03-02-2022	87.15	28.44	7.15	13.28	--
29.	07-02-2022	84.21	31.20	11.23	22.45	--
30.	10-02-2022	80.45	25.67	8.21	19.34	--
31.	14-02-2022	76.43	33.23	10.25	17.84	--
32.	16-02-2022	79.15	25.34	5.13	15.10	--
33.	21-02-2022	88.34	21.28	12.17	22.38	--

Continue...

Name of Location		SAMUDRA TOWNSHIP – STP				
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
34.	23-02-2022	73.12	34.23	8.26	20.21	--
35.	28-02-2022	85.44	30.15	17.10	23.45	--
36.	03-03-2022	73.20	22.10	10.45	17.23	--
37.	07-03-2022	70.45	19.40	8.15	14.56	--
38.	10-03-2022	83.80	27.80	14.32	20.16	--
39.	14-03-2022	72.45	31.30	12.31	17.89	--
40.	17-03-2022	75.50	28.12	9.13	16.20	--
41.	21-03-2022	85.10	29.75	10.56	14.32	--
42.	24-03-2022	78.60	30.12	11.30	18.80	--
43.	28-03-2022	80.40	27.34	15.32	21.45	--
44.	30-03-2022	71.20	23.42	18.14	23.17	--
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0
Test Method		IS - 5182, Part- 23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		SAMUDRA TOWNSHIP CUSTOMER CARE				
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
1.	01-11-2021	71.23	29.86	8.76	19.45	--
2.	02-11-2021	54.52	26.73	7.14	7.15	--
3.	08-11-2021	62.80	29.45	9.12	21.34	--
4.	09-11-2021	53.45	21.30	6.78	16.78	--
5.	15-11-2021	74.21	28.34	8.15	19.32	--
6.	16-11-2021	68.23	25.29	9.21	22.15	--
7.	22-11-2021	65.20	22.80	8.15	16.78	--
8.	23-11-2021	52.95	21.30	7.23	15.34	--
9.	29-11-2021	67.23	28.35	8.15	18.34	--
10.	30-11-2021	63.21	25.44	9.17	16.23	--
11.	05-12-2021	60.24	23.45	6.18	14.56	--
12.	06-12-2021	55.23	21.20	7.12	15.13	--
13.	13-12-2021	62.34	23.45	6.19	18.25	--
14.	14-12-2021	65.78	25.21	7.89	14.23	--
15.	20-12-2021	72.35	23.45	8.14	17.95	--
16.	21-12-2021	66.84	21.25	9.12	15.37	--

Continue...

Name of Location		SAMUDRA TOWNSHIP CUSTOMER CARE				
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
17.	27-12-2021	44.53	16.14	7.18	14.15	--
18.	28-12-2021	50.21	20.23	8.12	15.21	
19.	03-01-2022	53.12	21.40	6.12	17.65	0.05
20.	04-01-2022	63.40	18.35	7.11	19.35	0.10
21.	10-01-2022	47.80	15.34	5.15	15.67	0.08
22.	11-01-2022	55.21	24.29	9.13	18.34	0.15
23.	17-01-2022	76.12	20.54	5.12	20.18	0.12
24.	18-01-2022	82.34	28.95	10.23	21.34	0.17
25.	24-01-2022	54.32	24.23	5.67	16.14	0.05
26.	25-01-2022	84.50	27.15	14.21	23.20	0.16
27.	31-01-2022	87.50	23.18	9.15	17.21	0.14
28.	03-02-2022	77.23	25.23	5.17	13.26	--
29.	07-02-2022	62.34	20.19	8.14	20.23	--
30.	10-02-2022	81.38	23.21	6.10	22.17	--
31.	14-02-2022	69.25	26.78	13.21	21.16	--
32.	16-02-2022	72.56	26.12	10.14	17.32	--
33.	21-02-2022	78.18	29.13	15.21	24.17	--

Continue...

Name of Location		SAMUDRA TOWNSHIP CUSTOMER CARE				
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
34.	23-02-2022	79.35	33.21	9.28	20.14	--
35.	28-02-2022	69.26	26.25	12.20	17.55	--
36.	03-03-2022	65.80	21.37	7.18	17.89	--
37.	07-03-2022	82.90	29.45	11.34	18.27	--
38.	10-03-2022	74.70	25.31	10.42	15.69	--
39.	14-03-2022	70.80	23.29	14.23	22.34	--
40.	17-03-2022	84.56	29.37	12.83	20.68	--
41.	21-03-2022	88.50	32.45	17.21	24.19	--
42.	24-03-2022	71.24	26.40	15.23	22.51	--
43.	28-03-2022	88.56	29.18	11.60	19.28	--
44.	30-03-2022	72.55	32.48	14.23	22.36	--
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0
Test Method		IS - 5182, Part- 23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		SAMUDRA TOWNSHIP – STP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		29-11-2021	22-12-2021	13-01-2022	16-02-2022	10-03-2022
1	06:00 to 07:00	62.8	63.5	61.2	62.76	61.44
2	07:00 to 08:00	62.5	64.2	62.86	63.45	64.57
3	08:00 to 09:00	64.5	62.5	60.95	61.76	62.35
4	09:00 to 10:00	68.5	64.5	65.15	64.32	63.84
5	10:00 to 11:00	63.5	62.9	62.86	63.89	64.27
6	11:00 to 12:00	66.2	67.5	65.14	66.74	65.43
7	12:00 to 13:00	58.5	60.4	62.35	63.25	62.34
8	13:00 to 14:00	63.9	62.8	61.4	62.87	61.28
9	14:00 to 15:00	65.6	65.1	63.2	64.87	63.78
10	15:00 to 16:00	61.6	63.3	62.3	61.22	60.37
11	16:00 to 17:00	57.5	63.5	65.55	66.97	65.31
12	17:00 to 18:00	58.9	62.8	63.4	62.45	61.85
13	18:00 to 19:00	60.4	61.7	59.35	60.97	59.36
14	19:00 to 20:00	63.5	60.2	58.43	59.43	58.76
15	20:00 to 21:00	64.2	59.5	55.75	56.34	55.27
16	21:00 to 22:00	60.5	61.3	56.35	57.43	56.37
Day Time		<75 dB (A)				

Continue...

Location Name		SAMUDRA TOWNSHIP – STP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time				
		29-11-2021	22-12-2021	13-01-2022	16-02-2022	10-03-2022
1	22:00 to 23:00	56.5	60.3	55.75	56.43	57.25
2	23:00 to 24:00	58.5	59.5	56.15	57.98	56.21
3	24:00 to 01:00	57.2	59.8	54.25	55.34	54.38
4	01:00 to 02:00	55.5	60.3	56.13	57.98	56.48
5	02:00 to 03:00	60.5	58.5	53.15	54.12	55.16
6	03:00 to 04:00	61.6	57.3	55.23	56.43	57.38
7	04:00 to 05:00	56.7	59.2	54.95	55.98	56.38
8	05:00 to 06:00	55.3	60.5	57.8	56.32	55.28
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		SAMUDRA TOWNSHIP CUSTOMER CARE				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		30-11-2021	29-12-2021	12-01-2022	17-02-2022	17-03-2022
1	06:00 to 07:00	61.9	62.6	60.15	61.23	62.65
2	07:00 to 08:00	62.3	65.4	61.35	62.89	63.27
3	08:00 to 09:00	61.5	67.1	60.55	62.78	61.57
4	09:00 to 10:00	66.7	64.5	62.25	61.24	62.11
5	10:00 to 11:00	64.8	69.6	66.45	65.43	66.43
6	11:00 to 12:00	62.8	65.2	62.85	63.98	64.76
7	12:00 to 13:00	61.9	63.2	60.25	61.23	62.34
8	13:00 to 14:00	68.5	65.5	64.15	63.42	64.27
9	14:00 to 15:00	67.5	62.8	60.15	61.28	60.89
10	15:00 to 16:00	62.8	64.1	58.25	59.76	60.48
11	16:00 to 17:00	64.5	66.3	62.45	61.27	60.37
12	17:00 to 18:00	66.3	68.3	61.85	60.98	59.46
13	18:00 to 19:00	61.6	63.5	57.25	58.9	57.32
14	19:00 to 20:00	64.5	65.2	55.25	56.43	55.38
15	20:00 to 21:00	60.7	62.3	53.45	54.12	53.25
16	21:00 to 22:00	62.6	60.7	55.25	56.89	55.82
Day Time		<75 dB (A)				

Continue...

Location Name		SAMUDRA TOWNSHIP CUSTOMER CARE				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		30-11-2021	29-12-2021	12-01-2022	17-02-2022	17-03-2022
1	22:00 to 23:00	60.5	60.5	54.21	55.87	54.23
2	23:00 to 24:00	63.5	59.8	55.23	56.34	57.87
3	24:00 to 01:00	62.8	58.5	53.18	54.89	55.23
4	01:00 to 02:00	60.5	57.5	52.9	53.45	54.28
5	02:00 to 03:00	57.5	55.6	51.25	50.98	51.23
6	03:00 to 04:00	56.5	55.5	52.37	54.32	55.84
7	04:00 to 05:00	57.8	58.4	51.65	50.43	51.27
8	05:00 to 06:00	58.5	59.5	54.25	55.23	56.37
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 Stack Monitoring

Sr. No.	Parameter	Unit	December - 2021	GPCB LIMIT	Method of Test
			Adani Hospital DG Set		
			15-12-2021		
1	Particulate Matter	mg/Nm ³	18.7	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	5.25	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	29.14	50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Minimum Detection Limit

Ambient Air Quality Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Particulate Matter (PM10)	µg/m ³	5 µg/m ³
2	Particulate Matter (PM10)	µg/m ³	5 µg/m ³
3	Sulphur Dioxide (SO ₂)	µg/m ³	4 µg/m ³
4	Nitrogen Dioxide (NO ₂)	µg/m ³	5 µg/m ³
5	Carbon Monoxide (CO)	mg/m ³	0.01 mg/m ³
6	Ammonia (NH ₃)	µg/m ³	5 µg/m ³
7	Ozone (O ₃)	µg/m ³	5 µg/m ³
8	Lead (Pb)	µg/m ³	0.5 µg/m ³
9	Nickle (Ni)	ng/m ³	1 ng/m ³
10	Arsenic (As)	ng/m ³	1 ng/m ³
11	Benzene	µg/m ³	1µg/m ³
12	Benzo(o)Pyrene	ng/m ³	0.1 ng/m ³
14	Hydro Carbon	µg/m ³	1 µg/m ³

Stack Emission Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Suspended particulate matter	mg/Nm ³	2 mg/Nm ³
2	Sulphur Dioxide SO ₂	mg/Nm ³	4 mg/Nm ³
3	Oxides of Nitrogen NO _x	mg/Nm ³	5 mg/Nm ³

STP Water			
Sr. No.	Test Parameter	Unit	MDL
1	pH @ 25 ° C	--	2
2	Total Suspended Solids	mg/L	4
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	1
4	Residual chlorine	mg/L	0.1
5	Fecal Coliform	MPN Index/100ml	<2

RESULTS OF CETP INLET WATER

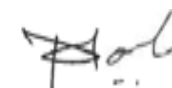
SR.NO.	TEST PARAMETERS	UNIT	CETP INLET						GPCB Permissible Limit CETP Inlet	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021		JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			01/11/2021	02/12/2021	09/12/2021	03/01/2022	01/02/2022	02/03/2022		
1.	pH @ 27 ° C	--	7.42	7.68	7.74	7.68	7.68	7.72	6.5 to 8.5	APHA 23 rd Ed.,2017,4500-H+B
2.	Temperature	°C	29	30	30	29.9	29.9	30	--	IS 3025(Part 9)1984
3.	Colour	Pt. Co. Scale	50	50	45	60	60	50	100	IS 3025(Part 4)
4.	Total Suspended Solids	mg/L	28	44	38	76	76	64	800	APHA 23 rd Ed.,2017,2540 –D
5.	Oil & Grease	mg/L	4	5	3	6	6	7	20	IS 3025(Part39)1991, Amd. 2
6.	Phenolic Compound	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	2	IS 3025(Part 43)1992, Amd.2
7.	Fluoride	mg/L	0.8	0.74	1.1	0.68	0.68	0.74	2	APHA 23 rd Ed.,2017,4500 F, D
8.	Iron as Fe	mg/L	0.66	0.57	0.25	0.52	0.52	0.64	3	IS 3025(Part 53)2003,
9.	Zinc as Zn	mg/L	0.48	0.24	0.086	0.38	0.38	0.48	15	IS 3025(Part 49)1994
10.	Trivalent Chromium	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	3	By Calculation
11.	Sulphide	mg/L	0.18	0.38	1.4	0.44	0.44	0.58	2	APHA 23 rd Ed.,2017,4500-H+B

Continue...

SR.NO.	TEST PARAMETERS	UNIT	CETP INLET						GPCB Permissible Limit CETP Inlet	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021		JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			01/11/2021	02/12/2021	09/12/2021	03/01/2022	01/02/2022	02/03/2022		
12.	Ammonical Nitrogen	mg/L	18.8	28.5	26.3	36.4	36.4	38.1	50	IS 3025(Part 9)1984
13.	BOD (3 days at 27 °C)	mg/L	112	126	48	130	130	144	1000	IS 3025(Part 4)
14.	COD	mg/L	475.4	574	169	588.2	588.2	608.1	2000	APHA 23 rd Ed.,2017,2540 –D
15.	Chloride (as Cl) ⁻	mg/L	832.8	882.4	848.7	882.4	882.4	910.2	1000	IS 3025(Part39)1991, Amd. 2
16.	Sulphate (as SO ₄)	mg/L	218.3	192.8	151.7	204.2	204.2	216.2	1000	IS 3025(Part 43)1992, Amd.2
17.	Total Dissolved Solids	mg/L	1750	2064	1884	1780	1780	1842	2100	APHA 23 rd Ed.,2017,4500 F, D
18.	Total Residual Chlorine	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	2	IS 3025(Part 53)2003,
19.	Copper as Cu	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	3	IS 3025(Part 49)1994



Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

RESULTS OF CETP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	CETP OUTLET						GPCB Permissible Limit CETP Outlet	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021		JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			01/11/2021	02/12/2021	09/12/2021	03/01/2022	01/02/2022	02/03/2022		
1.	pH @ 27 ° C	--	8.03	8.09	7.98	7.78	7.62	7.51	6.0 – 9.0	APHA 23 rd Ed.,2017,4500-H ⁺ B
2.	Temperature	°C	29	30	30	29.9	30.1	30.1	Shall not exceed more than 5 °C above received water temperature	IS 3025(Part 9)1984
3.	Colour	Pt. Co. Scale	30	30	30	25	30	25	100	IS 3025(Part 4)
4.	Total Suspended Solids	mg/L	14	23	28	18	14	12	100	APHA 23 rd Ed.,2017,2540 –D
5.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	10	IS 3025 (Part39)1991, Amd. 2
6.	Phenolic Compound	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	1	IS 3025(Part 43)1992, Amd.2
7.	Fluoride	mg/L	0.7	0.64	1	0.41	0.32	0.44	2	APHA 23 rd Ed.,2017,4500F, D
8.	Iron as Fe	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	3	IS 3025(Part 53)2003,
9.	Zinc as Zn	mg/L	0.077	0.086	0.077	0.14	0.19	0.26	15	IS 3025(Part 49)1994
10.	Trivalent Chromium	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	2	By Calculation

Continue...

SR.NO.	TEST PARAMETERS	UNIT	CETP OUTLET						GPCB Permissible Limit CETP Inlet	TEST METHOD
			NOVEMBER 2021	DECEMBER 2021		JANUARY 2022	FEBRUARY 2022	MARCH 2022		
			01/11/2021	02/12/2021	09/12/2021	20/01/2022	01/02/2022	02/03/2022		
11.	Sulphide	mg/L	BDL	0.2	BDL	0.29	0.34	0.94	2	APHA 23 rd Ed.,2017,4500-H*B
12.	Ammonical Nitrogen	mg/L	4.3	3.2	3.3	3.8	4.1	5.8	50	IS 3025(Part 9)1984
13.	BOD (3 days at 27 °C)	mg/L	24	22	26	24	24	25	100	IS 3025(Part 4)
14.	COD	mg/L	96.5	86.8	94.2	90.4	92.2	104.1	250	APHA 23 rd Ed.,2017,2540 –D
15.	Chloride (as Cl) ⁻	mg/L	767.2	878.5	903.3	784.2	859.8	844.2	1000	IS 3025(Part39)1991, Amd. 2
16.	Sulphate (as SO ₄)	mg/L	195.7	152.9	148.6	124.6	142.4	148.1	1000	IS 3025(Part 43)1992, Amd.2
17.	Total Dissolved Solids	mg/L	1680	2012	1856	1772	1816	1864	2100	APHA 23 rd Ed.,2017,4500F, D
18.	Total Residual Chlorine	mg/L	0.74	BDL	BDL	BDL	BDL	BDL	1	IS 3025(Part 53)2003,
19.	Copper as Cu	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	3	IS 3025(Part 49)1994
20.	Bio Assay test (%)	%	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	90 % survival of fish after 96 hrs. in 100% effluent	IS:6582-1971

Nilesh Patel

Mr. Nilesh Patel
Sr. Chemist



Nitin Tandel

Mr. Nitin Tandel
Technical Manager

Results of Ambient Air Quality Monitoring

Name of Location		WTP- Nr. CETP				
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
1.	01-11-2021	80.54	45.62	21.48	38.48	--
2.	02-11-2021	76.52	37.41	18.74	29.56	--
3.	08-11-2021	80.54	42.26	20.53	34.54	--
4.	09-11-2021	67.81	35.68	17.65	27.84	--
5.	15-11-2021	79.56	39.45	28.11	36.74	--
6.	16-11-2021	92.44	47.24	25.32	37.25	--
7.	22-11-2021	85.58	43.14	21.85	32.44	--
8.	23-11-2021	90.75	48.51	28.45	39.15	--
9.	29-11-2021	78.62	37.53	24.18	33.55	--
10.	30-11-2021	85.51	40.44	23.15	31.28	--
11.	05-12-2021	72.34	39.21	23.15	29.18	--
12.	06-12-2021	64.55	30.15	15.23	26.34	--
13.	13-12-2021	70.34	35.21	22.18	30.15	--
14.	14-12-2021	75.21	38.14	20.17	28.21	--
15.	20-12-2021	68.12	29.18	16.21	25.39	--
16.	21-12-2021	65.2	34.21	18.14	25.23	--

Continue...

Name of Location		WTP- Nr. CETP				
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
17.	27-12-2021	60.35	23.45	17.22	26.78	--
18.	28-12-2021	53.44	21.67	19.25	27.44	--
19.	03-01-2022	84.23	33.56	16.12	24.12	0.23
20.	04-01-2022	70.51	28.43	19.34	28.15	0.67
21.	10-01-2022	81.25	30.13	25.21	27.23	0.1
22.	11-01-2022	68.23	26.72	22.18	25.16	0.84
23.	17-01-2022	93.45	37.65	19.14	26.15	0.25
24.	18-01-2022	84.12	30.15	21.17	29.15	0.16
25.	24-01-2022	93.45	39.12	10.18	21.45	0.54
26.	25-01-2022	95.43	44.35	14.12	23.12	1.05
27.	31-01-2022	90.6	40.21	10.25	19.21	0.88
28.	03-02-2022	86.54	44.21	22.45	27.53	--
29.	07-02-2022	88.12	34.23	25.14	31.27	--
30.	10-02-2022	83.77	29.23	21.16	30.22	--
31.	14-02-2022	79.52	31.67	18.45	34.21	--
32.	16-02-2022	75.35	46.86	23.67	30.22	--
33.	21-02-2022	83.45	39.17	20.45	33.12	--

Continue...

Name of Location		WTP- Nr. CETP				
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
34.	23-02-2022	87.33	30.5	23.21	35.18	--
35.	28-02-2022	77.68	46.25	20.45	27.38	--
36.	03-03-2022	72.34	37.15	18.15	28.13	--
37.	07-03-2022	75.42	41.23	23.34	30.15	--
38.	10-03-2022	78.35	44.64	20.17	26.73	--
39.	14-03-2022	76.55	37.15	24.54	32.18	--
40.	17-03-2022	69.85	33.45	22.23	35.21	--
41.	21-03-2022	74.55	40.18	26.18	30.15	--
42.	24-03-2022	79.42	42.61	21.44	29.17	--
43.	28-03-2022	70.47	38.25	17.25	28.55	--
44.	30-03-2022	83.45	42.37	22.18	30.19	--
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0
Test Method		IS - 5182, Part- 23	UERL/AIR/ SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		AIR STRIP						
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	78.34	30.12	16.45	23.42	0.15	NOT DETECTED	NOT DETECTED
2.	02-11-2021	82.60	34.55	14.35	20.16	0.12	NOT DETECTED	NOT DETECTED
3.	08-11-2021	65.73	27.65	15.21	22.45	0.17	NOT DETECTED	NOT DETECTED
4.	09-11-2021	72.81	30.12	13.56	26.71	0.11	NOT DETECTED	NOT DETECTED
5.	15-11-2021	68.44	26.45	11.84	22.21	0.08	NOT DETECTED	NOT DETECTED
6.	16-11-2021	75.37	29.51	12.65	19.84	0.14	NOT DETECTED	NOT DETECTED
7.	22-11-2021	60.42	23.18	16.43	23.25	0.09	NOT DETECTED	NOT DETECTED
8.	23-11-2021	67.14	27.15	12.75	20.15	0.05	NOT DETECTED	NOT DETECTED
9.	29-11-2021	56.84	21.72	19.21	24.32	0.12	NOT DETECTED	NOT DETECTED
10.	30-11-2021	69.45	30.15	16.35	21.15	0.15	NOT DETECTED	NOT DETECTED
11.	05-12-2021	65.32	31.23	15.21	20.18	0.11	NOT DETECTED	NOT DETECTED
12.	06-12-2021	70.25	30.23	27.83	24.68	0.15	NOT DETECTED	NOT DETECTED
13.	13-12-2021	63.40	26.21	19.33	27.25	0.15	NOT DETECTED	NOT DETECTED
14.	14-12-2021	70.23	35.44	15.67	26.21	0.17	NOT DETECTED	NOT DETECTED
15.	20-12-2021	76.52	33.42	16.34	25.88	0.14	NOT DETECTED	NOT DETECTED
16.	21-12-2021	81.23	35.67	15.34	26.60	0.05	NOT DETECTED	NOT DETECTED

Continue...

Name of Location		AIR STRIP						
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	68.34	30.12	17.15	25.44	0.08	NOT DETECTED	NOT DETECTED
18.	28-12-2021	60.15	29.34	14.21	23.45	0.05	NOT DETECTED	NOT DETECTED
19.	03-01-2022	54.32	18.24	10.23	18.23	0.05	NOT DETECTED	NOT DETECTED
20.	04-01-2022	62.13	21.40	15.32	27.81	0.10	NOT DETECTED	NOT DETECTED
21.	10-01-2022	46.43	16.70	12.15	26.19	0.12	NOT DETECTED	NOT DETECTED
22.	11-01-2022	62.51	25.23	15.14	29.67	0.07	NOT DETECTED	NOT DETECTED
23.	17-01-2022	76.85	29.15	10.15	21.35	0.05	NOT DETECTED	NOT DETECTED
24.	18-01-2022	83.60	43.56	7.83	20.16	0.12	NOT DETECTED	NOT DETECTED
25.	24-01-2022	61.45	38.91	12.35	25.21	0.10	NOT DETECTED	NOT DETECTED
26.	25-01-2022	56.32	27.44	10.20	19.17	0.12	NOT DETECTED	NOT DETECTED
27.	31-01-2022	82.24	35.12	14.23	27.15	0.08	NOT DETECTED	NOT DETECTED
28.	03-02-2022	83.23	34.56	18.23	23.18	0.08	NOT DETECTED	NOT DETECTED
29.	07-02-2022	59.21	26.78	15.21	25.17	0.05	NOT DETECTED	NOT DETECTED
30.	10-02-2022	78.90	38.21	10.23	18.25	0.07	NOT DETECTED	NOT DETECTED
31.	14-02-2022	75.25	30.45	14.23	26.78	0.10	NOT DETECTED	NOT DETECTED
32.	16-02-2022	86.12	29.25	12.28	27.12	0.04	NOT DETECTED	NOT DETECTED
33.	21-02-2022	76.23	34.21	14.89	23.18	0.09	NOT DETECTED	NOT DETECTED

Continue...

Name of Location		AIR STRIP						
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	82.30	30.15	15.21	24.79	0.07	NOT DETECTED	NOT DETECTED
35.	28-02-2022	87.13	35.22	12.47	21.36	0.10	NOT DETECTED	NOT DETECTED
36.	03-03-2022	72.34	28.15	15.12	24.56	0.05	NOT DETECTED	NOT DETECTED
37.	07-03-2022	65.12	22.34	11.57	19.78	0.07	NOT DETECTED	NOT DETECTED
38.	10-03-2022	82.39	30.17	13.45	20.15	0.05	NOT DETECTED	NOT DETECTED
39.	14-03-2022	76.34	27.89	12.19	17.68	0.04	NOT DETECTED	NOT DETECTED
40.	17-03-2022	80.98	31.35	16.78	21.56	0.09	NOT DETECTED	NOT DETECTED
41.	21-03-2022	65.92	26.68	13.56	20.89	0.04	NOT DETECTED	NOT DETECTED
42.	24-03-2022	81.37	29.35	17.12	24.18	0.10	NOT DETECTED	NOT DETECTED
43.	28-03-2022	86.45	32.10	11.38	20.25	0.07	NOT DETECTED	NOT DETECTED
44.	30-03-2022	75.22	25.68	14.56	23.78	0.08	NOT DETECTED	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		WTP- Nr. CETP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		17-11-2021	15-12-2021	28-01-2022	02-02-2022	05-03-2022
1	06:00 to 07:00	66.7	65.8	64.45	63.24	64.34
2	07:00 to 08:00	64.9	67.9	66.25	67.89	68.94
3	08:00 to 09:00	65.3	69.3	68.15	69.73	67.5
4	09:00 to 10:00	67.1	68.6	70.4	69.3	66.5
5	10:00 to 11:00	64.6	68.3	71.25	69.15	67.3
6	11:00 to 12:00	63.8	67.3	68.35	69.87	68.43
7	12:00 to 13:00	61.9	66.2	67.45	66.34	65.32
8	13:00 to 14:00	63.5	68.2	70.15	66.43	66.5
9	14:00 to 15:00	65.2	67.5	66.39	67.89	68.32
10	15:00 to 16:00	69.8	62.9	64.8	65.32	64.23
11	16:00 to 17:00	65.5	66.4	69.12	64.85	69.84
12	17:00 to 18:00	68.3	62.6	65.17	64.23	63.23
13	18:00 to 19:00	67.7	65.5	61.4	60.72	61.98
14	19:00 to 20:00	65.2	68.5	60.25	59.43	58.35
15	20:00 to 21:00	62.4	66.7	62.19	63.31	64.52
16	21:00 to 22:00	64.4	62.8	60.15	59.42	58.74
Day Time		<75 dB (A)				

Continue...

Location Name		WTP- Nr. CETP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time				
		17-11-2021	15-12-2021	28-01-2022	02-02-2022	05-03-2022
1	22:00 to 23:00	62.8	63.5	60.25	61.26	60.24
2	23:00 to 24:00	63.3	62.5	58.3	59.43	58.36
3	24:00 to 01:00	64.9	61.9	57.25	58.43	59.76
4	01:00 to 02:00	61.5	62.8	56.25	55.32	56.32
5	02:00 to 03:00	59.1	60.5	55.65	56.87	55.21
6	03:00 to 04:00	62.9	59.6	57.24	56.32	57.84
7	04:00 to 05:00	60.2	58.5	55.25	54.32	53.24
8	05:00 to 06:00	64.5	59.7	58.4	59.76	58.63
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		AIR STRIP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		30-11-2021	10-12-2021	11-01-2022	23-02-2022	24-03-2022
1	06:00 to 07:00	64.3	61.5	62.35	63.67	64.26
2	07:00 to 08:00	65.5	66.7	64.25	65.23	66.74
3	08:00 to 09:00	62.8	60.5	61.25	62.89	63.25
4	09:00 to 10:00	62.5	63.9	64.18	65.78	66.28
5	10:00 to 11:00	61.6	64.5	62.51	63.22	64.58
6	11:00 to 12:00	62.3	65.2	60.56	61.98	62.37
7	12:00 to 13:00	64.5	66.1	62.45	63.24	62.66
8	13:00 to 14:00	65.2	60.6	61.9	62.88	63.36
9	14:00 to 15:00	59.8	61.8	62.45	63.21	62.31
10	15:00 to 16:00	63.5	62.5	60.78	61.98	60.78
11	16:00 to 17:00	61.8	63.2	61.2	62.34	63.42
12	17:00 to 18:00	67.5	65.4	64.28	65.13	64.38
13	18:00 to 19:00	68.4	62.1	58.67	59.98	58.74
14	19:00 to 20:00	62.9	60.2	61.34	62.34	63.21
15	20:00 to 21:00	68.4	58.9	55.69	56.98	57.47
16	21:00 to 22:00	64.5	59.2	58.1	59.23	58.32
Day Time		<75 dB (A)				

Continue...

Location Name		AIR STRIP				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		30-11-2021	10-12-2021	11-01-2022	23-02-2022	24-03-2022
1	22:00 to 23:00	57.5	58.5	56.25	57.12	58.54
2	23:00 to 24:00	55.4	56.5	55.78	56.34	57.32
3	24:00 to 01:00	56.2	57.2	53.45	54.87	55.18
4	01:00 to 02:00	55.5	55.5	58.12	59.71	58.17
5	02:00 to 03:00	53.9	55.2	51.67	52.34	53.27
6	03:00 to 04:00	58.6	54.1	51.25	50.98	51.38
7	04:00 to 05:00	61.2	59.5	55.28	56.23	57.25
8	05:00 to 06:00	57.5	60.2	58.35	57.32	58.19
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	February-2022	GPCB LIMIT	Method of Test
			D.G.Set No. S-1 (380 KVA)		
			24-02-2022		
1	Particulate Matter	mg/Nm ³	22.4	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	6.5	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	30.8	50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)



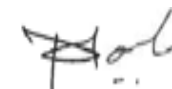

Jaivik S. Tandel
(Manager - Operations)

RESULTS OF BORE HOLE WATER

SR.NO.	TEST PARAMETERS	UNIT	MUL CETP	NEAR CETP	TEST METHOD
			01/11/2021	10/12/2021	
1.	pH @ 25 ° C	--	7.48	7.87	IS 3025(Part 11)1983
2.	Salinity	ppt	2.97	2.83	APHA 23 rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL	BDL	IS 3025(Part39)1991, Amd. 2
4.	Hydrocarbon	mg/L	BDL	Not Detected	GC/GCMS
5.	Lead as Pb	mg/L	0.045	0.080	IS 3025 (PART 47) 1994
6.	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23 rd Ed.,2017,3114-C
7.	Nickel as Ni	mg/L	BDL(MDL:0.02)	0.073	IS 3025 (PART 54) 2003
8.	Total Chromium as Cr	mg/L	BDL	BDL	IS 3025 (PART 52) 2003
9.	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.003)	IS 3025(PART 41) 1992
10.	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.001)	APHA 23 rd Ed.,2017, 3112-B
11.	Zinc as Zn	mg/L	0.35	0.352	IS 3025(PART 49) 1994
12.	Copper as Cu	mg/L	BDL	BDL	IS 3025 (PART 42) 1992
13.	Iron as Fe	mg/L	0.25	BDL	IS 3025(PART 53) 2003
14.	Insecticides/Pesticides	µg/L	Absent	Absent	USEPA 8081 B
15.	Depth of Water Level from Ground Level	meter	2.0	2.3	--



Mr. Nilesh Patel
Sr. Chemist

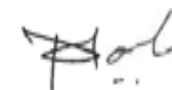
Mr. Nitin Tandel
Technical Manager

RESULTS OF SOIL SAMPLE

SR.NO.	TEST PARAMETERS	UNIT	MUL CETP	TEST METHOD
			01/11/2021	
1.	pH	--	8.96	Minimum Detection limit for Soil Sample prepared as per USEPA 3050 B
2.	Nitrogen as N	%	0.37	
3.	Phosphorus as P	mg/kg	356	
4.	Potassium as K	mg/kg	119	
5.	Baron as B	mg/kg	3.41	
6.	Calcium as Ca	mg/kg	467	
7.	Magnesium as Mg	mg/kg	616	
8.	Iron as Fe	%	0.49	
9.	Moisture	%	8.24	
10.	Organic Matter	%	0.19	
11.	Cation exchange capacity (CEC)	meq/100gm	9.68	
12.	TVC	CFU/gm	1.7 x 10 ⁶	
13.	Cadmium as Cd	mg/kg	BDL	
14.	Thorium as Th	mg/kg	BDL	
15.	Antimony as Sb	mg/kg	BDL	
16.	Arsenic as As	mg/kg	BDL	
17.	Lead as Pb	mg/kg	BDL	
18.	Chromium as Cr	mg/kg	BDL	
19.	Cobalt as Co	mg/kg	24.6	
20.	Copper as Cu	mg/kg	39.8	
21.	Nickel as Ni	mg/kg	12.5	
22.	Manganese and Mn	mg/kg	314	
23.	Vanadium as V	mg/kg	8.31	



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/m ³	5 µg/m ³
2	Particulate Matter (PM10)	µg/m ³	5 µg/m ³
3	Sulphur Dioxide (SO ₂)	µg/m ³	4 µg/m ³
4	Nitrogen Dioxide (NO ₂)	µg/m ³	5 µg/m ³
5	Carbon Monoxide (CO)	mg/m ³	0.01 mg/m ³
6	Ammonia (NH ₃)	µg/m ³	5 µg/m ³
7	Ozone (O ₃)	µg/m ³	5 µg/m ³
8	Lead (Pb)	µg/m ³	0.5 µg/m ³
9	Nickle (Ni)	ng/m ³	1 ng/m ³
10	Arsenic (As)	ng/m ³	1 ng/m ³
11	Benzene	µg/m ³	1µg/m ³
12	Benzo(o)Pyrene	ng/m ³	0.1 ng/m ³
14	Hydro Carbon	µg/m ³	1 µg/m ³

Stack Emission Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Suspended particulate matter	mg/Nm ³	2 mg/Nm ³
2	Sulphur Dioxide SOX	mg/Nm ³	4 mg/Nm ³
3	Oxides of Nitrogen NOX	mg/Nm ³	5 mg/Nm ³

CETP water			
Sr. No.	Test Parameter	Unit	MDL
1	pH @ 27 ° C	--	2
2	Temperature	OC	5
3	Colour	Pt. Co. Scale	5
4	Total Suspended Solids	mg/L	4
5	Oil & Grease	mg/L	2
6	Phenolic Compound	mg/L	0.1
7	Fluoride	mg/L	0.2
8	Iron as Fe	mg/L	0.1
9	Zinc as Zn	mg/L	0.05
10	Trivalent Chromium	mg/L	0.05
11	Sulphide	mg/L	0.05
12	Ammonical Nitrogen	mg/L	2
13	BOD (3 days at 27 OC)	mg/L	1
14	COD	mg/L	2
15	Chloride (as Cl) ⁻	mg/L	1
16	Sulphate (as SO ₄)	mg/L	1
17	Total Dissolved Solids	mg/L	4
18	Total Residual Chlorine	mg/L	0.1
19	Copper as Cu	mg/L	0.05
20	Bio Assay test (%)	%	--

TEST REPORT

Report No.	URC /21/12/Soil/APL-001		
Name & Address of Customer	M/S. ADANI PORTS & SEZ Limited. Notified SEZ area, Tal. – Mundra, Dist. – Kutch – 370421.	Date of Report	17/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Soil Sample	Location	PUB Building
Sample Qty.	3 kg	Appearance	Brown
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	16/12/2021
Sampled By	UERL-LAB	Sampling Method	UERL/CHM/SOP/113
UERL Lab ID. No.	21/12/Soil/APL-001		

TEST RESULTS:

Sr. No.	Parameters	Unit of Measurement	Results
1.	pH	--	9.06
2.	Nitrogen as N	%	0.12
3.	Phosphorus as P	mg/kg	342
4.	Potassium as K	mg/kg	209
5.	Baron as B	mg/kg	2.14
6.	Calcium as Ca	mg/kg	326
7.	Magnesium as Mg	mg/kg	362
8.	Iron as Fe	%	0.49
9.	Moisture	%	8.24
10.	Organic Matter	%	0.29
11.	Cation exchange capacity (CEC)	meq/100gm	10.18
12.	TVC	CFU/gm	3.0x 10 ⁶
13.	Cadmium as Cd	mg/kg	BDL(MDL:1.0)
14.	Thorium as Th	mg/kg	BDL(MDL:1.0)
15.	Antimony as Sb	mg/kg	BDL(MDL:1.0)
16.	Arsenic as As	mg/kg	BDL(MDL:1.0)
17.	Lead as Pb	mg/kg	BDL(MDL:1.0)
18.	Chromium as Cr	mg/kg	BDL(MDL:1.0)
19.	Cobalt as Co	mg/kg	14.1
20.	Copper as Cu	mg/kg	15.8
21.	Nickel as Ni	mg/kg	8.44
22.	Manganese and Mn	mg/kg	262
23.	Vanadium as V	mg/kg	9.34

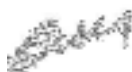
Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,

Remarks: Soil Sample prepared as per USEPA method 3050 B

Opinion & Interpretation (If required):--

*****End of Report *****


Checked By



(Nilesh C. Patel)
(Sr. Chemist)

Page 1 of 1

Authorized By



(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F-2/05

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

TEST REPORT

Report No.	URC /21/12/Soil/APL-002		
Name & Address of Customer	M/S. ADANI PORTS & SEZ Limited. Notified SEZ area, Tal. – Mundra, Dist. – Kutch – 370421.	Date of Report	17/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Soil Sample	Location	Dhrub
Sample Qty.	3 kg	Appearance	Brown
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	16/12/2021
Sampled By	UERL-LAB	Sampling Method	UERL/CHM/SOP/113
UERL Lab ID. No.	21/12/Soil/APL-002		

TEST RESULTS:

Sr. No.	Parameters	Unit of Measurement	Results
1.	pH	--	8.94
2.	Nitrogen as N	%	0.19
3.	Phosphorus as P	mg/kg	282
4.	Potassium as K	mg/kg	156
5.	Baron as B	mg/kg	1.94
6.	Calcium as Ca	mg/kg	384
7.	Magnesium as Mg	mg/kg	388
8.	Iron as Fe	%	0.64
9.	Moisture	%	8.36
10.	Organic Matter	%	0.75
11.	Cation exchange capacity (CEC)	meq/100gm	10.03
12.	TVC	CFU/gm	2.8 x 10 ⁶
13.	Cadmium as Cd	mg/kg	BDL(MDL:1.0)
14.	Thorium as Th	mg/kg	BDL(MDL:1.0)
15.	Antimony as Sb	mg/kg	BDL(MDL:1.0)
16.	Arsenic as As	mg/kg	BDL(MDL:1.0)
17.	Lead as Pb	mg/kg	BDL(MDL:1.0)
18.	Chromium as Cr	mg/kg	BDL(MDL:1.0)
19.	Cobalt as Co	mg/kg	12.1
20.	Copper as Cu	mg/kg	17.8
21.	Nickel as Ni	mg/kg	20.1
22.	Manganese and Mn	mg/kg	318
23.	Vanadium as V	mg/kg	8.03

Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,

Remarks: Soil Sample prepared as per USEPA method 3050 B

Opinion & Interpretation (If required):--

*****End of Report *****


Checked By



(Nilesh C. Patel)
(Sr. Chemist)

Page 1 of 1

Authorized By



(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F-2/05

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

TEST REPORT

Report No.	URC /21/12/Soil/APL-003		
Name & Address of Customer	M/S. ADANI PORTS & SEZ Limited. Notified SEZ area, Tal. – Mundra, Dist. – Kutch – 370421.	Date of Report	17/12/2021
		Customer's Ref.	As Per W.O.
Sample Details	Soil Sample	Location	Near Flyover Bridge
Sample Qty.	3 kg	Appearance	Brown
Sampling Date	10/12/2021	Sample Received Date	11/12/2021
Test Started Date	11/12/2021	Test Completion Date	16/12/2021
Sampled By	UERL-LAB	Sampling Method	UERL/CHM/SOP/113
UERL Lab ID. No.	21/12/Soil/APL-003		

TEST RESULTS:

Sr. No.	Parameters	Unit of Measurement	Results
1.	pH	--	8.44
2.	Nitrogen as N	%	0.21
3.	Phosphorus as P	mg/kg	164
4.	Potassium as K	mg/kg	111
5.	Baron as B	mg/kg	2.28
6.	Calcium as Ca	mg/kg	394
7.	Magnesium as Mg	mg/kg	756
8.	Iron as Fe	%	0.69
9.	Moisture	%	7.13
10.	Organic Matter	%	0.72
11.	Cation exchange capacity (CEC)	meq/100gm	10.41
12.	TVC	CFU/gm	2.2 x 10 ⁶
13.	Cadmium as Cd	mg/kg	BDL(MDL:1.0)
14.	Thorium as Th	mg/kg	BDL(MDL:1.0)
15.	Antimony as Sb	mg/kg	BDL(MDL:1.0)
16.	Arsenic as As	mg/kg	BDL(MDL:1.0)
17.	Lead as Pb	mg/kg	BDL(MDL:1.0)
18.	Chromium as Cr	mg/kg	BDL(MDL:1.0)
19.	Cobalt as Co	mg/kg	26.2
20.	Copper as Cu	mg/kg	43.1
21.	Nickel as Ni	mg/kg	14.1
22.	Manganese and Mn	mg/kg	326
23.	Vanadium as V	mg/kg	8.44

Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,

Remarks: Soil Sample prepared as per USEPA method 3050 B

Opinion & Interpretation (If required):--

*****End of Report *****


Checked By



(Nilesh C. Patel)
(Sr. Chemist)

Page 1 of 1

Authorized By



(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F-2/05

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

TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH - 370421.

Test Report No. : **PL/AM 0994**

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 , 269 DTF 2015		

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
					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	Samundra Township STP	N 22°48.568'	E 69°43.411'	13/10/2021	60.5	58.4	62.5	69.4	65.4	66.3	66.7	64.9
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06/10/2021	64.4	68.8	65.3	68.5	62.3	66.1	61.8	65.5
3	Airstrip	N 22°50.179'	E 69°45.846'	12/10/2021	61.1	65.6	61.2	60.3	66.4	65.1	68.6	61.3

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
					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	Samundra Township STP	N 22°48.568'	E 69°43.411'	13/10/2021	66.8	63.6	64.8	62.2	68.4	67.1	60.2	63.4
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06/10/2021	69.2	70.5	62.8	63.3	63.7	64.6	66.9	65.8
3	Airstrip	N 22°50.179'	E 69°45.846'	12/10/2021	60.4	62.1	64	62.7	60.8	60.1	63.1	69.8

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)		
					AVERAGE	MAX	MIN
1	Samundra Township STP	N 22°48.568'	E 69°43.411'	13/10/2021	64.4	69.4	58.4
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06/10/2021	65.6	70.5	61.8
3	Airstrip	N 22°50.179'	E 69°45.846'	12/10/2021	63.3	69.8	60.1



Ravi Jariwala
Sr. Environmental Scientist



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, 0701660514 Page 731 of 762 Email: info@polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. – MUNDRA,
DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0995**

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 , 269 DTF 2015	

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
					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	CETP	N 22° 48.446'	E 69° 42.238'	01/10/2021	63.2	66.2	68.2	65.9	69.1	62.6	69.5	63.5
2	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

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)							
					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	CETP	N 22° 48.446'	E 69° 42.238'	01/10/2021	61.4	64.7	66.5	62.4	65.2	68.7	62.9	65.7
2	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

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	DAY TIME RESULTS IN Leq dB(A)		
					AVERAGE	MAX	MIN
1	CETP	N 22° 48.446'	E 069° 42.238'	01/10/2021	65.4	69.5	61.4
2	PUB/Adani House	N 22°46.537'	E 069°41.030'	05/10/2021	65.1	71.9	60.8



Ravi Jariwala
Sr. Environmental Scientist



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, 0701660514888 | Email: info@polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0996**

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 , 269 DTF 2015		

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			NIGHT TIME RESULTS IN Leq dB(A)				
				DATE OF SAMPLING	22:00-23:00	23:00-00:00	00:00-01:00	01:00-02:00
1	Samundra Township STP	N 22°48.568'	E 69°43.411'	13& 14/10/2021	66.2	62.7	64.5	60.1
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06& 07/10/2021	60.3	65.2	62.3	55.2
3	Airstrip	N 22°50.179'	E 69°45.846'	12& 13/10/2021	63.4	56.1	59.4	63.3

SR NO	SAMPLING LOCATION & GPS LOCATION			NIGHT TIME RESULTS IN Leq dB(A)				
				DATE OF SAMPLING	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
1	Samundra Township STP	N 22°48.568'	E 69°43.411'	13&14/10/2021	62.4	62.8	62.4	61.5
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06& 07/10/2021	62.9	60.7	65.3	60.5
3	Airstrip	N 22°50.179'	E 69°45.846'	12& 13/10/2021	60.2	57.1	58.9	61.3

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)		
					AVERAGE	MAX	MIN
1	Samundra Township STP	N 22°48.568'	E 69°43.411'	13& 14/10/2021	62.8	66.2	60.1
2	Samundra Township Customer Care	N 22°48.200'	E 69°42.797'	06& 07/10/2021	61.6	65.3	55.2
3	Airstrip	N 22°50.179'	E 69°45.846'	12& 13/10/2021	60.0	63.4	56.1



Ravi Jariwala
Sr. Environmental Scientist



Dr. Arun Bajpai
Lab Manager (Q)

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

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"Pollucon House", Plot No.5/6, Opp.Balaji Industrial Society, Old Shantinath Silk Mill Lane, Near Gaytri Farsan Mart,
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Phone : 0261-2635750, 0261-2635751, 0261-2635775, 0701660511 Page 733 of 762 Email: info@polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

TEST REPORT FOR NOISE LEVEL MONITORING

QF/7.8/19-EX

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH - 370421.

Test Report No. : **PL/AM 0997**

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

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

NOISE LEVEL MONITORING REPORT

Sampling Location : As per table	Sampling By : Pollucon Laboratories Pvt. Ltd.
Test Method : IS 9876 : 2013 /	Protocol : Noise Level Monitoring
	(purpose)
Instrument Used : SLM-100 , 269 DTF 2015	

RESULT TABLE

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)			
					22:00-23:00	23:00-00:00	00:00-01:00	01:00-02:00
1	CETP	N 22° 48.446'	E 069° 42.238'	01& 02/10/2021	64.6	65.2	69.2	66.8
2	PUB/Adani House	N 22°46.537'	E 069°41.030'	05& 06/10/2021	60.9	68.5	66.5	60.8

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)			
					02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
1	CETP	N 22° 48.446'	E 069° 42.238'	01 & 02/10/2021	62.7	66.8	58.4	59.9
2	PUB/Adani House	N 22°46.537'	E 069°41.030'	05 & 06/10/2021	61.8	61.2	65.6	67.4

SR NO	SAMPLING LOCATION & GPS LOCATION			DATE OF SAMPLING	NIGHT TIME RESULTS IN Leq dB(A)		
					AVERAGE	MAX	MIN
1	CETP	N 22° 48.446'	E 069° 42.238'	01 & 02/10/2021	64.2	69.2	58.4
2	PUB/Adani House	N 22°46.537'	E 069°41.030'	05 & 06/10/2021	64.1	68.5	60.8



Ravi Jariwala
Sr. Environmental Scientist



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, 070166051 Page 734 of 762 Email: info@polluconlab.com, E. mail: pollucon@gmail.com, info@polluconlab.com

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 & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH - 370421.

Test Report No. : **PL/AM 0991**

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

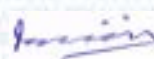
RESULT TABLE

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 (NOx)	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
Sr. Environmental Scientist



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 & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH - 370421.**

Test Report No. : **PL/AM 0992**

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

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

Location of Sampling : **WTP - NEAR CETP**
GPS Location : **N 22° 48.446' E 069° 42.238'**

Date of Sampling : **As per table** Protocol (purpose) : **Ambient Air Quality Monitoring**
Sampling By : **Pollucon Laboratories Pvt. Ltd. Lab Id : As per table**
RDS: Envirotech M.No.-APM 460 BRUSHLESS S.R.-2769 DTH-2014
Instrument Used : **FDS: POLLTECH PEM-ADS-2.5/10, I.NO.19413**
Gas Asse. Model No.TECI B1,Sr.No.4813 RotameterSr No.PT/37/13

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 ID			AMA/2110 [A – D]									
			11	24	37	50	63	76	89	102		
1	Particulate Matter (PM ₁₀)	µg/m ³	68.55	88.42	76.31	69.33	84.52	78.64	87.42	59.61	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	34.51	51.53	46.33	39.46	48.53	41.54	47.54	25.35	60	CPCB guidelines for AAQM (Vol. I, NAAQMS/36/2012-13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	18.31	21.48	14.56	24.33	20.40	16.24	19.48	22.59	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NO _x)	µg/m ³	35.64	38.48	33.43	45.35	39.42	28.96	32.62	44.56	80	IS 5182 (Part-6) 2014

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


Ravi Jariwala
Sr. Environmental Scientist


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 & SEZ LTD.
NOTIFIED SEZ AREA, TAL. -MUNDRA,
DIST. - KUTCH - 370421.

Test Report No. : **PL/AM 0993**
Issue Date : **16/11/2021**
Customer's Ref. : **As Per W.O**

Location of Sampling : **AIR STRIP**
GPS Location : **N 22° 50.179' E 069° 45.846'**

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 /2313
Instrument Used : **FDS: POLLTECH PEM-ADS-2.5/10 , I.NO.20314**
Gas Asse. Model No.TECI B1, Sr.NO.4413 RotameterSr No.PT/26/13

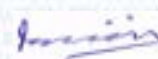
RESULT TABLE

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 ID AMA/2110 [A-G]			13	26	39	52	65	78	91	104		
1	Particulate Matter (PM ₁₀)	µg/m ³	50.72	75.62	52.61	46.38	68.56	53.41	77.55	51.28	100	IS 5182 (Part-23) 2017
2	Particulate Matter (PM _{2.5})	µg/m ³	21.82	37.50	22.62	29.35	32.40	16.56	33.41	28.47	60	CPCB guidelines for AAQM (Vol. I, NAAQMS/36/2012-13)
3	Sulphur Dioxide (SO ₂)	µg/m ³	6.69	17.60	9.31	13.47	10.59	12.88	14.85	8.51	80	IS 5182 (Part-2) 2017
4	Oxide of Nitrogen (NO _x)	µg/m ³	24.67	31.57	30.66	26.35	23.83	34.82	18.61	25.65	80	IS 5182 (Part-6) 2014
5	Carbon Monoxide as (CO)	mg/m ³	0.26	0.11	0.21	0.13	0.31	0.27	0.18	0.22	4.0	IS 5182 (Part-10) 2017
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*: Not Detected ,Detection Limit: Hydrocarbon (µg/m³):50, Benzene as C₆H₆(µg/m³): 2.0.



Ravi Jariwala
Sr. Environmental Scientist



Dr. Arun Bajpai
Lab Manager (Q)

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● schedule II auditor

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TEST REPORT FOR SEWAGE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. – MUNDRA,
DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0998**

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

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

Location Name : **Pub Adani House**

Description of Sample : **STP Water**

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

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

Sampling Procedure : **Grab/ IS: 4733 1972**

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

Lab ID : **AM/2110/09 & 10**

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

Test Parameters : **As per table**

Packing/ Seal : **Sealed**

Date of Completion : **12/10/2021**

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

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	RESULTS		GPCB PERMISSIBLE LIMIT OF OUTLET**	TEST METHOD
			STP Inlet	STP Outlet		
1	pH	--	7.80	7.93	--	IS 3025 (Part-11) 2017 Electrometric Method
2	Total Suspended Solids	mg/L	72	15	30	IS 3025 (Part – 17) 2017
3	BOD (5 Days @ 20 °C)	mg/L	89	13	20	IS 3025 (Part-44) 2019
4	Residual Chlorine	mg/L	--	0.7	Min. 0.5	APHA (23 rd Edition 2017) 4500 Cl G DPD Colorimetric method
5	Fecal Coliform	MPN Index/ 100 ml	--	110	< 1000	APHA(23 rd Edition)9221 C&E 2017

**GPCB Limit consent order No. AWH-88998 Issue Date: 26/10/2017 Up to Date: 21/08/2022.


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 SEWAGE WATER SAMPLE

QF/7.8/19-WT

Page: 1 of 1

Customer's Name and Address :

M/S. ADANI PORTS & SEZ LTD.
NOTIFIED SEZ AREA, TAL. – MUNDRA,
DIST. - KUTCH – 370421.

Test Report No. : **PL/AM 0999**

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

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

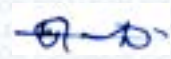
Location Name : **Pub Adani House**

Description of Sample : STP Water	Quantity/No. of Samples : 02 Lit/Two
Sampling Date : 19/10/2021	Sampling Procedure : Grab/ IS: 4733 1972
Sampling By : Pollucon Laboratories Pvt. Ltd.	Lab ID : AM/2110/29 & 30
Sample Receipt Date : 20/10/2021	Test Parameters : As per table
Packing/ Seal : Sealed	Date of Completion : 25/10/2021
Date of Starting of Test : 20/10/2021	

RESULT TABLE

SR. NO.	TEST PARAMETERS	UNIT	RESULTS		GPCB PERMISSIBLE LIMIT OF OUTLET**	TEST METHOD
			STP Inlet	STP Outlet		
1	pH	--	8.12	8.23	--	IS 3025 (Part-11) 2017 Electrometric Method
2	Total Suspended Solids	mg/L	87	14	30	IS 3025 (Part – 17) 2017
3	BOD (5 Days @ 20 °C)	mg/L	73	12	20	IS 3025 (Part-44) 2019
4	Residual Chlorine	mg/L	--	0.8	Min. 0.5	APHA (23 rd Edition 2017) 4500 Cl G DPD Colorimetric method
5	Fecal Coliform	MPN Index/ 100 ml	--	280	< 1000	APHA(23 rd Edition)9221 C&E 2017

**GPCB Limit consent order No. AWH-88998 Issue Date: 26/10/2017 Up to Date: 21/08/2022.


H. T. Shah
Lab. Manager


Dr. Arun Bajpai
Lab Manager (Q)

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Annexure – 15

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports and Special Economic Zone Limited (AHMPL)

ADANI HOSPITAL

Near Samundra Township Mundra
Prepared by



Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

January 2022

ACKNOWLEDEMENT

We are grateful to the management of Adani Port and SEZ for giving us an opportunity to contribute in their efforts towards efficient energy management by undertaking this Energy Audit study exercise.

Eco Energy Solution acknowledges with thanks the co-operation and support extended by management and operating personnel at Adani Port And SEZ during the audit exercise. Detailed discussions and interaction were held with plant personnel throughout the course of the audit and awareness of energy conservation was noted as exemplary. We would also like to place on record our sincere thanks and appreciation for all plant executives. Our special thanks are to,

- Mr. D. Varu - Associate Manager
- Mr. G.Pavar - Assistant Manager
- Mr. J.Nandaya - Senior Engineer
- Mr. D.Joshi - Senior Engineer
- Mr. S.Trivedi - Senior Engineer

We are also thankful to the other staff members who were actively involved while collecting the data and conducting the field studies. We take this opportunity to also thank all the team members at various departments associated with this study of energy audit for extending cooperation during collection of on-site data.

We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Hospital, Adani Port And SEZ.

We have prepared this Energy Audit report document of Adani Hospital, Adani Port And SEZ, on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided and measurements undertaken at the facility.

For ECO ENERGY SOLUTION

Krunal Shah (Partner)

Pushkar Khanna (Partner)

Energy Audit Report For Adani Port and SEZ, Adani Hospital

Company Profile

Adani Hospital is a healthcare arm of Adani Group. Adani Healthcare Services, Gujarat Adani Institute of Medical Sciences and Adani Hospitals Mundra, are part of Corporate Social Responsibility initiatives of Adani Group, under the umbrella of Adani Foundation.

Adani Healthcare team is providing technical assistance to Adani Power for establishing a Nursing College & Hostel and construction of a new 300 bedded Hospital in place of the existing District Hospital at Baran, Rajasthan.

Adani Hospital is 100 bedded Hospital located in place of Mundra, Gujarat.

In order to reduce increasing energy costs, Adani Port And SEZ approached ECO ENERGY SOLUTION for conduct of energy audit for their A2/1 Samundra township, old, port road, near adani hospital, Gujarat 370421. This proposal was approved by plant vide its purchase order no 5702004681 dated 06.02.2022.

This energy audit report for Adani Hospital presents the analysis of the data collected, observations made and field trials undertaken from 21st Jan to 22nd Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd (4 MLD)
Mundra,
Gujarat-392130, India

Prepared by



Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

FEB 2022

ACKNOWLEDEMENT

We are grateful to the management of Adani Ports & Special Economic Zone Ltd for giving us an opportunity to contribute in their efforts towards efficient energy management by undertaking this Energy Audit study exercise.

Eco Energy Solution acknowledges with thanks the co-operation and support extended by management and operating personnel at Adani Ports & Special Economic Zone Ltd during the audit exercise. Detailed discussions and interaction were held with plant personnel throughout the course of the audit and awareness of energy conservation was noted as exemplary. We would also like to place on record our sincere thanks and appreciation for all plant executives. Our special thanks are to,

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- Mr. D.Joshi - Senior Engineer
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We are also thankful to the other staff members who were actively involved while collecting the data and conducting the field studies. We take this opportunity to also thank all the team members at various departments associated with this study of energy audit for extending cooperation during collection of on-site data.

We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Ports & Special Economic Zone Ltd.

We have prepared this Energy Audit report document Adani Ports & Special Economic Zone Ltd, on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided and measurements undertaken at the facility.

For ECO ENERGY SOLUTION

Krunal Shah (Partner)

Pushkar Khanna-AEA-0260 (Partner)

Company Profile

Adani Ports and Special Economic Zone Limited (APSEZ) is the largest commercial ports operator in India accounting for nearly one-fourth of the cargo movement in the country. Its presence across 13 domestic ports in seven maritime states of Gujarat, Maharashtra, Goa, Kerala, Andhra Pradesh, Tamil Nadu and Odisha presents the most widespread national footprint with deepened hinterland connectivity. The port facilities are equipped with the latest cargo-handling infrastructure which is not only best-in-class, but also capable of handling the largest vessels calling at Indian shores. Our ports are equipped to handle diverse cargos, from dry cargo, liquid cargo, crude to containers.

Through its subsidiary Adani Logistics Ltd., APSEZ operates three logistics parks located at Patli in Haryana, Kila-Raipur in Punjab and Kishangarh in Rajasthan. With the ability to handle 500,000 twenty foot equivalent units (TEUs) annually, the Adani logistics business is growing at a rapid pace.

Over the years, APSEZ has evolved into a provider of integrated port infrastructure services, of which the Mundra SEZ in Gujarat is a landmark validation. Spanning over 8,000 hectares, the Mundra Economic Hub offers investment options as the largest multi-product SEZ, Free Trade and Warehousing Zone (FTWZ) and Domestic Industrial Zone.

The Company's integrated services across three verticals, i.e. Ports, Logistics and SEZ, has enabled it to forge alliances with leading Indian businesses making APSEZ an undisputed leader in the Indian port sector.

Along with its expertise in providing end-to-end logistics solutions, operational excellence, low-cost operations and synergies through acquisitions, APSEZ was also certified as a Great Place to Work in FY 2021-22. The Company is backed by a young and dynamic workforce that propels it to greater heights.

In order to reduce increasing energy costs, Adani Ports and Special Economic Zone Limited (APSEZ) approached ECO ENERGY SOLUTION for conduct of energy audit for their Mundra Plant at APSEZ, Mundra, Gujarat. This proposal was approved by plant vide its purchase order no 5702004681 dated 06.02.2022.

This energy audit report for APSEZ Mundra Port presents the analysis of the data collected, observations made and field trials undertaken from 17th Jan to 18th Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd (WTP)
Mundra,
Gujarat-392130, India



Prepared by

Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

FEB 2022

ACKNOWLEDEMENT

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Eco Energy Solution acknowledges with thanks the co-operation and support extended by management and operating personnel at Adani Ports & Special Economic Zone Ltd during the audit exercise. Detailed discussions and interaction were held with plant personnel throughout the course of the audit and awareness of energy conservation was noted as exemplary. We would also like to place on record our sincere thanks and appreciation for all plant executives. Our special thanks are to,

- Mr. D. Varu - Associate Manager
- Mr. G.Pavar - Assistant Manager
- Mr. J.Nandaya - Senior Engineer
- Mr. D.Joshi - Senior Engineer
- Mr. S.Trivedi - Senior Engineer

We are also thankful to the other staff members who were actively involved while collecting the data and conducting the field studies. We take this opportunity to also thank all the team members at various departments associated with this study of energy audit for extending cooperation during collection of on-site data.

We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Ports & Special Economic Zone Ltd.

We have prepared this Energy Audit report document Adani Ports & Special Economic Zone Ltd (WTP Plant), on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided and measurements undertaken at the facility.

For ECO ENERGY SOLUTION

Krunal Shah (Partner)

Pushkar Khanna (Partner)

Company Profile

Adani Ports and Special Economic Zone Limited (APSEZ) is the largest commercial ports operator in India accounting for nearly one-fourth of the cargo movement in the country. Its presence across 13 domestic ports in seven maritime states of Gujarat, Maharashtra, Goa, Kerala, Andhra Pradesh, Tamil Nadu and Odisha presents the most widespread national footprint with deepened hinterland connectivity. The port facilities are equipped with the latest cargo-handling infrastructure which is not only best-in-class, but also capable of handling the largest vessels calling at Indian shores. Our ports are equipped to handle diverse cargos, from dry cargo, liquid cargo, crude to containers.

Through its subsidiary Adani Logistics Ltd., APSEZ operates three logistics parks located at Patli in Haryana, Kila-Raipur in Punjab and Kishangarh in Rajasthan. With the ability to handle 500,000 twenty foot equivalent units (TEUs) annually, the Adani logistics business is growing at a rapid pace.

Over the years, APSEZ has evolved into a provider of integrated port infrastructure services, of which the Mundra SEZ in Gujarat is a landmark validation. Spanning over 8,000 hectares, the Mundra Economic Hub offers investment options as the largest multi-product SEZ, Free Trade and Warehousing Zone (FTWZ) and Domestic Industrial Zone.

The Company's integrated services across three verticals, i.e. Ports, Logistics and SEZ, has enabled it to forge alliances with leading Indian businesses making APSEZ an undisputed leader in the Indian port sector.

Along with its expertise in providing end-to-end logistics solutions, operational excellence, low-cost operations and synergies through acquisitions, APSEZ was also certified as a Great Place to Work in FY 2021-22. The Company is backed by a young and dynamic workforce that propels it to greater heights.

In order to reduce increasing energy costs, Adani Ports and Special Economic Zone Limited (APSEZ) approached ECO ENERGY SOLUTION for conduct of energy audit for their Mundra Plant at APSEZ, Mundra, Gujarat. This proposal was approved by plant vide its purchase order no 5702004681 dated 06.02.2022.

This energy audit report for APSEZ Mundra Port presents the analysis of the data collected, observations made and field trials undertaken from 23rd Jan to 24th Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd (Samudra Township)
Mundra,
Gujarat-392130, India

Prepared by



Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

Feb 2022

ACKNOWLEDEMENT

We are grateful to the management of Adani Ports & Special Economic Zone Ltd for giving us an opportunity to contribute in their efforts towards efficient energy management by undertaking this Energy Audit study exercise.

Eco Energy Solution acknowledges with thanks the co-operation and support extended by management and operating personnel at Adani Ports & Special Economic Zone Ltd during the audit exercise. Detailed discussions and interaction were held with plant personnel throughout the course of the audit and awareness of energy conservation was noted as exemplary. We would also like to place on record our sincere thanks and appreciation for all plant executives. Our special thanks are to,

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We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Ports & Special Economic Zone Ltd.

We have prepared this Energy Audit report document Adani Ports & Special Economic Zone Ltd, on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided and measurements undertaken at the facility.

For ECO ENERGY SOLUTION

Krunal Shah Lead Auditor
(Partner)

Pushkar Khanna AEA 0260
(Partner)

Company Profile

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This energy audit report for APSEZ Mundra Port presents the analysis of the data collected, observations made and field trials undertaken from 18th to 20th Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd (PUB Building)
Mundra,
Gujarat-392130, India

Prepared by



Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

Feb 2022

ACKNOWLEDEMENT

We are grateful to the management of Adani Ports & Special Economic Zone Ltd for giving us an opportunity to contribute in their efforts towards efficient energy management by undertaking this Energy Audit study exercise.

Eco Energy Solution acknowledges with thanks the co-operation and support extended by management and operating personnel at Adani Ports & Special Economic Zone Ltd during the audit exercise. Detailed discussions and interaction were held with plant personnel throughout the course of the audit and awareness of energy conservation was noted as exemplary. We would also like to place on record our sincere thanks and appreciation for all plant executives. Our special thanks are to,

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We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Ports & Special Economic Zone Ltd.

We have prepared this Energy Audit report document Adani Ports & Special Economic Zone Ltd, on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided and measurements undertaken at the facility.

For ECO ENERGY SOLUTION

Krunal Shah Lead Auditor (Partner)

Pushkar Khanna AEA-0260

(Partner)

Company Profile

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This energy audit report for APSEZ Mundra Port presents the analysis of the data collected, observations made and field trials undertaken from 25th Jan to 26th Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd (Adani House)
Mundra,
Gujarat-392130, India



Prepared by

Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

Feb 2022

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We trust that the findings of this study will help plant management in improving the equipment performance thereby giving optimum energy consumption at Adani Ports & Special Economic Zone Ltd.

We have prepared this Energy Audit report document Adani Ports & Special Economic Zone Ltd, on a best judgment basis.

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For ECO ENERGY SOLUTION

Krunal Shah (Partner)

Pushkar Khanna AEA-0260 (Partner)

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DETAILED ENERGY AUDIT REPORT

AT



Adani Ports & Special Economic Zone Ltd,
Central Effluent Treatment plant (CETP)
Mundra, Gujarat-392130, India

Prepared by



Eco Energy Solution

49, Sector 2, Sarika Society, Samrat Nagar, Isanpur,
Ahmedabad – 382443, Gujarat, INDIA

FEB 2022

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For **ECO Energy Solution**

Krunal Shah Lead Auditor
(Partner)

Pushkar Khanna AEA -0260
(Partner)

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This energy audit report for APSEZ Mundra Port presents the analysis of the data collected, observations made and field trials undertaken from 24th Jan to 25th Jan 2022. It is governed by the objectives, scope of work, and methodology discussed in ensuing report sections.

Annexure – 16

Adani Ports and Special Economic Zone Limited

Environmental Policy

Adani Ports and Special Economic Zone Limited's (APSEZ) environment responsibilities are driven by its commitment to preserve the environment and are integral to the way we do business. We shall strive to integrate best environmental practices across APSEZ's management and governance systems to minimize environmental impacts and attain a leadership position in environmental stewardship.

APSEZ, its subsidiaries and joint ventures shall keep its commitment to:

- Build and operate the facilities in compliance with all applicable environmental laws, regulations, obligations and endeavour to go beyond compliances;
- Identify and evaluate environmental and climate impacts and its associated risks for all activities and formulate a mitigation strategy;
- Continually improve the environmental performance by setting objectives, targets and processes for efficient use of natural resources, waste minimization, emission reduction and pollution prevention;
- Conserve and protect biodiversity in and around of our operational sites in cooperation with relevant stakeholders;
- Conduct environmental due diligence for new and expansion of existing projects, mergers and acquisitions by set procedures;
- Create environmental awareness through continuous engagement with stakeholders including employees, customers, vendors and local communities; and
- Measure, monitor and review the environmental performance of organization in accordance to this policy at regular intervals and audit (internal/ external) it before communicating to relevant stakeholders.

The policy shall be reviewed annually for its appropriateness and updated as necessary.

Annexure – 17

Organogram of Environment Management Cell, APSEZ, Mundra

