



## Power

Ref: APL/EMD/EC/MoEFCC/211/05/23  
Date- 22/05/2023

To,

**Additional Principal Chief Conservator of Forest (APCCF)**  
**Ministry of Environment, Forest and Climate Change**  
Integrated Regional Office (Near Kishan Circle)  
Aranya Bhavan, Fourth Floor, Room No 407  
Sector 10A, Gandhinagar, Gujarat 382010

**Sub: Six Monthly Compliance Status report of Environment Clearances for Phase I, II & III along with Environmental Monitoring reports by Mundra TPP- reg.**

Ref: Env. Clearance letter **J-13011/7/2007-IA-II (T)** dated, 13<sup>th</sup> August 2007,  
Letter No. **J-13011/1/2008-IA-II (T)** dated, 21<sup>st</sup> October 2008 and  
Letter No. **J-13012/126/2008-IA-II (T)** dated, 20<sup>th</sup> May 2010 & Corrigendum dated  
01/06/2011.  
Transfer of EC from Adani Power Ltd. to Adani Power (Mundra) Ltd. dated 13.04.2018  
& EC Transfer from Adani Power (Mundra) Ltd. to Adani Power Ltd. dated **24.04.2023**.

Dear Sir,

With reference to above subject, please find enclosed herewith Half yearly Environment Clearances (EC) compliance status report along with environmental monitoring results like Ambient Air Quality, Noise level, Water Quality, Soil, Met. data, Terrestrial Ecology & Marine Biology, CSR Report, Fly Ash, Green belt development report etc. for the period of **October'2022 to March'2023** in soft (e-mail).

This is for your kind information & record please.

Thanking You,  
Yours faithfully,  
for **Adani Power Limited**

(Santosh Kumar Singh)  
**Head AESG**

**Encl:** as above

**CC:** Member Secretary  
**Central Pollution control Board**  
Parivesh Bhavan, East Arjun Nagar  
Kendriya Paryavaran Bhawan  
New Delhi- 110 032.

Member Secretary,  
**Gujarat Pollution Control Board**  
Paryavaran Bhawan, Sector -10 A  
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The Regional Officer,  
**Gujarat Pollution Control Board,**  
Kandla Port Trust Building (KPT)  
Gandhidham – Kutchh 370 201

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**SIX MONTHLY COMPLIANCE REPORT OF  
ENVIRONMENTAL CLEARANCE (EC)**

**4620 (4×330+5×660) MW THERMAL POWER  
PLANT PHASE - I, II & III of Mundra TPP**

**At**

**MUNDRA TALUKA, KUTCHH DISTRICT  
GUJARAT**

*Submitted to:*

**Integrated Regional Office, Gandhinagar  
Ministry of Environment, Forest & Climate Change,  
Central Pollution Control Board, New Delhi &  
Gujarat Pollution Control Board, Gandhinagar**

**adani**

*Submitted By:*

**Environment Management Department  
Adani Power Limited  
Tunda & Wandh Village,  
Mundra Taluka, Kutchh District  
Gujarat**

**PERIOD: October'2022 – March'2023**

## Adani Power Ltd., Mundra

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## INTRODUCTION

Mundra Thermal Power Plant is located at village: Siracha & Tunda, Taluka Mundra, District Kutchh in Gujarat.

Environmental Clearances has been granted from Ministry of Environment, Forest & Climate Change and Consent to Establish (CTE) and Consent to Operate (CTO) from Gujarat Pollution Control Board for Phase I, II & III and has also obtained all necessary statutory / mandatory clearance.

Adani Power Limited, Mundra (APL Mundra) has been restructured and the Mundra Thermal Power Plant has been demerged and transferred to Adani Power (Mundra) Ltd.

Adani Power (Mundra) Limited has commissioned the first supercritical 660 MW unit in the country. Mundra is also the World's First supercritical technology project to have received 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

**Environment Clearance for Phases I, II & III were transferred from Adani Power (Mundra) Limited to Adani Power Limited vide F. No. J-13011/7/2007-IA-II(T) dated; 24<sup>th</sup> April' 2023.**

Under the Hon'ble NCLT vide its order dated 08.02.2023 sanctioning the scheme of amalgamation of Adani power (Mundra) Limited with Adani Power Limited. Subsequently,

**We have implemented the Environment Management System (EMS) ISO 14001:201**

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### Compliance status of Environment Clearance (EC)

#### For Phase – I 660 MW (2x330) TPP

Vide letter No. J-13011/7/2007-IA-II (T) dated 13/08/07.

**EC Transfer from APMuL to APL dated 24.04.2023.**

Sr. No.	Conditions	Status
3-(i)	No activities in CRZ area will be taken up without prior requisite clearance under the provisions of the CRZ Notification, 1991.	<p>CRZ Clearance obtained from MoEF&amp;CC vide letter No. 10 - 94/2007- IA - III dated 29th May' 2008. However, the facility for Sea water intake and outfall were not developed by Adani Power Ltd. The CRZ clearance has not been acted upon and the validity of 5 years under the CRZ Notification, 1991 is over.</p> <p>Presently there is no CRZ clearance with Adani Power (Mundra) Limited.</p> <p>NIO suggested to develop integrated intake and outfall facility in place of multiple intakes and outfalls. This integrated intake &amp; outfall has been approved by MoEF&amp;CC under the clearance for Waterfront Development proposed by APSEZL.</p> <p>APMuL is using this integrated intake and outfall facilities.</p>
(ii)	The seawater intake structure shall be so designed to ensure that the continuity of free flow of water in the two arms of Kotdi Creek is not hampered.	The integrated Intake channel developed by APSEZ is away from Kotdi Creek. The outfall crosses Kotdi Creek at one place, for which aqueduct has been provided so that the treated effluent does not mix with water in the Creek and does not Interfere with free flow of water in the two arms of Kotdi Creek.
(iii)	The recommendations made in the NIO report shall be effectively implemented in the project cycle.	Subsequent to NIO's recommendations, integrated intake & outfall facilities are developed by APSEZ and approved from MoEFCC New Delhi.
(iv)	It shall be ensured that the mangroves are not adversely affected due to the project.	The Thermal Power Plant is located well beyond the CRZ area and there are no mangroves at the plant site.
(v)	The temperature of discharged water shall be continuously monitored to ensure that it does not exceed the prescribed limit of 7°C above the ambient temperature of receiving waters at any point of time.	<p>The temperature of discharge water and the Intake water is monitored on daily basis.</p> <p>Differential temperature is well within the Stipulated limits. Please refer <b>Annexure V</b></p>
(vi)	Space provision shall be made for installation of FGD of requisite efficiency of removal of SO <sub>2</sub> , if required at later stage.	Space has been provided for FGD for future requirement. FGD installation is in progress in compliance with the CPCB directions vide letter No.: B- 33014/07/2017-18/IPC-II/TPP/152872, dated 11/12/2017.

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(vii)	The total land requirement shall not be exceed 228 Ha for all the activities/facilities relating to the proposed power project.	The project has undergone two expansions. The total area has changed and the same has been approved by MoEF&CC. The total area for all three phases is 452.79 ha.
(viii)	Coal with ash content not exceeding 8% and sulphur content not exceeding 0.69% shall be used as fuel	Being followed. The coal is imported from Indonesia and South Africa. The ash content in coal is below 8% and sulphur content below 0.3%. The Ash content report is being sent to MoEF&CC, Regional office on quarterly basis. Ash content report is enclosed as <b>Annexure- VII</b> .
(ix)	Rainwater harvesting should be adopted. Central Groundwater Authority/Board shall be consulted for finalization of appropriate rainwater harvesting structure within a period of three months from the date of clearance	Rainwater harvesting (RWH) scheme has been submitted to Regional Office, CGWB, Ahmedabad.  We have adopted the scheme and developed rainwater collection & groundwater recharging facilities at three locations within plant premises.
(x)	A bi -flue stack of 220 m height with exit velocity of at least 22 m/s shall be provided with continuous monitoring system.	Complied. A Bi - flue stack of 220-meter height is provided. Online analyzers for PM, SO <sub>2</sub> , NO <sub>x</sub> have been provided & maintained and calibration is being done on regular basis, exit velocity is more than 22 m/s. RTDMS commissioned for gas analyzer.
(xi)	High efficiency Electrostatic precipitator (ESPs) having efficiency of 99.9% shall be installed so as to ensure that particulate emissions do not exceed 100 mg/Nm <sup>3</sup> .	Complied, ESP with efficiency of 99.9% installed in both the units to meet permissible norm for particulate emissions less than 50 mg/Nm <sup>3</sup> . (As we have received renewed "Consent to Operate" (CTO). Please refer <b>Annexure - I</b>
(xii)	Fly ash shall be collected in dry form and its 100 % utilization shall be ensured from the day of commissioning of the plant. In case of emergency, the utilized ash may be disposed in the ash pond through High Concentration Slurry Disposal (HCSD) system.	Complied. Ash Generation & utilization details from Oct' 22 to Mar 23. Please refer <b>Annexure- VII</b> .
(xiii)	Regular monitoring of ground water quality including heavy metals shall be undertaken around ash dyke and project area to ascertain the change, if any, in the water quality due to leaching of contaminants from ash disposal area.	Four nos. of Bore well establish around the ash dyke & Ground water quality is being monitored on regular basis. Ground water analyses report enclosed. Please refer <b>Annexure VIII</b> .

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(xiv)	Noise level shall be limited up to 75 dB (A). For People working in high noise area, protective devices such as earplugs etc. shall be provided.	Noise level monitoring is being carried out on regular basis inside the plant locations & monitoring values are well within stipulated limits. Please refer <b>Annexure- I</b> .  We are providing necessary PPE's like ear-muff and ear plug to all employee & workers. Occupational Health & Safety Management System as ISO ISO 45001:2018 implemented.
(xv)	A greenbelt shall be developed all around the plant boundary and ash dyke covering an area of at least 88.2 Ha.	Green belt / plantation are being developed in 147.33 Ha (Out of total 452.79 Ha Land for all three phases). Green belt/plantation is enclosed as <b>Annexure VI</b> .
(xvi)	First aid and sanitation arrangements shall be made for the drivers and contract labor during construction phase.	Complied.  First aid and sanitation were provided for driver and contract labour during construction phase.
(xvii)	Regular monitoring of the air quality shall be carried out in and around the power plant and records shall be maintained. The location of the monitoring stations and frequency of monitoring shall be finalized in consultation with State Pollution Control Board. Six monthly reports shall be submitted to this Ministry.	Being Complied.  The regular Environmental Monitoring is being carried out in & around plant premises and reports are being submitted on monthly basis to GPCB regional office, Bhuj.  Online continuous AAQ Monitoring systems has been installed in consultation with GPCB and also established five AAQM locations in & around the plant with frequency of twice in a week, monitoring is being carried out by third party. Monitoring report is enclosed as <b>Annexure I</b> .  Online Continuous AAQ results are enclosed as <b>Annexure – IV</b> . Last Six-Monthly compliance report was submitted for the period of April'2022 to September'2022 had been submitted vide letter no. APL/EMD/EC/MoEFCC/202/11/22 Dated: 21.11.2022.
(xviii)	For controlling fugitive dust, regular sprinkling of water in coal handling area and other vulnerable areas of the plant shall be ensured.	Being Complied.  Regular water sprinkling is being done to control the fugitive dust in CHP area and all other areas. An addition mechanical sweeping machine have been deployed for cleaning the road.  To control and minimize the fugitive air pollution at coal handling plant, dust extraction system has been provided in all the transfer towers as well as crusher house. Desalinated water is being used for dust suppression system.  Windshield is also provided at coal stack yard area. Close conveyor system for Coal transportation is provided.  Integrated Ash silo system (Ash transfer by Numeric system in pipe) is in place for ash

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		handling.
(xix)	The project proponent should advertise within seven day of Environment clearance, in at least two newspapers widely circulated in the region around the project, one of which should be in vernacular language of the locality concerned, informing that the project has been accorded environmental clearance and copies of clearance latter are available with State Pollution Control Board/Committee and may also seen in the Website of Ministry of Environment and Forest in the - <a href="http://envfor.nic.in">http://envfor.nic.in</a>	Complied Published in Two News paper
(xx)	A separate environment-monitoring cell with suitable qualified staff should be set up for implementation of the stipulated environmental safeguards.	Complied. We have established separate environmental management cell with well qualified staff to carry out regular surveillane for implementation of stipulated environmental safeguards and full fledge Environment Lab for Air & Water has been established. <b>Environment Management System as per EMS ISO 14001: 2015 &amp; Water Efficiency Management System (ISO 46001:2019) implemented.</b>
(xxi)	Half yearly report on the status of implementation of conditions and environmental safeguards should be submitted to this Ministry, the Regional Office, CPCB and SPCB.	Six monthly compliance report accordance to the Environmental clearance granted by MoEF&CC is being submitted to MoEF&CC, CPCB & GPCB regularly. Compliance status report updated on company's website. Last Six-Monthly compliance report was submitted for the period of April'2022 to September'2022 had been submitted vide letter no. APL/EMD/EC/MoEFCC/202/11/22 Dated: 21.11.2022.
(xxii)	Regional Office of the Ministry of Environment & Forests located at Bhopal will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment report, Environment Management Plan and additional information/ clarifications submitted to this ministry subsequently should be forwarded to the Regional Office for their use during monitoring.	Being followed All necessary information forwarded to the MoEF&CC Regional Office, Bhopal on regular basis.



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(xxiii)	Separate funds should be allocated for implementation of environmental protection measures along with item-wise break-up. These cost should be included as part of the project cost. The funds earmarked for the environment protection measures should not be diverted for other purposes and year- wise expenditure should be reported to the Ministry.	Being complied. Separate funds allocated for environmental protection measures.  Expenditure details from October"2022 to March' 2023, FY 2022-23 is enclosed as <b>Annexure IX.</b>
(xxiv)	Full cooperation should be extended to the Scientists/Officers from the Ministry and its Regional Office at Bhopal/ the CPCB/ the SPCB during monitoring of the project.	Noted Full co-operation shall be extended to the Authority

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### Compliance status of Environment Clearance (EC)

#### For 1980 MW (2x330 + 2x660) TPP Phase – II

Vide letter No.J-13011/7/2007-IA-II (T) dated 13/08/07

Transferred EC from APMuL to APL dated; 24.04.2023.

Sr. No.	Conditions	Status
3-(i)	The changes/ modification made in the scope of phase - I of the project should be get incorporated formally in the environmental clearance already granted.	Noted Changes in Phase-I communicated to MoEF&CC
(ii)	Prior CRZ clearance under the provisions of CRZ Notification, 1991 for the activities to be taken up in the CRZ area as applicable to this project, shall be obtained.	CRZ Clearance obtained from MoEF&CC vide letter No. 10 - 94/2007- IA - III dated 29 <sup>th</sup> May' 2008. However, the facility for Sea water intake and outfall were not developed by Adani Power Ltd. The CRZ clearance has not been acted upon and the validity of 5 years under the CRZ Notification, 1991 is over. <b>Presently there is no valid CRZ clearance available with Adani Power Limited.</b> NIO suggested to develop integrated intake and outfall facility in place of multiple intakes and outfalls. This integrated intake & outfall has been approved by MoEF&CC under the clearance for Waterfront Development proposed by APSEZL. Mundra TPP is using this integrated intake and outfall facilities.
(iii)	Regular monitoring of the thermal discharges into the sea shall be carried out and records maintained. The temperature changes, if any, in the sea water within the impact zone due to the project shall be carried out. Based on the same, necessary safeguard measures as may be required to protect the aquatic flora and fauna shall be taken. It shall be ensured that discharge temperature does not exceed the prescribed limits of 7°C above the ambient temperature of receiving waters at any point of time.	Being complied The temperature of discharge water and the intake water is monitored on daily basis.  Differential temperatures are well within the stipulated limits. Please refer <b>Annexure V</b> .  Regular third-party marine monitoring also being carried out, monitoring report enclosed for the period of October'22 to March' '23 Please refer <b>Annexure – III</b>
(iv)	The recommendations made in the report of NIO relating to intake and outfall shall be implemented.	NIO suggested/recommended to develop integrated intake and outfall facility in place of multiple intake and outfall. This integrated intake & outfall has been approved by MoEF&CC under the clearance for Waterfront Development proposed by APSEZL. TPP is using this integrated intake and outfall facility.
(v)	The sulphur content in the coal to be used both for Phase-I and Phase-II shall not exceed 0.3 %.	Being followed The coal is imported from Indonesia and South Africa. It is ensured that sulphur content in coal

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		below 0.3%.
(vi)	Appropriate measures shall be adopted to reduce the emissions of SO <sub>2</sub> . It shall also be ensured that at no point of time the ground level concentration of SO <sub>2</sub> in the impact zone exceeds the prescribed limit. The proponent shall also provide, additional corrective measures as may be deemed necessary shall be taken.	Being Complied. The regular monitoring is being carried out in & around the plant premises. We have already installed online continuous monitoring system in all stacks. At no point of time, the ground level concentration of SO <sub>2</sub> has exceeded the permissible limits.
(vii)	Continuous meteorological data shall be collected at site for at least three years. Based on the data so collected, air quality modeling prediction shall be carried out. The results so obtained shall be analyzed and based on the same, additional corrective measures as may be deemed necessary shall be taken.	Complied.  Continuous meteorological stations installed within plant premises; Details of metrological data observation enclosed as <b>Annexure I</b> .
(viii)	Two bi-flue stacks of 275 m height each for 2 X 330MW and 2 X 660 MW units shall be provided with continuous online monitoring equipments for SO <sub>2</sub> , NO <sub>x</sub> and Particulate. Exit velocity of Flue gases shall not be less than 22.27 m/sec for 2 X 330MW stack and 22.97 m/sec for 2 X 660 MW units.	Complied Two bi-flue stacks 275 meters has been provided in all four boilers (2x330 MW + 2x660 MW) and online continuous emission monitoring system (CEMS) installed for PM, SO <sub>x</sub> & NO <sub>x</sub> . Exit velocity is more than 23 m/sec & records are being maintained. Please refer <b>Annexure I</b> .  Regular stack emission monitoring is also being carried out by third party laboratory.
(ix)	High efficiency electrostatic precipitators (ESP's) shall be installed to ensure that particulate emission does not exceed 50 mg/ Nm <sup>3</sup>	Complied Highly efficient Electrostatic Precipitator (ESPs) has been provided to each boiler to maintain particulate emission less than 50 mg/Nm <sup>3</sup> . Please refer <b>Annexure I</b> .
(x)	The seawater intake structure shall be so designed to ensure that the continuity of free flow of water in the two arms of Kotdi creek is not hampered	The integrated Intake channel developed by APSEZ is away from Kotdi Creek.  The outfall channel Crosses Kotdi Creek at one place, for which aqueduct has been provided so that the treated effluent does not mix with Creek water and does not Interfere with free flow of water in the two arms of Kotdi Creek.
(xi)	It shall be ensured that the mangroves are not adversely affected due to the project.	The Thermal Power Plant is located well beyond the CRZ area and there are no mangroves at the plant site.
(xii)	Cooling towers with closed cycle system shall be installed COC of at least 1.5 shall be maintained.	Being Complied COC of 1.5 is being maintained
(xiii)	Space provision shall be made for installation of FGD of requisite efficiency of removal of SO <sub>2</sub> , If required at later stage.	Noted Space for FGD has been provided in the plant as per the guidelines of CPCB vide letter No. B-33014/07/2017/IPC-II/TPP/15872 dated

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		11.12.2017. However, as per MoEFCC Notification date 05 <sup>th</sup> September'2022, Mundra TPP is falling under Category "C" Non- retiring TPPs and the timelines for compliance of SO <sub>2</sub> emission is up to December'2026. Accordingly, the work is under progress for compliance as per CPCB direction.
(xiv)	The total land requirement shall not exceed 254.49 ha for all the activities/ facilities relating to Phase - I and Phase - II of the proposed power project.	Noted The project has undergone two expansions. The total area has changed and the same has been approved by MoEF&CC. The total area for all three Phases is 452.79 ha.
(xv)	Rainwater harvesting should be adopted. Central Groundwater Authority/Board shall be consulted for finalization of appropriate rainwater harvesting structures within a period of three months form the date of clearance.	Rainwater Harvesting (RWH) scheme has been submitted to RO, CGWB, Ahmedabad. We have adopted the scheme and developed rainwater collection & groundwater recharging facilities at three locations within plant premises.
(xvi)	Fly ash shall be collected in dry form and its 100 % utilization shall be ensured from the day of the commissioning of the plant. In case of emergency, the utilized ash may be disposed in the ash pond through High Concentration Slurry Disposal (HCSD) system and bottom ash in conventional slurry mode.	Being Complied Ash Generation & utilization details from October'2022 to March'2023 is enclosed as <b>Annexure VII.</b>
(xvii)	Adequate safety measures shall be provided in the plant area to check/ minimize spontaneous fires in coal yard, especially during summer season. Copy of these measures with full details along with plant layout location shall be submitted to the ministry as well as to the Regional Office of the Ministry of Bhopal.	Water sprinkler system and Hydrant system in operation to minimize spontaneous fires in coal yard.
(xviii)	Storage facilities for auxiliary liquid fuel such as LDO and HFO/LSHS shall be made in the plant area where risk is minimum to the storage facilities Disaster management Plan shall be prepared to meet any eventuality in case of accident taking place. Mock drills shall be conducted regularly and based on the same, modifications required, if any shall be incorporated in the DMP. Sulphur content in the liquid fuel will not exceed 0.5 %.	The LDO and HFO / LSHS are stored in designated location and minimum risk area.  Emergency Management Plan (EMP) has been prepared & Mock Drill is being conducted on regular interval.  Occupational Health & Safety Management System as ISO 45001:2018 implemented.
(xix)	Noise levels emanating from turbines shall be limited to 75 dBA. For people working in the high noise area, requisite personal protective equipment like	Regular noise level monitoring is being carried out inside the plant locations & monitoring values are well within limits. Please refer <b>Annexure- I.</b>

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	earplugs/earmuffs etc. Shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non - noisy/less noisy areas.	We are providing necessary PPE's like earmuff and ear plug to all employees & workers.  Occupational Health & Safety Management System as ISO 45001:2018 implemented.
(xx)	Regular monitoring of ground water quality including heavy metals shall be undertaken around ash dyke and the project area to ascertain the change, if any, in the water quality due to leaching of contaminants from ash disposal area.	Being complied Four nos. of Bore well establish around the ash dyke & Ground water quality is being monitored on regular basis. Monitoring report is enclosed as <b>Annexure-VIII.</b>
(xxi)	A greenbelt shall be developed all around the plant boundary and ash dyke covering and area of at least 98.2 ha.	Complied. Green belt / plantation being developed in 147.33 Ha. (Out of total 452.79 Ha Land for all three phases) Green belt / plantation is enclosed as <b>Annexure VI.</b>
(xxii)	First aid and sanitation arrangements shall be made for the drivers and contract labour during construction phase.	Complied. First aid and sanitation were provided for driver and contract labour during construction phase.
(xxiii)	Regular monitoring of ground level concentration of SO <sub>2</sub> , NO <sub>x</sub> , Hg, SPM and RSPM shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry.	Being Complied The regular Environmental Monitoring is being carried out in & around plant premises and reports are submitted to MoEFCC, CPCB & GPCB. Monitoring report is enclosed as <b>Annexure- I</b> Online continuous monitoring systems Installed in consultation with GPCB. AAQM monitoring in and around also being done by third party twice in a week. Monitoring report is enclosed as <b>Annexure - IV</b>
(xxiv)	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Complied Proper housing and infrastructure facilities were provided to labors during the construction.  The temporary facilities have been removed after the completion of project.
(xxv)	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days form the date of this clearance letter, informing	Complied

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	that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at website of the Ministry of Environment and Forests <a href="http://envfor.nic.in">http://envfor.nic.in</a>	
(xxvi)	A separate environment management cell with qualified staff shall be set up for implementation of the stipulated environment safeguards.	We have established separate environmental monitoring cell with well-qualified staff to carry out regular surveillance for implementation of stipulated environmental safeguards and full fledge Environment Lab accredited with NABL ISO/IEC 17025:2017 for Air, Water & Noise including marine biology as well as terrestrial ecology regularly. <b>Environment Management System as per EMS ISO 14001: 2015 Water Efficiency Management System (ISO 46001:2019) implemented.</b> Terrestrial monitoring report enclosed as <b>Annexure -II</b> and Marine monitoring Report is enclosed as <b>Annexure - III</b> .
(xxvii)	Half yearly on the status of implementation of stipulated condition and environmental safeguards shall be submitted to this Ministry/Regional office /CPCB/SPCB.	Six monthly compliance report accordance to the Environmental clearance granted by MoEFCC being submitted to MoEFCC, CPCB & GPCB. Last compliance report was submitted for the period of April'22 to September'22 had been submitted vide letter no. APL/EMD/EC/MoEFCC /202/11/22 Dated: 21.11.2022.
(xxviii)	Regional office of the Ministry of Environment & Forest located at Bhopal will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment - Report and environment Management Plant along with the additional information submitted from time to time shall be forwarded to the Regional office for their use during monitoring.	Being followed  All necessary documents already submitted to MoEFCC, Regional Office Bhopal.  Addition information being forwarded time to time MoEFCC, Regional Office Bhopal.
(xxix)	Separate funds shall be allocated for implementation of environmental protection measures along with item wise break up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year wise expenditure shall not be diverted for other purposes and year wise expenditure should be reported to the Ministry.	Being followed Separate funds allocated for environmental protection measures.  Details of Expenditure from October'2022 to March'2023 (F.Y. 2022-23) is enclosed as <b>Annexure-IX</b> .

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(xxx)	The project authorities shall inform the Regional office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.	Complied
(xxxi)	Full cooperation shall be extended to the Scientists/Officers from the Ministry /Regional Office of the Ministry at Bhopal/the CPCB/ the SPCB who would be monitoring the compliance of environmental status.	Noted Full co-operation shall be extended to mentioned authority.

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### Compliance status of Environment Clearance (EC)

#### For 1980 MW (3x660) TPP Phase – III

Vide letter No. J-13012/126/2008-IA.II (T) dated 20.05.10

Transferred EC from APMuL to APL dated; 24.04.2023.

Sr. No.	Specific Conditions	Status
A -(i)	Phase – I and Phase – II projects shall be run purely on imported coal. Phase- III project shall be run on 70 % domestic and 30 % imported coal.	Phase - I & II: Already commissioned being operated on imported coal. Phase-III: Domestic Coal Linkage for 70 % quantity granted by Ministry of Coal. Operational on blended coal.
(ii)	In case source of fuel supply is to be changed for Phase- I and Phase- II at a later stage, the project proponent shall intimate the Ministry well in advance along with necessary requisite documents for its concurrence for allowing the change.	Noted. Change in the source of fuel supply for power plant will be intimated to the Ministry well in advance along with necessary requisite documents for its concurrence for allowing the change.
(iii)	The project proponent shall examine in detail the possibility to adopting NIOT technology for desalination of sea water through Low temperature Thermal Desalination (LTTD) process. In case the same is not feasible detailed explanation shall be submitted.	Complied. The desalination plant is already commissioned. The LTTD process is not feasible at Mundra, and report already submitted to RO, MoEF&CC, Bhopal
(iv)	Marine biology shall not be disturbed in the Kotdi Creek and Gulf of Tunda due to any activity arising from the operation of power plant. Continuous monitoring of the marine biology in the area shall be undertaken and assessed for any changes beyond the natural variability identified and records maintained and submitted to the Ministry from time to time.	Complied. The integrated intake channel developed by APSEZL is away from Kotdi Creek, which is used by TPP also. The integrated outfall developed by APSEZL and being used by APL, crosses Kotdi Creek, through aqueduct without mixing with Kotdi Creek and without causing any obstruction to free flow. Marine biology monitoring is being monitored on regular basis. Monitoring report prepared by third party is enclosed as <b>Annexure – III</b> .
(v)	A comprehensive marine biological quality monitoring program and mitigation measures shall be prepared and submitted within six months to the Ministry for immediate implementation.	Being Complied. A comprehensive marine biological quality monitoring report is prepared and implementation. Report being submitted to MoEFCC. Monitoring report is enclosed as <b>Annexure – III</b> .
(vi)	A dedicated Environment Management Cell with suitable qualified personnel constituting of marine Biologist and an ecologist shall be set up under the control of a Senior Executive, who will report directly to the head of the Organization.	A dedicated Environment Management cell has been set up with qualified staff Including marine biologist and an ecologist. The head of the Environment Management Cell reports to the Station Head at Mundra. We have full-fledged Environment Lab accredited with NABL ISO/IEC 17025:2017 to



## Adani Power Ltd., Mundra

		<p>carry out in-house environmental monitoring.</p> <p><b>Environment Management System as per EMS ISO 14001: 2015 &amp; Water Efficiency Management System (ISO 46001:2019) implemented.</b></p>
(vii)	<p>The project proponent shall not be hamper the vocation of the fishing community in the area and it shall be ensured that local fishing community shall be allowed to carry out their vocation in the creek.</p>	<p>The power plant is located at a site, which is away from the fishing areas. Adani Power (Mundra) Ltd. uses the marine facilities such as intake channel and outfall channel, developed by APSEZ Ltd., which is not hampering the vocation of fishing community.</p> <p>Our CSR activities enhance infrastructure &amp; essential nets to fishermen communities for the betterment of their vocation in the area.</p> <p>Please refer <b>Annexure X</b>.</p>
(viii)	<p>The project proponent shall adopt the fishing communities displaced/ affected by the power plant and in particular those residing in and around Zarpara, Kotdi, Navinal, and Tragadi for their overall socio-economic development.</p>	<p>No fishing community is displaced by the power plant. The fishing community is being supported by the CSR activities of the company, being implemented through <b>Adani Foundation</b>.</p> <p>The CSR report is enclosed as <b>Annexure -X</b>.</p>
(ix)	<p>An endowment of Fisherman Welfare Fund shall be created not only to enhance their quality of life through creation of facilities for fish landing platforms/ fishing harbour/cold storage, but also to provide relief in case of emergency situations such as missing of fisherman on duty due to rough seas, tropical cyclone and storms etc.</p>	<p>Mundra TPP provided adequate funds for creation, maintenance and support of facilities such as sanitation facilities, support schools, approach roads, cycle to school going children, fish lending sheds etc. as well as support for purchasing various essential materials like nets, cycle, iceboxes, anchors, weighing scales, other fishing equipment's etc. All these activities are undertaken as a part of CSR, being implemented through Adani Foundation.</p> <p>Adani Foundation has also established "<b>Adani Vidya Mandir</b>" a school focusing on education of fisherman's children. Refer <b>Annexure X</b>.</p>
(x)	<p>Suitable screens (in stages) shall be placed across intake channel to prevent entrainment of life forms including eggs, larvae, juvenile fish, plankton etc. during extraction of sea water.</p>	<p>Being complied.</p> <p>Suitably designed screen systems have been provided in the intake system.</p>
(xi)	<p>No ground water shall be extracted for use in operation of the power plant even in lean season.</p>	<p>Being Complied.</p> <p>There is no extraction of Ground water for use in operation of the power plant.</p>
(xii)	<p>No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up/operation of the power plant.</p>	<p>Being Complied.</p> <p>No ground water bodies/natural drainage will be disturbed.</p>

## Adani Power Ltd., Mundra

(xiii)	FGD shall be provided for Phase- III units.	Complied. Sea water based FGD has been provided.
(xiv)	The system with COC of at least 1.3 shall be designed since the sea water has high TDS.	Being complied. COC of least 1.3 is being maintained
(xv)	Additional soil for leveling of the proposed site shall be generated within the sites (to the extent possible) so that natural drainage system of the area is protected and improved.	Complied. For leveling the site, the maximum additional soil has been generated within the site itself and maintained natural drainage system of the area.
(xvi)	High Efficiency Electrostatic Precipitator (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm <sup>3</sup> .	Complied, High efficient Electrostatic Precipitator (ESPs) has been provided to each boiler to maintain particulate emission less than 50 mg/Nm <sup>3</sup> . Please refer <b>Annexure-I</b>
(xvii)	Adequate dust extraction system such as cyclones/bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.	Water spraying system is provided in coal handling area and dust extraction system provided in coal transfer & other vulnerable dusty area. Closed conveyor system for Coal transportation is provided. Wind shield around coal stack has been provided. Integrated Ash silo system (Ash transfer by pneumatic system through pipeline) is in place for ash handling at single place and frequently water sprinkling is being done in the area.
(xviii)	Utilization of 100 % Fly Ash generated for Phase-III shall be made from day one of operation of the plant. Status of implementation shall be reported to the regional office of the Ministry from time to time.	Being complied Ash Generation & utilization details from October' 2022 to March' 2023. Generation & utilization details is enclosed as <b>Annexure- VII</b> .
(xix)	Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry form. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area.	Being followed Fly Ash is collected in dry form and storage silos have been provided. Unutilized ash is wet conditioned for disposal in Ash Dyke. Mercury and heavy metals are periodically monitored in the ash. No ash from Phase III Units is disposed off in low-lying area.
(xx)	Ash pond shall be lined with HDP/LDP lining or any other suitable impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash	Ash dyke is provided with LDPE Lining. Safety measures are in place to prevent breaching of the dyke.

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	dyke from getting breached.	
(xxi)	For disposal of Bottom Ash in abandoned mines (if proposed to be undertaken) it shall be ensured that the bottom and sides of the mined-out areas are adequately lined with clay before Bottom Ash is filled up. The project proponent shall inform the State Pollution Control Board well in advance before undertaking the activity.	No mines in the near by area.
(xxii)	There should not be any contamination of soil, ground and surface waters (Canals & village pond) with sea water in and around the project sites. In other wards necessary preventive measures for spillage from pipelines, such as lining of guard pond used for the treatment of outfall and intake should be adopted. This is just because the areas around the projects boundaries fertile agriculture and used for paddy cultivation.	Being complied. The Sea water is used within the plant premises only and in closed circuit. There is no contamination of soil, ground and surface water. There are no agricultural lands on Sea ward side of the power plant.
(xxiii)	To absorb the ground level pollutants, to act buffer against strong winds arising out of tropical cyclones/ storms, to reduce heat load and ameliorate environment, there is a need for shelterbelts/greenbelts/tree cover along the coastline, bunds around marshy areas, roadsides, around the project protected monuments, forts, waste places, School Campuses and other vacant lots. Coconut plantations can be developed along the coastline and near villages, school and forts. Stands of Casuariana should also be developed on some dunes and along coasts. Bamboos, Neem and other native trees should be planted in and around at the villages.	Being complied. Green belt / plantation developed in 147.33 Ha (Out of total 452.79 Ha Land for all three phases). Afforestation has been undertaken by APSEZL and Adani Foundation. Please refer <b>Annexure – VI</b>
(xxiv)	The above suggest Green Belt shall consist of 3 tires of plantation as cited above and largely comprising of native species around the power plant and at least 100 m width shall be raised. Wherever 100 m width is not feasible a 50 m width shall be raised and adequate justification shall be submitted to the regional office of the Ministry. Tree density shall not less than 2500 per ha with survival rate not less than 70 %.	Being complied. Green belt Being developed in & around plant area. We have well established Horticulture Department which has started large scale plantation/ Green Belt developed in and around the plant.
(xxv)	To meet the expenditure of these plantations and their management, a common Green Endowment fund should be created by the project proponents out of EMP budgets the	Mundra TPP has internal department of Horticulture for developing greenbelt/landscaping of our premises and its surrounding area. Mundra TPP has separate

## Adani Power Ltd., Mundra

	interest earned out of it should be used for the development and management of green cover of the area.	fund for such development.
(xxvi)	No wastewater should be discharged onto channel systems, backwaters, marshy areas and seas without treatment. The outfall should be first treated in guard pond and then discharge into deep sea (12 to 15 m depth). Similarly, the intake should be from deep sea to avoid aggregation of fish. The brine that comes out from desalinization plants should not be discharged into sea.	The wastewater is treated and disposed off through Outfall Channel, as recommended by NIO and approved by MoEF&CC.
(xxvii)	The treated effluents conforming to the prescribed standards only shall be re circulated and reused within the plant (as may be required). Arrangements shall be made that effluent and storm water do not get mixed.	Desalination wastewater is treated and utilized for dust suppression, CHP make up, etc. effluent stream and storm water drainage are isolated to prevent any mixing.
(xxviii)	The project proponent shall identify and develop new fodder farm/grazing land (Gaucher land) Firm financial commitment along with details for development of fodder farm/grazing land shall be submitted within three months to the Regional Office of the Ministry.	Fodder support is provided to various needy villages so as to facilitate the farmers and cattle owners in the time of need when fodder is highly expensive and in short supply, CSR report enclosed as <b>Annexure X</b> .
(xxix)	The project proponent shall prepare an action plan to be submitted within three months to the Ministry for regeneration of mangroves in the area and shall specify the financial commitments for the same.	Mangrove plantation plan along with regeneration plan submitted to MoEF&CC. To enhance the marine biodiversity, till date Adani group has carried out mangrove afforestation in more than 2800 ha. Area across the coast of Gujarat.
(xxx)	The water containing brine shall be discharged only after cooling at ambient temperature in a guard pond such that the same meets the average salinity of sea water.	Being complied The wastewater is treated and disposed off through Outfall Channel, as recommended by NIO and approved by MoEF&CC
(xxxi)	The project proponent shall set up single teacher school in every village in the study area so that village boy and girls do not have to walk long distances. The project proponent shall also explore the feasibility of providing cycles to school going children/students to address school dropouts. Report to this effect shall be submitted to the Regional Office of the Ministry from time to time.	All school of the surrounding villages adopted for development by Adani Foundation, CSR activities being done by Adani Foundation. CSR Progress Report for April'2022 to March'2023 (FY 2022-23) is enclosed as <b>Annexure - X</b> .
(xxxii)	Action plan for R&R (If applicable) with compensation package of the project affected persons be submitted and	Not applicable.

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	implemented as per prevalent R&R policy within three months from the date of issue of this letter.	
(xxxiii)	An amount of Rs. 36.0 Crores shall be earmarked as one-time capital cost for CSR programme. Subsequently a recurring expenditure of Rs. 7.20 Crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within one month along with road map for implementation.	Complied. A separate budget earmarked for CSR activities. CSR study report already submitted to ministry. CSR activities being carried out by Adani Foundation.
(xxxiv)	While identifying CSR programme the company shall conduct need-based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc, can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self employment and jobs. In addition, a special scheme for upliftment of SC/ST's and marginalised population in the study area out of CSR programme shall be formulated and submitted to the Ministry within six months along with firm commitment of implementation. The scheme shall have an in-built monitoring mechanism.	Need based Assessment Study for development of CSR plan completed by VIKSAT, Ahmedabad. Report already submitted to MoEF&CC.  Need based plan implementation is being started nearby villages; individuals who are economically weak to undertake some economic activity that would help them achieve sustainable livelihood and financial independence.  CSR progress report is enclosed as <b>Annexure X</b> .
(xxxv)	If shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.	Being complied Audit has been conducted by Indian Institute of Social Welfare and Business Management (IISWBM) of university of Kolkata. Final Social Audit Report is awaited from IISWBM. Implementation of Social Accountability 8000 ISO SA8000:2014 is on progress.
<b>B</b>	<b>General Conditions:</b>	<b>Status</b>
(i)	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.	Sewage Treatment Plants (STP) installed within the plant and treated water being utilizing/recycle within the plant remises for plantation and green belt development.

## Adani Power Ltd., Mundra

(ii)	Rainwater harvesting should be adopted. Central Groundwater Authority/ Board shall be consulted for finalization of appropriate rainwater harvesting technology within a period of three months from the date of clearance and details shall be furnished.	Being Complied. Rainwater Harvesting (RWH) scheme has been submitted to RO, CGWB, Ahmedabad. We have adopted the scheme and developed rainwater collection & groundwater recharge facilities at three locations within plant premises.
(iii)	Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fires in coal yard, especially during summer season. Copy of these measures with full details along with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.	Proper fire fighting and fire hydrant system has been provided in the coal stack yard. <b>Occupational Health &amp; Safety Management System as ISO 45001:2018 implemented.</b>
(iv)	Storage facilities for auxiliary liquid fuel such as LDO and /HFO /LSHS shall be made in the plant area in consultation with department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5 %. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	The LDO and HFO/LSHS properly stored in minimum risk area. A Disaster management plan will be prepared covering the all the eventualities in case of accident due to storage of oil. On site plan has already been made and implemented. Disaster management Plan has already been prepared and implemented. <b>Occupational Health &amp; Safety Management system as ISO 45001:2018 implemented.</b>
(v)	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metals (Hg, Cr, As, Pb) and records maintained and submitted to the Regional Office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project.	Being Complied  Four nos. of Borewell establish around the ash dyke & Ground water quality monitored on regular basis by third party and periodic report being submitted to the MoEF&CC. Please refer <b>Annexure VIII.</b>
(vi)	First aid and Sanitation arrangement shall be made for the drivers and other contract workers during construction phase.	Complied First aid and sanitation was provided for driver and contract labour during construction.
(vii)	Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA. For people working in the high noise area, requisite personal protective equipment like earplugs/earmuffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any	Being complied Necessary action has been taken to maintain noise level 75dB (A). The working personals provided with appropriate personal protective equipment and periodic audiometric check up is being carried out and records are maintained.  Regular noise level monitoring is being carried out inside the plant locations & monitoring

## Adani Power Ltd., Mundra

	hearing loss including shifting to non noisy/less noisy areas.	values are well within limits. Please refer <b>Annexure- I.</b> <b>Occupational Health &amp; Safety Management System as ISO 45001:2018 implemented.</b>
(viii)	Regular monitoring of ground level concentration of SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> & PM <sub>10</sub> and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.	Being complied. Regular monitoring of PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> and Hg is being carried out by third party consultant as well as in house and records are maintained. Online Continuous Ambient Air Quality Monitoring System has been installed at three various locations within the plant premises. Monitoring result is available & within the permissible limits. Monitoring reports being submitted to regional office of the MoEF&CC, CPCB and GPCB periodically. Please refer <b>Annexure - I</b>
(ix)	Provision shall be made for the made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	The temporary facilities removed after the Completion of project.
(x)	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a>	Complied. Advertisement published in the local newspaper.
(xi)	A copy of the clearance letter shall be sent by the proponent to concern Panchayat, Zila Parisad /Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal: The clearance letter shall also be put on the website of the Company by the proponent.	Complied.
(xii)	A separate Environment Management cell with qualified staff shall be set up for	We have established separate environmental monitoring cell with well qualified staff to carry

## Adani Power Ltd., Mundra

	implementation of the stipulated environment safeguards.	<p>out regular surveillance for implementation of stipulated environmental safeguards and full-fledged Environment Lab accredited with NABL ISO/IEC 17025:2017 to carry out in-house monitoring of Air, Water &amp; Noise as well as terrestrial &amp; marine ecology regularly.</p> <p><b>Environment Management System as per EMS ISO 14001: 2015 &amp; Water Efficiency Management System (ISO 46001:2019) implemented.</b></p> <p>Terrestrial monitoring report enclosed as <b>Annexure - II</b> and Marine monitoring Report is enclosed as <b>Annexure - III.</b></p>
(xiii)	The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the regional office of MOEF, the respective Zonal Office of CPCB and SPCB. The criteria pollutant levels namely; SPM, RSPM (PM <sub>2.5</sub> , & PM <sub>10</sub> ), SO <sub>2</sub> , NO <sub>x</sub> (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.	<p>Six monthly Environmental Clearance compliance status report is regularly submitted to MoEF&amp;CC, CPCB and SPCB. The same is sent by email also.</p> <p>Compliance status updated on Company's website.</p> <p>Regular monitoring of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and Hg is being carried out by third party and records are maintained.</p> <p>Please refer <b>Annexure I.</b></p> <p>Display board is already installed in main gate.</p>
(xiv)	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well by e-mail) to the respective Regional Office of MOEF, the respective Zonal office of CPCB and SPCB.	<p>Being Complied</p> <p>Half yearly compliance report is regularly submitted to MoEF, CPCB &amp; SPCB. The same is sent by email also.</p> <p>Compliance status updated on Company's website.</p> <p>Last compliance report was submitted for the period of April'2022 to September'2022 had been submitted vide letter no. APL/EMD/EC/MoEFCC/202/11/22 Dated: 21.11.2022.</p>
(xv)	The environment statement for each financial year ending 31st March in Form V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website, of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.	<p>Being complied,</p> <p>Regular environment statement is being submitted to the Gujarat Pollution Control Board (GPCB). FY 2021-22 was submitted along with previous EC compliance report Dated: 21.11.2022.</p>
(xvi)	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated	<p>Six monthly Environmental Clearance compliance status report is regularly submitted to MoEF&amp;CC, CPCB and SPCB. The same is sent</p>



## Adani Power Ltd., Mundra

	environmental safeguards to the ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, Ministry of Environment and Forests.	by email also. Compliance status updated on Company's website.
(xvii)	Regional Office of Ministry of Environment and Forest will monitor the implementation of the stipulated conditions. A complete set of documents including Environment Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the regional office for their use during monitoring. Project proponent will upload the compliance status in their website and update the same from time to time at least six monthly basis. Criteria pollutants levels including NOx (from stack & ambient air) shall be displayed at the main gate of the power plant.	Being Complied. Display board already installed at main gate.
(xviii)	Separate funds allocated for implementation of environmental protection measures along with item wise breakup. This cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year wise expenditure should be reported to the Ministry.	Being Complied. Separate funds allocated for environmental protection measures. Expenditures details F.Y. 2022-23 is enclosed as <b>Annexure-IX</b> .
(xix)	The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the Concerned authorities and the dates of start of land development work and commissioning of plant.	Complied
(xx)	Full cooperation shall be extended to the scientists/ officers from the Ministry/Regional office of the Ministry at Bangalore/CPCB/ the SPCB who would be monitoring the compliance of environmental status.	Noted, Full co-operation shall be extended to mentioned authority always.

**F. No. J-13011/7/2007-IA II(T)**  
Government of India  
Ministry of Environment, Forest and Climate Change  
(Impact Assessment Division)

2nd Floor, Vayu Block  
Indira Paryavaran Bhawan  
Jor Bagh Road, Aliganj,  
New Delhi-110003

**Dated: 24<sup>th</sup> April, 2023**

To,

**M/s Adani Power Ltd.**

Adani House, Nr Mithakhali Circle,  
Navrangpura, Ahmedabad - 380 009  
Gujarat

**Sub: Transfer of Environmental Clearance for Coal based Thermal Power Plant at village Tunda Wandh, Taluk Mundra, District Kutch (Gujarat) from M/s Adani Power (Mundra) Limited to M/s Adani Power Ltd- reg.**

Sir,

This has reference to your online proposal no. IA/GJ/THE/297916/2023 dated 25<sup>th</sup> February, 2023 regarding transfer of the Environmental Clearance for the above said project from M/s Adani Power (Mundra) Limited to M/s Adani Power Ltd.

2. The Ministry had issued ECs vide letter dated 13.08.2007 for 2x330 MW capacity (Phase I), 21.10.2008 for 1980 MW (2x330 & 2x660 MW) TPP (Phase II), 20.05.2010 for expansion by addition of 3x660 MW coal based TPP (Phase III) followed by corrigendum dated 1.06.2011 at village Tunda Wandh, in Mundra Taluka, District Kutch (Gujarat). Also, the Ministry vide OM dated 13.04.2018 has transferred the all the environmental clearance in the name of M/s Adani Power (Mundra) Ltd.

3. M/s Adani Power Ltd has submitted application for transfer of environmental clearance and informed that the Hon'ble NCLT vide its order dated 8.02.2023, sanctioning the scheme of amalgamation of M/s Adani Power (Mundra) Limited with M/s Adani Power Ltd, and thus necessitating transfer of all requisite approvals in the name of M/s Adani Power Ltd. Also, it has informed that M/s Adani Power (Mundra) Ltd is wholly owned subsidiary company of Adani Power Ltd.

4. M/s Adani Power Ltd, has submitted an affidavit to abide by the terms and conditions stipulated in the environment clearance dated 13.08.2007, 21.10.2008, 20.05.2010 and corrigendum dated 1.06.2011 issued in the name of M/s Adani Power (Mundra) Limited. The CIN number of M/s Adani Power Ltd is L40100GJ1996PLC030533.

5. As per the relevant provisions of the EIA Notification, 2006, the environmental clearance granted to the project vide letter dated 13.08.2007 for 2x330 MW capacity (Phase I), 21.10.2008 for 1980 MW (2x330 & 2x660 MW) TPP (Phase II), 20.05.2010 for expansion by addition of 3x660 MW coal based TPP (Phase III) followed by corrigendum dated 1.06.2011 at village Tunda Wandh, in Mundra Taluka, District Kutch (Gujarat) are hereby transferred from M/s Adani Power



(Mundra) Limited to M/s Adani Power Ltd on the same terms and conditions under which prior ECs were granted.

6. This issues with approval of the competent authority.

  
24.4.2023

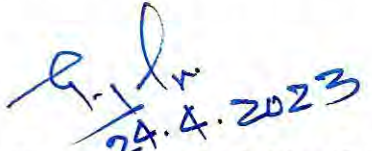
**(Yogendra Pal Singh)**  
**Scientist 'E'**

Tele: 011-20819364

Email Id: [yogendra78@nic.in](mailto:yogendra78@nic.in)

**Copy to: -**

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi - 110 001.
2. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi - 110 066.
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD cum-Office Complex, East Arjun Nagar, Delhi - 110 032.
4. The Deputy Director General of Forests (Central), Integrated Regional Office, Office Address: Room No 407, Aranya Bhawan, Near CH-3 Circle, Sector 10A, Gandhinagar, Gujarat - 382 010.
5. The Additional Chief Secretary, Forests & Environment Department, Government of Gujarat, Block-14, 8<sup>th</sup> Floor, Sachivalaya, Gandhinagar -382 010, Gujarat.
6. The Member Secretary, Gujarat Pollution Control Board, Paryavaran Bhavan, Sector-10A, Gandhinagar - 382 010.
7. The District Collector, Kutch District, City Police Station Rd, Old Umed Nagar, Bhuj, Gujarat - 370 001.
8. Guard file/Monitoring file.
9. Website of MoEF&CC.

  
24.4.2023

**(Yogendra Pal Singh)**  
**Scientist 'E'**

# **ENVIRONMENTAL MONITORING REPORT**

**M/s. ADANI POWER (MUNDRA) LIMITED**



**Report Period: October 2022 to December 2022**



**PREPARED BY: M/S.UNISTAR ENVIRONMENT AND RESEARCH LABS PVT. LTD**

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**FOR**  
**UniStar Environment and**  
**Research Labs Pvt. Ltd.**



**Mr. Jaivik Tandel**  
**(Authorized By)**



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## EXECUTIVE SUMMARY

Adani Power (Mundra) Limited (APMuL) places great emphasis on delivering long-term sustainable value for its respective stakeholders and is certain to fulfill them by sustaining perseverance in their actions. In ensuring to generate electricity at large scales and provide seamless access to electricity to households with generation capacity of 4620 in three phases. Mundra Thermal (coal Based) Power Plant near Village Tunda in Mundra, District Kutch, and Gujarat. APMuL received Consolidated consent AWH-102106 on dated 17.07.2019 valid up to 29/06/2024.

The phased wise development being undertaken for ultimate capacity of power plant is shown below.

- First Phase : 2 x 330 MW
- Second Phase : 2 x 330 MW + 2 x 660 MW
- Third Phase : 3 x 660 MW

The Thermal Power Plant is located near Village Tunda, Mundra Taluka in Kutch District. The Site is closed to the sea, making cooling water perennially available for the power plant. The Power Plant is based on supercritical technology using imported coal.

All three phase of the power plant is operational and as the part of the compliance to the statutory requirement, M/s. Adani Power(Mundra) Limited has entrusted the environmental quality monitoring study for the area surrounding the power plant. Towards achieving and sustaining Business excellence at the Plant, Adani Power (Mundra) Limited Implemented ISO-14001:2015 Environment Management System (EMS), ISO 46001:2019 Water Efficiency management and Accreditation of NABL in Environmental Laboratory (ISO/IEC 17025:2017) vide Certificate No. TC-5215.

Various environmental parameters have been monitored during the period of October 2022 to December 2022. The detail of the environmental parameters along with frequency of monitoring is shown in subsequent sections.



### 1. ENVIRONMENTAL PARAMETERS

Sr. No.	Environmental Indices	Parameter	No. of Location and Monitoring.	Frequency of Sampling
1.	Ambient Air Quality	PM <sub>10</sub> , PM <sub>2.5</sub> , Sulphur Dioxide and Nitrogen Dioxide	<b>Three Location</b> 1. Siracha Village, 2. Kandagara Village 3. Wandh Village	Twice a week
2.	Ambient Air Quality	PM <sub>10</sub> , PM <sub>2.5</sub> , Sulphur Dioxide, Nitrogen Dioxide, Ozone and Mercury	<b>Five Location</b> 1. Siracha, 2. Kandagara, 3. Wandh, 4. 20 MLD Desalination plant, 5. Shantiniketan-1)	Once in a month
3.	Stack Monitoring	PM, Sulphur Dioxide, Oxide of Nitrogen and Hg	Nine Location	Once in a month
4.	Meteorological Monitoring	Wind rose, Wind speed, Wind direction, Rainfall, Temperature, Relative Humidity	One location	Round the clock
5.	Ground Water Monitoring for Surrounding Villages	Colour, Odour, Taste, Turbidity, Dissolved Solids, pH value, Total Hardness, Calcium, Boron, Copper, Iron, Manganese, Chloride, Sulphate, Nitrate, Fluoride, Phenolic Compounds, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Anionic Detergents as MBAS, Chromium Cr+6, Mineral Oil, MPN Index for Coliform Bacteria per 100 ml, Residual Free Chlorine, Aluminium, Alkalinity, Magnesium as Mg, Escherichia Coli in 250 ml.	Five Location	Once in Quarter
6.	Effluent Water Sample	pH, Temperature, colour, SS, O & G, BOD <sub>3</sub> , COD, Chlorides, TDS, Sulphates, Ammonical Nitrogen, % Sodium, Sodium Absorption Ratio, Sulphides, Total Chromium, Hexavalent Chromium, Copper, Lead, Zinc, Free available chlorine, Phosphate, Iron	Four Location	Once in a month / Quarter
7.	Combined effluent Water Sample	pH, Temperature, colour, SS, O & G, BOD <sub>3</sub> , COD, Chlorides, TDS, Sulphates, Ammonical Nitrogen, % Sodium, Sodium Absorption Ratio, Sulphides, Total Chromium, Hexavalent Chromium, Copper, Lead, Zinc, Free available chlorine, Phosphate, Iron	One Location	Once in a month
8.	STP Water Analysis	pH, Residual Chlorine, SS, BOD, COD, Faecal coliform	Three Location	Once in month/ Quarter

9.	Borwell water Near Ash Dyke Area	pH @ 25 ° C, Conductivity (µS), Chloride as Cl <sup>-</sup> Salinity (ppt), Total Dissolved Solids, Carbonate as CaCO <sub>3</sub> , Bicarbonate as CaCO <sub>3</sub> , Mercury as Hg, Arsenic as As, Lead as Pb, Chromium as Cr, Cadmium as Cd.	Four Location	Once in a Quarter
10.	Surrounding Villages Soil Analysis	Magnesium as Mg %, Molybdenum as Mo in ppm, Phosphorus as P %, Calcium as Ca %, Zinc as Zn, Manganese as Mn, Potassium as K%, Nitrogen as N%, Iron as Fe%, Copper as Cu, Boron as B, Sulphur in %, Chloride as Cl%.	Five Location	Once in Six Month
11.	Noise Level Monitoring	Noise level monitoring in dB(A)	10 Location	Once in a Quarter
12.	Condensate Cooling tower	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 Location	Once in a Quarter
13.	Cooling tower Blow down	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 Location	Once in a Quarter
14.	Boiler Blow down	TSS, O & G, Total Copper, Total Iron	04 Location	Once in a Quarter

### 1.1 AMBIENT AIR QUALITY

The scenario of the Ambient Air Quality in the study region has been assessed through a network of 5 locations of Ambient Air Quality Monitoring. The design of monitoring network in the air quality surveillance program was based on the following considerations.

- Topography / Terrain of the study area.
- Human Settlements
- Wind pattern
- Health status
- Representation of regional Background levels.
- Accessibility of monitoring site.
- Resource availability.

Pre-calibrated Respirable Dust Samplers (PM<sub>10</sub>) & Fine Dust Samplers (PM<sub>2.5</sub>) have been used for monitoring the existing AAQM Status. Maximum, Minimum, Average, Standard Deviation and percentile have been computed from the raw data collected at all individual sampling stations to represent the Ambient Air Quality Status.

The significant parameters viz., PM<sub>10</sub>, PM<sub>2.5</sub>, Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxides (NO<sub>2</sub>) and Mercury were monitored within the study area of 10 km from the site.

### 1.2 FLUE GAS MONITORING

All three phases of the Thermal Power Plant is in operation. The flue gas emission from stack attached to individual boiler is monitored once in month during the monitoring period.

### 1.3 WATER QUALITY MONITORING

The water quality parameters as per IS: 10500 for water resource within the study area have been used for describing the water environment and assessing the impacts on it.

Groundwater samples of nearby villages were collected at five locations the parameters of prime importance selected under physicochemical characteristics were estimated to describe the baseline environmental status of the water resources during the monitoring period. Four bore well samples surrounding the ash dyke area were collected during the month of December 2022 along with outfall water sample.

### 1.4 AMBIENT NOISE LEVEL MONITORING

The Ambient Noise levels within the plant premises were relocated at a different location (10 nos.) for the implementation of effective noise control programs.

**METEOROLOGICAL MONITORING REPORT**  
**Period: October 2022-December 2022**



### 1.5 MICROMETEOROLOGY

Meteorological parameters are important factors in the study of Air Pollution. The Transport and diffusion of the pollutants in the atmosphere are governed by meteorological factors.

Primary / Basic Meteorological Parameters

- Wind Velocity
- Wind Direction

Since the dispersion and diffusion of pollutants mainly depend on the above factors hence these factors are considered as primary meteorological parameters.

Secondary Meteorological Parameters

- Relative Humidity
- Ambient Temperature

The above-said factors are considered as secondary factors since these factors control the dispersion of the pollutant indirectly by affecting the primary factors.

### METEROLOGICAL DATA

#### METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF OCTOBER-2022

Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	Total
01.10.2022	32.6	24.0	99.0	60.5	0.0
02.10.2022	32.3	24.0	94.0	55.6	0.0
03.10.2022	33.2	23.3	98.4	61.1	0.0
04.10.2022	32.7	23.8	97.1	59.1	0.0
05.10.2022	34.4	24.1	99.4	53.5	0.0
06.10.2022	35.0	24.2	99.6	52.2	0.0
07.10.2022	35.3	25.1	92.5	38.2	0.0
08.10.2022	35.5	26.0	98.3	51.1	0.0
09.10.2022	36.6	25.0	93.5	47.2	0.0
10.10.2022	37.2	26.0	98.5	40.0	0.0
11.10.2022	37.2	25.0	89.4	35.4	0.0
12.10.2022	37.4	23.2	75.1	32.3	0.0
13.10.2022	37.6	23.2	77.1	27.4	0.0
14.10.2022	37.4	23.1	89.3	27.3	0.0
15.10.2022	36.1	23.2	88.1	26.0	0.0
16.10.2022	37.0	22.0	77.5	24.0	0.0
17.10.2022	36.4	21.3	73.2	29.3	0.0
18.10.2022	36.1	22.1	89.3	27.5	0.0
19.10.2022	35.1	22.0	85.5	31.3	0.0
20.10.2022	35.2	21.3	86.5	32.1	0.0
21.10.2022	35.3	21.0	83.2	34.1	0.0
22.10.2022	35.5	23.3	73.3	25.2	0.0
23.10.2022	36.3	21.0	66.6	25.1	0.0
24.10.2022	36.1	21.2	77.3	25.2	0.0
25.10.2022	34.3	21.3	90.0	33.3	0.0
26.10.2022	32.5	21.0	96.5	44.4	0.0
27.10.2022	33.3	21.2	99.3	45.5	0.0
28.10.2022	35.4	21.2	99.2	29.2	0.0
29.10.2022	35.6	23.2	83.1	32.2	0.0
30.10.2022	35.2	24.0	87.6	31.4	0.0
31.10.2022	35.5	23.1	86.1	27.0	0.0
Min	32.3	21.0	66.6	24.0	0.0
Max	37.6	26.0	99.6	61.1	0.0

**METEROLOGICAL DATA**

**METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF NOVEMBER -2022**

Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	Total
01.11.2022	36.1	20.0	88.4	27.3	0.0
02.11.2022	35.0	22.0	83.2	31.2	0.0
03.11.2022	36.0	21.0	82.0	32.3	0.0
04.11.2022	37.5	21.0	81.0	22.0	0.0
05.11.2022	36.2	19.1	93.1	29.1	0.0
06.11.2022	36.5	21.0	86.1	26.0	0.0
07.11.2022	35.2	22.1	69.1	33.1	0.0
08.11.2022	32.3	20.3	95.2	34.0	0.0
09.11.2022	34.2	21.4	85.6	46.6	0.0
10.11.2022	33.5	20.2	89.3	32.1	0.0
11.11.2022	34.4	20.3	76.3	23.2	0.0
12.11.2022	33.6	20.0	69.9	27.2	0.0
13.11.2022	33.5	20.0	68.3	29.0	0.0
14.11.2022	33.2	19.2	81.1	31.1	0.0
15.11.2022	32.2	20.1	99.3	52.2	0.0
16.11.2022	33.2	20.0	81.2	41.2	0.0
17.11.2022	32.4	19.1	78.1	32.2	0.0
18.11.2022	32.3	19.0	93.1	36.0	0.0
19.11.2022	32.5	18.0	93.1	31.3	0.0
20.11.2022	32.2	18.1	91.3	35.0	0.0
21.11.2022	32.3	19.0	84.3	28.0	0.0
22.11.2022	32.5	18.2	77.3	33.2	0.0
23.11.2022	32.5	17.2	84.4	29.0	0.0
24.11.2022	33.1	17.2	77.1	23.5	0.0
25.11.2022	31.3	17.0	79.6	27.5	0.0
26.11.2022	31.3	16.0	75.2	24.5	0.0
27.11.2022	30.6	15.2	81.0	31.2	0.0
28.11.2022	31.0	16.1	89.6	26.3	0.0
29.11.2022	31.1	16.0	85.5	23.0	0.0
30.11.2022	31.0	17.0	65.1	28.3	0.0
Min	30.6	15.2	65.1	22.0	0.0
Max	37.5	22.1	99.3	52.2	0.0

**METEROLOGICAL DATA**

**METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF DECEMBER -2022**

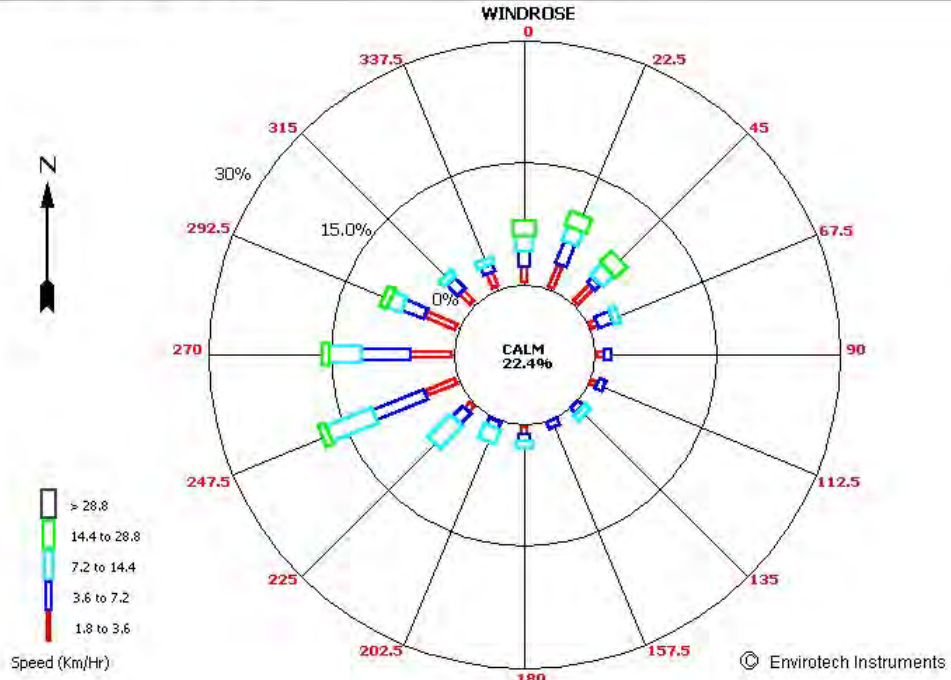
Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	Total
01.12.2022	31.2	16.0	67.4	33.1	0.0
02.12.2022	30.5	16.2	69.4	35.1	0.0
03.12.2022	30.4	16.2	75.2	31.0	0.0
04.12.2022	30.2	16.1	69.4	35.1	0.0
05.12.2022	29.2	15.2	69.5	21.5	0.0
06.12.2022	29.3	15.0	68.3	22.2	0.0
07.12.2022	29.3	15.0	68.1	30.0	0.0
08.12.2022	30.5	15.2	58.3	31.2	0.0
09.12.2022	30.0	14.2	66.2	25.3	0.0
10.12.2022	30.0	15.2	60.4	24.0	0.0
11.12.2022	30.4	15.0	82.1	29.3	0.0
12.12.2022	30.5	16.0	84.1	33.2	0.0
13.12.2022	30.3	18.1	64.3	39.3	0.0
14.12.2022	30.6	20.0	58.0	35.0	0.0
15.12.2022	31.4	18.2	60.1	34.0	0.0
16.12.2022	32.2	19.1	65.5	29.3	0.0
17.12.2022	33.2	21.0	53.2	23.0	0.0
18.12.2022	33.1	20.0	71.1	21.1	0.0
19.12.2022	32.5	19.1	71.1	21.1	0.0
20.12.2022	31.4	19.6	58.1	22.0	0.0
21.12.2022	33.4	17.0	67.5	15.5	0.0
22.12.2022	31.0	16.0	65.1	15.5	0.0
23.12.2022	27.4	15.2	56.1	13.6	0.0
24.12.2022	28.4	13.3	56.3	12.0	0.0
25.12.2022	28.2	13.1	56.4	23.5	0.0
26.12.2022	28.5	12.2	61.3	14.0	0.0
27.12.2022	29.7	14.0	57.2	12.5	0.0
28.12.2022	31.2	14.1	70.5	12.2	0.0
29.12.2022	32.3	16.0	83.0	21.2	0.0
30.12.2022	30.4	18.2	99.4	31.2	0.0
31.12.2022	27.5	16.1	64.1	19.3	0.0
Min	27.4	12.2	53.2	12.0	0.0
Max	33.4	21.0	99.4	39.3	0.0

**1.5.1 Wind Rose Diagram**

**ADANI POWER (MNDRA) LIMITEMUNDRA WINDROSE FOR THE SEASON OF Oct. to Dec. 2022**

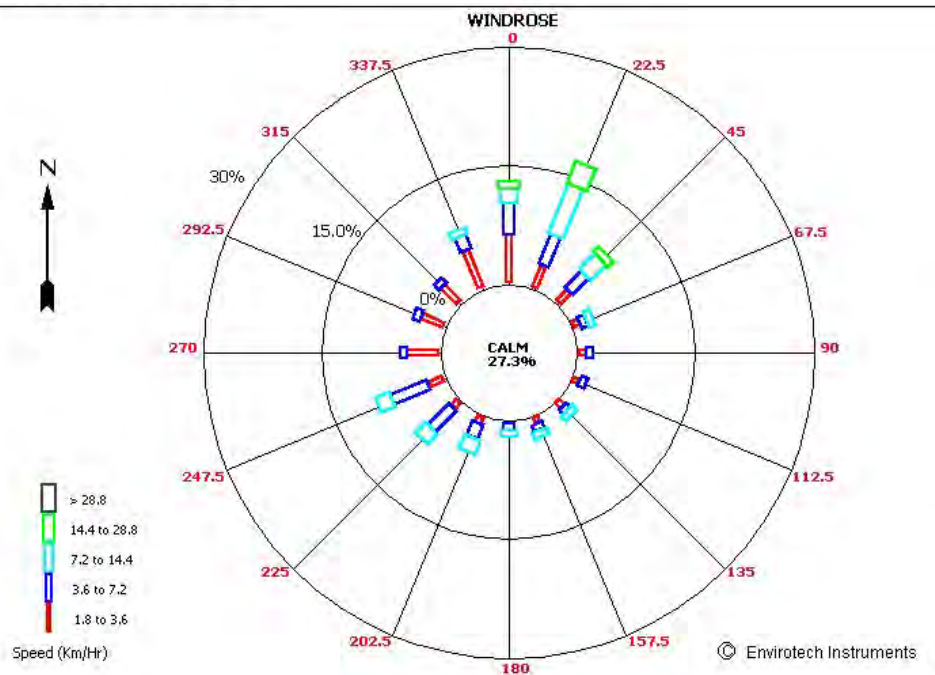
Time : 00:00 - 23:00  
Date : 01/10/22 - 31/10/22

ADANI POWER (MUNDRA) LIMITED



Time : 00:00 - 23:00  
Date : 01/11/22 - 30/11/22

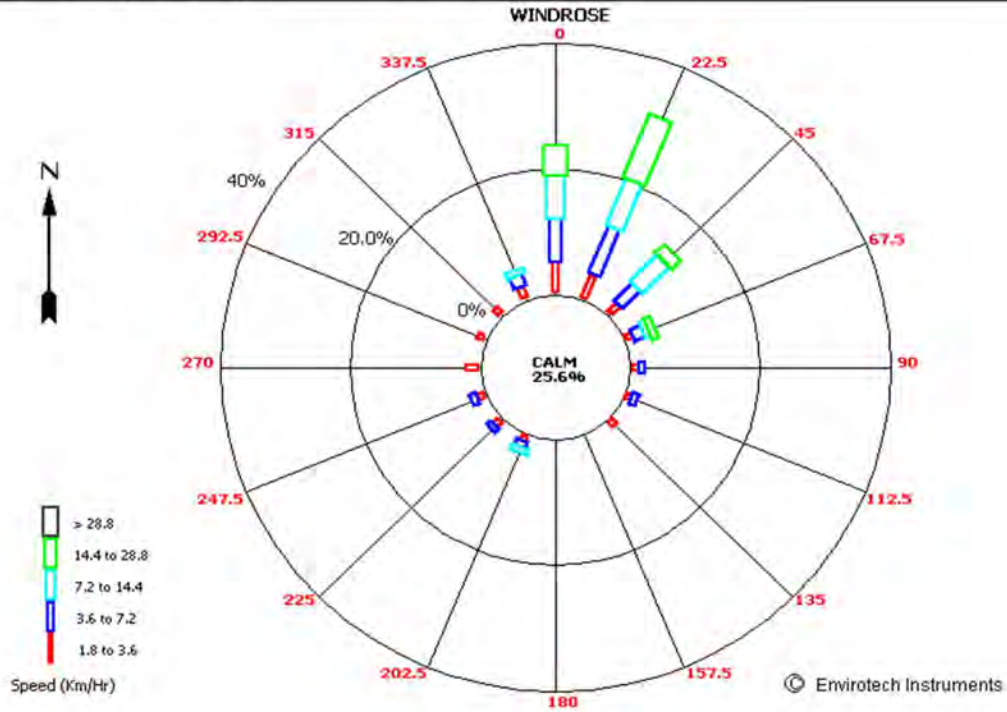
ADANI POWER (MUNDRA) LIMITED





Time : 00:00 - 23:00  
Date : 01/12/22 - 31/12/22

ADANI POWER MUNDRA LIMITED



Project	: Adani Power (Mundra) Limited (APMuL)	Period	: October 2022 to December 2022
Location	: Village – Tunda, Dist. - Kutch		
<b>October 2022</b>			
Wind Direction		SW	
Average Wind Speed		5.2 Km/Hr	
<b>November 2022</b>			
Wind Direction		NE	
Average Wind Speed		4.6 Km/Hr	
<b>December 2022</b>			
Wind Direction		NE	
Average Wind Speed		6.5 Km/Hr	

## 2 SCOPE & METHODOLOGY ADOPTED FOR ENVIRONMENTAL MONITORING

### 2.1 Introduction

The scope of the study includes detailed characterization of various environmental like air, water and noise within an area of 10 km radius in and around the power plant area at 20 MLD Plant, Shantiniketan-1 and surrounding villages named as Siracha, Wandh and Kandagara of Dist. Kutch. The above-mentioned environmental components were monitored at the study area and frequency of monitoring, number of samples along with methodology is as shown in below table.

### 2.2 Scope and Methodology for Monitoring of Various Environmental Attributes

Sr. No	Environmental Attributes	Sampling Locations	Sampling Parameters	Sampling Frequency	Total No of samples	Methodology
1	Ambient Air Quality	3	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub>	Twice a week (24 hourly Samples)	72	IS : 5182 & Reference APHA(AIR)
2	Ambient Air Quality	5	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , Mercury	Once in month (24 hourly Samples)	15	IS : 5182 & Reference APHA(AIR)
2	Flue Gas Stack Analysis	Unit 1 to 9 Boiler	PM, SO <sub>2</sub> , NOx	Once in month	27	As per IS : 11255
3	Surrounding Villages Ground Water Analysis	5 water sample	Test specification as per IS : 10500 - 1991	Once in Quarter	5	AS per APHA Method
4	Water Quality of Outfall for APMuL	1	As per CTO	Once in month	3	As Per APHA Method
5	STP Outlet	1	As per CTO	Once in month	3	As Per APHA Method
6	Bore well water Near Ash Dyke Area	4	Test specification as per IS : 10500 - 1991	Once in Quarter	4	As Per APHA Method
7	Cooling Tower Blow down Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method
8	Condensate Cooling Tower Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method
9	Boiler Blow down Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method

### 3 ENVIRONMENT AIR QUALITY AND FLUE GAS EMISSION MONITORING

The principal objective of the ambient air quality was to assess the existing levels of the air pollution as well as the regional background concentration in the plant area. Air pollution forms important and critical factors to study the environmental issues in the study areas. Thus, air quality has to be frequently monitored to know the extent of pollution due to power plant activity and other ancillary activities. Details are provided in Section 3.1.1.

Flue gas monitoring analysis has been conducted by M/s. UniStar Environment and Research Labs Pvt. Ltd. Details are provided in Section 3.2.

#### 3.1 Ambient Air Monitoring Data

##### 3.1.1 Details of Ambient Air Quality Monitoring Stations

The detail of the ambient air monitoring locations including the distance from the project site with direction is as shown below.

S.No.	Code	Name of sampling location	Distance	Frequency
1	A - 1	Siracha Village	2.6 km (NE)	Twice a week
2	A - 2	Kandagara Village	3.2 km (NW)	Twice a week
3	A - 3	Wandh Village	2.0 km (SW)	Twice a week
4	A - 4	Nr.20 MLD Plant	1.2 Km	Once in month
5	A - 5	Nr. Shantiniketan-1	0.8 Km	Once in month



**Ambient Air Quality Monitoring Stations**

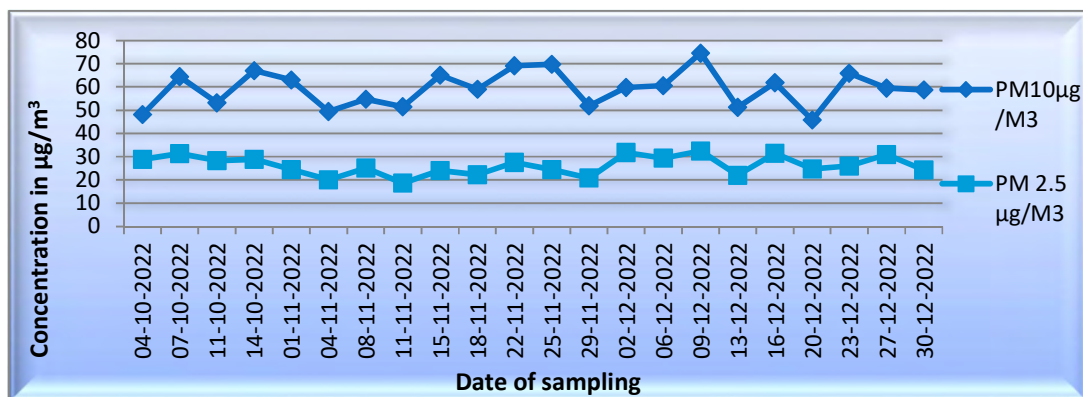
**3.1.2 Location: Siracha Village**

The Sampling station was located in the Siracha village. The Station is located at about 3.5 km away in Northwest Direction from the core zone area. The Respirable Dust Sampler & PM<sub>2.5</sub> was placed at a height of 3.0 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (October 2022-December 2022) are as follows.

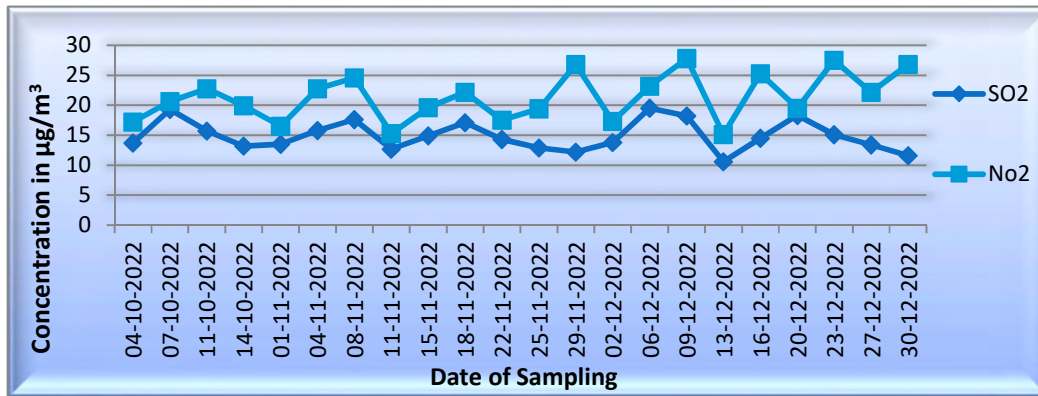
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
04-10-2022	48.2	28.8	13.7	17.2	-
07-10-2022	64.5	31.3	19.3	20.6	-
11-10-2022	53.2	28.3	15.7	22.8	13.3
14-10-2022	67.1	28.8	13.2	19.9	-
01-11-2022	63	24.4	13.5	16.5	-
04-11-2022	49.5	20	15.8	22.8	-
08-11-2022	54.8	25.1	17.6	24.6	15.8
11-11-2022	51.5	18.6	12.7	15.3	-
15-11-2022	65.1	24.1	14.9	19.6	-
18-11-2022	59	22.3	17.1	22.2	-
22-11-2022	69.1	27.6	14.3	17.5	-
25-11-2022	69.8	24.5	12.9	19.4	-
29-11-2022	51.9	20.9	12.2	26.8	-
02-12-2022	59.8	31.8	13.8	17.3	-
06-12-2022	60.6	29.4	19.5	23.2	-
09-12-2022	74.6	32.5	18.2	27.8	13.2
13-12-2022	51.3	22	10.6	15.1	-
16-12-2022	61.9	31.5	14.5	25.3	-
20-12-2022	45.8	24.7	18.3	19.5	-
23-12-2022	65.9	26	15.1	27.5	-
27-12-2022	59.6	30.9	13.4	22.2	-
30-12-2022	58.7	24.3	11.6	26.8	-
Maximum Value	74.6	32.5	19.5	27.8	15.8
Minimum Value	45.8	18.6	10.6	15.1	13.2
Average Value	59.3	26.3	14.9	21.4	14.1
Standard Deviation	7.8	4.1	2.5	4.0	1.4
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 1: Particulate Matter Level Siracha Village**



**Graph 2: SO<sub>2</sub>, NO<sub>2</sub> Level Siracha Village**



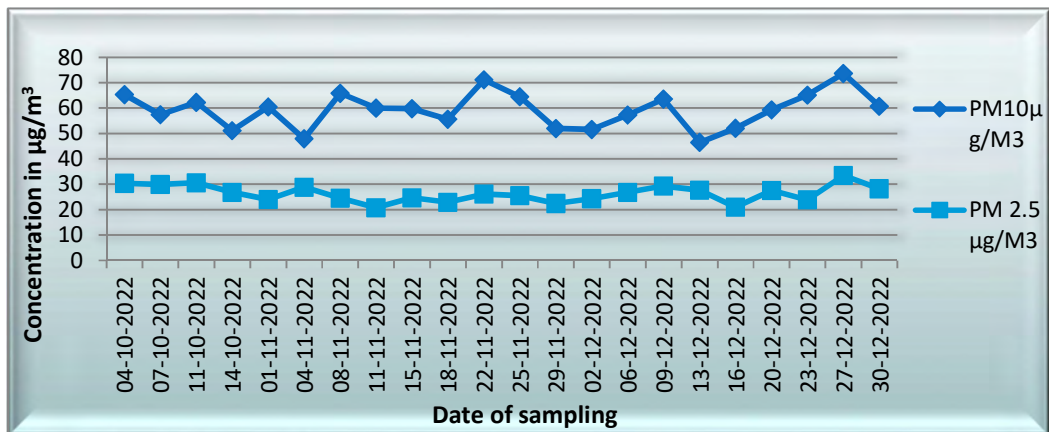
**3.1.3 Location: Kandagara Village**

The Sampling station was located in the core zone. The Station is located at about 3 km away in Northwest Direction from the Company premises. The Respirable Dust Sampler (PM<sub>10</sub>) & PM<sub>2.5</sub> Sampler were placed at a height of 2.5 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (October 2022-December 2022) are as follows.

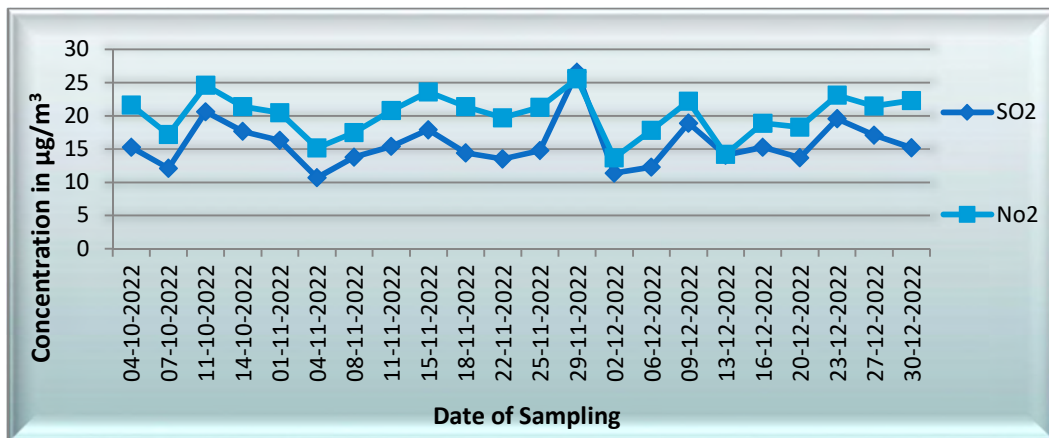
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
04-10-2022	65.4	30.4	15.3	21.6	-
07-10-2022	57.5	29.9	12.1	17.2	-
11-10-2022	62.3	30.6	20.6	24.6	15.8
14-10-2022	51.2	26.9	17.7	21.4	-
01-11-2022	60.5	24	16.3	20.5	-
04-11-2022	47.9	28.9	10.7	15.2	-
08-11-2022	65.9	24.6	13.8	17.5	18.9
11-11-2022	60.1	20.8	15.4	20.8	-
15-11-2022	59.8	24.7	17.9	23.6	-
18-11-2022	55.7	22.9	14.4	21.4	-
22-11-2022	71.2	26.2	13.5	19.7	-
25-11-2022	64.5	25.6	14.8	21.3	-
29-11-2022	52	22.5	26.6	25.6	-
02-12-2022	51.6	24.4	11.4	13.7	-
06-12-2022	57.3	26.9	12.3	17.8	-
09-12-2022	63.6	29.3	18.9	22.2	15.7
13-12-2022	46.5	27.7	14.1	14.2	-
16-12-2022	52.1	21.1	15.3	18.9	-
20-12-2022	59.3	27.6	13.7	18.3	-
23-12-2022	65.1	23.9	19.6	23.1	-
27-12-2022	73.7	33.5	17.1	21.5	-
30-12-2022	60.8	28.3	15.2	22.3	-
Maximum Value	73.7	33.5	26.6	25.6	18.9
Minimum Value	46.5	20.8	10.7	13.7	15.7
Average Value	59.3	26.4	15.8	20.1	16.8
Standard Deviation	7.1	3.3	3.6	3.2	1.8
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 3: Particulate Matter Level Kandagara Village**



**Graph 4 : SO2, NO2 Level Kandagara Village**



**3.1.4 Location: Wandh Village**

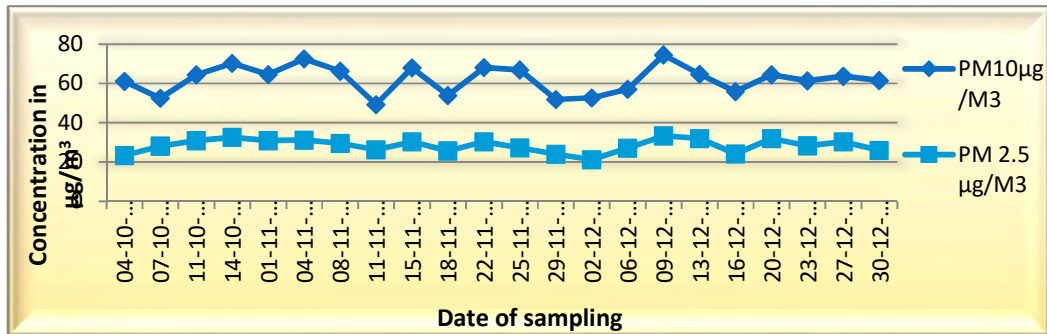
The Sampling station was located in the core zone in Wandh village. The Station is located at about 3.0 km away in Southwest Direction from the Company premises. The Respirable Dust Sampler Was placed at a height of 3.0 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (October 2022-December 2022) are as follows.

Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
04-10-2022	61.1	23.4	14.6	18.2	-
07-10-2022	52.5	28.1	21.6	25.3	-
11-10-2022	64.4	30.8	18.4	23.7	18.4
14-10-2022	70.3	32.5	16.3	20.9	-
01-11-2022	64.6	30.9	18.5	22.7	-
04-11-2022	72.6	31.2	16.7	25.4	-
08-11-2022	66.2	29.5	15.5	21.2	22.6
11-11-2022	49.3	26.2	13.9	18.5	-
15-11-2022	67.9	30.3	16.2	23.7	-
18-11-2022	53.8	25.6	15.8	21.3	-
22-11-2022	68.1	30.2	14.5	19.8	-

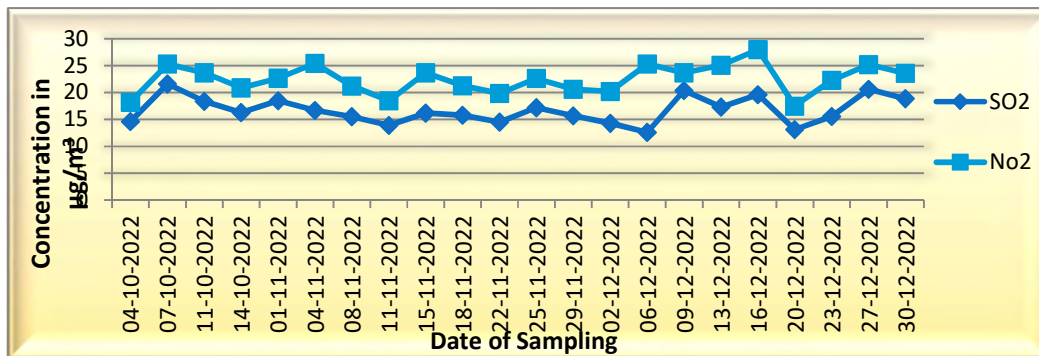
25-11-2022	66.9	27.2	17.2	22.6	-
29-11-2022	51.9	23.9	15.7	20.6	-
02-12-2022	52.6	21.2	14.3	20.2	-
06-12-2022	57.1	27	12.6	25.3	-
09-12-2022	74.5	33.3	20.4	23.7	20.4
13-12-2022	64.7	31.9	17.3	25.1	-
16-12-2022	55.9	24.1	19.6	28	-
20-12-2022	64.4	31.9	13.1	17.5	-
23-12-2022	61.4	28.2	15.6	22.3	-
27-12-2022	63.7	30.2	20.6	25.2	-
30-12-2022	61.5	26	18.9	23.6	-
Maximum Value	74.5	33.3	21.6	28	22.6
Minimum Value	49.3	21.2	12.6	17.5	18.4
Average Value	62.1	28.3	16.7	22.5	20.4
Standard Deviation	7.1	3.3	2.5	2.7	2.1
Permissible Limits	100	60	80	80	100

Units:  $\mu\text{g}/\text{m}^3$

**Graph 5: Particulate Matter Level Wandh Village**



**Graph 6: SO<sub>2</sub>, NO<sub>2</sub> Level Wandh Village**



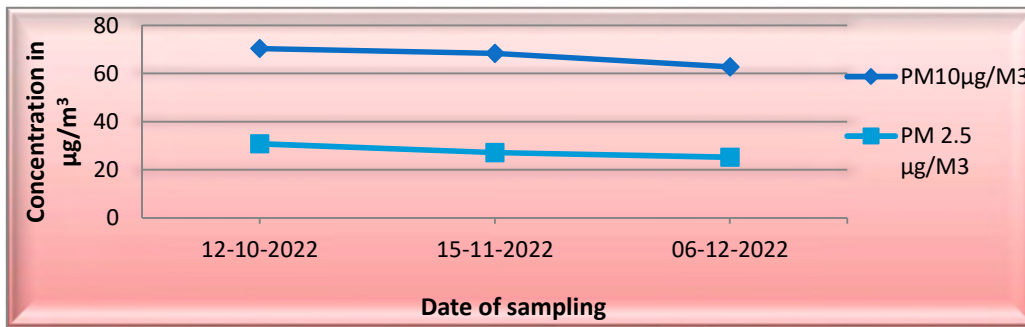
**3.1.5 Location: Nr.20 MLD Plant**

The Sampling station was located in the core zone in Company premises. The Respirable Dust Sampler (PM<sub>10</sub>) & (PM<sub>2.5</sub>) Sampler were placed at a height of 3 m above the ground level. Assess present pollution level the observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during monitoring period (October 2022-December 2022) are as follows:

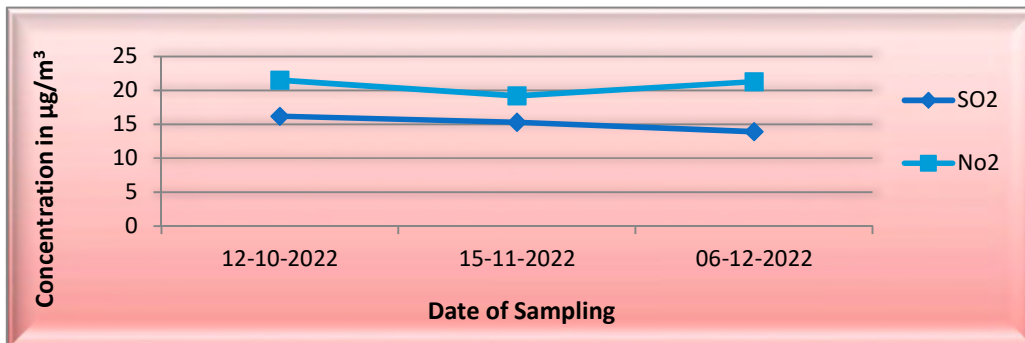
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
12-10-2022	70.4	30.8	15.8	20.3	20.4
15-11-2022	68.4	27.1	13.9	22.1	21.9
06-12-2022	62.8	25.2	13.8	18.9	14.8
Maximum Value	70.4	30.8	16.2	21.5	20.2
Minimum Value	62.8	25.2	13.9	19.2	17.2
Average Value	67.2	27.7	15.1	20.7	18.6
Standard Deviation	3.9	2.8	1.2	1.3	1.5
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 7: Particulate Matter Level Nr.20 MLD Plant**



**Graph 8: SO2, NO2 Nr.20 MLD Plant**





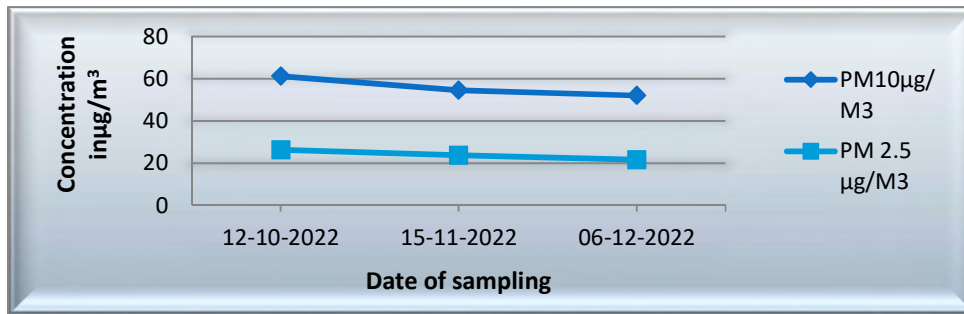
**3.1.6 Location: Nr. Shantiniketan-1**

The Sampling station was located in the core zone in company premises. The Respirable Dust Sampler PM<sub>10</sub> & PM<sub>2.5</sub> Sampler were placed at a height of 3 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during monitoring period (October 2022- December 2022) are as follows

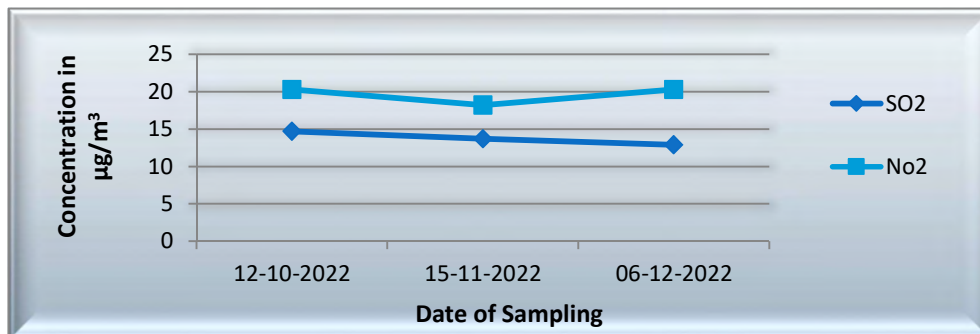
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
12-10-2022	61.3	26.4	14.7	20.3	18.5
15-11-2022	54.6	23.8	13.7	18.2	16.4
06-12-2022	52.1	21.7	12.9	20.3	15.1
Maximum Value	61.3	26.4	14.7	20.3	18.5
Minimum Value	52.1	21.7	12.9	18.2	15.1
Average Value	56.0	24.0	13.8	19.6	16.6
Standard Deviation	4.8	2.4	0.9	1.2	1.7
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 9: Particulate Matter Level Nr. Shantiniketan-1**



**Graph 10: SO<sub>2</sub>, NO<sub>2</sub> Nr. Shantiniketan-1**



**3.1.7 Ambient Air Quality Monitoring:**

The principal objective of the ambient air quality was to assess the existing levels of air pollution as well as the regional background concentration in the plant area. Air pollution forms critical factor to study the environmental issues in the study areas. Ambient Air Quality Monitoring has been carried out of 12 parameters at 05 Locations near surrounding villages within a 05 KM radius of the plant as per CEA guidelines.

Locations →			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date →			11/10/22	11/10/22	11/10/22	12/10/22	12/10/22
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	53.2	62.3	64.4	70.4	61.3
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	28.3	30.6	30.8	30.8	26.4
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	15.7	20.6	18.4	16.2	14.7
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	22.8	24.6	23.7	21.5	20.3
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.13	1.14	1.23	1.21	1.15
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	13.3	15.8	18.4	20.2	18.5
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

Note: BDL: Below Detection Limit:1) Hg: 0.001 µg/M<sup>3</sup>, 2) Ozone: 5.0 µg/M<sup>3</sup>

Locations →			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date →			8/11/22	8/11/22	8/11/22	15/11/22	15/11/22
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	54.8	65.9	66.2	68.4	54.6
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	25.1	24.6	29.5	27.1	23.8
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	17.6	13.8	15.5	15.3	13.7
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	24.6	17.5	21.2	19.2	18.2
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.18	1.19	1.28	1.18	1.14
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	15.8	18.9	22.6	18.5	16.4
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

Note: BDL: Below Detection Limit:1) Hg: 0.001 µg/M<sup>3</sup>, 2) Ozone: 5.0 µg/M<sup>3</sup>

Locations			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date			9/12/22	9/12/22	9/12/22	6/12/22	6/12/22
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	74.6	63.6	74.5	62.8	52.1
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	32.5	29.3	33.3	25.2	21.7
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	18.2	18.9	20.4	13.9	12.9
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	27.8	22.2	23.7	21.3	20.3
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.11	1.14	1.23	1.22	1.18
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	13.2	15.7	20.4	17.2	15.1
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

### 3.2 Flue Gas Monitoring Data

Stack Emission monitoring procedure includes tasks of Measurement, testing, sampling and analysis. Stack Emission testing is the process of evaluation of those gases and their degree of presence in atmosphere from industries to meet environmental standards.

Date	Location	PM in mg/Nm <sup>3</sup>	SO <sub>2</sub> in mg/Nm <sup>3</sup>	NO <sub>x</sub> in mg/Nm <sup>3</sup>	Mercury	Stack Velocity
13-10-2022	Boiler (Unit - 1)	40.1	561.4	254.1	BDL	22.4
13-10-2022	Boiler (Unit - 4)	30.1	548.6	245.6	BDL	23.8
06-10-2022	Boiler (Unit - 5)	33.4	442.1	266.1	BDL	23.2
28-12-2022	Boiler (Unit - 5)	33.7	402.4	247.3	BDL	23.2
06-10-2022	Boiler (Unit - 6)	37.6	469.2	286.9	BDL	23.5
09-11-2022	Boiler (Unit - 6)	36.1	486.7	265.8	BDL	23.8
28-12-2022	Boiler (Unit -6)	34.1	457.3	268.7	BDL	23.6
07-11-2022	Boiler (Unit - 9)	33.2	142.6	254.7	BDL	23.6
15-12-2022	Boiler (Unit - 9)	29.2	146.7	259.3	BDL	23.9
Permissible Limits		50	<500 MWH-600 >500 MWH-200	450		

### 3.3 Ground Water Quality Monitoring

Groundwater is a vital natural resource, being increasingly under pressure of climate change and human activities. The main objective of Ground Water monitoring in the study area is to monitoring ground water quality and assess the impact on groundwater by the operation activities. Ground water monitoring has been conducted at 05 locations within 10 Km Radius Villages.

#### 3.3.1 Location: Tunda Village Water Sample

DATE: 20/12/2022

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	--	7.68	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	10	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	123.5	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	28	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	20.2	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1356	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	402.1	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	501.7	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	153.8	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	4	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.28	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.64	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent

34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	12	100 CFU/ml	100 CFU/ml

**Note: BDL= Below Detection Limit. N.D. = Not Detected**

### 3.3.2 Location: Kandagra Village Water Sample

DATE: 20/12/2022

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.68	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	10	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	90.2	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	26.9	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	17.5	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1276	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	387.5	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	349.9	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	126.4	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	3.2	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.28	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.71	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	N.D.(MDL:0.001)
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	N.D.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	N.D.(MDL:0.01)
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	N.D.(MDL:0.003)
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	N.D.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.(MDL:0.1)
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	N.D.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	N.D.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	N.D.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.(MDL:0.001)
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	10	100 CFU/ml	100 CFU/ml

**Note: BDL= Below Detection Limit. N.D. = Not Detected**

**3.3.3 Location: Siracha Village Water Sample**
**DATE: 20/12/2022**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.21	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	10	5	15
3	Odour	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	313.6	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	49.3	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	53.7	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1320	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	382.2	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	359.5	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	197	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.7	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.38	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.65	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	12	100 CFU/ml	100 CFU/ml

Note: BDL= Below Detection Limit. N.D. = Not Detected

**3.3.4 Location: Navinal Village Water Sample**
**DATE: 20/12/2022**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.93	6.5 – 8.5	6.5 – 8.5
2	Colour	Pt-Co	10	5	15
3	Odour	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	191.8	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	41.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	24.3	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1156	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	246.7	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	407.9	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	135.1	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.6	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.32	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.61	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	10	100 CFU/ml	100 CFU/ml

Note: BDL= Below Detection Limit. N.D. = Not Detected

**3.3.5 Location: Desalpur Village Water Sample**
**DATE: 20/12/2022**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.80	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	10	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	159	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	36.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	25	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1120	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	351.8	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	372.2	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	129.3	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.9	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.34	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	2.0	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	08	100 CFU/ml	100 CFU/ml

Note: Colour = 1(10) = 10 APHA, BDL= Below Detection Limit. N.D. = Not Detected

**3.4 Water Quality Monitoring – Plant area**



Water quality monitoring is defined here as the sampling and analysis of water constituents and conditions. These may include:

- Introduced pollutants, such as pesticides, metals, and oil
- Constituents found naturally in water that can nevertheless be affected by human sources, such as dissolved oxygen, bacteria, and nutrients

### 3.4.1 Location: Outfall Channel

Sr. No.	Parameter	Unit	Date of sampling		
			13/10/2022	09/11/2022	12/12/2022
1	pH @ 25	--	7.62	7.51	7.44
2	Temperature	°C (Intake)	30.0	28	26
		°C (Outfall)	33.5	30.5	30.0
		°C (Differential)	3.5	2.5	4.0
3	Color	Pt. CO. Scale	10	10	10
4	Total Suspended Solids	mg/L	18	14	12
5	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Ammonical Nitrogen	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
7	Sulphide as S-2	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
8	Total Chromium	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
9	Hexavalent Chromium as Cr+6	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
10	Phosphate as PO <sub>4</sub>	mg/L	0.14	0.11	0.13
11	Lead as Pb	mg/L	0.027	BDL(MDL:0.01)	BDL(MDL:0.01)
12	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
13	Zinc as Zn	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
14	Iron (as Fe)	mg/L	0.117	0.109	0.114
15	Chemical Oxygen Demand(COD)	mg/L	43.4	48.4	44.1
16	Biochemical Oxygen Demand (BOD)	mg/L	14	14	12

### 3.4.2 Location: STP Outlet Water Sample;

Sr. No.	Parameter	Unit	SPCB Limit	Date of sampling		
				13/10/2022	09/11/2022	12/12/2022
1	pH @ 25 °C	--	6.5-8.5	7.14	7.31	7.28
2	Total Suspended Solids	mg/L	30	12	12	08
3	Residual Chlorine	mg/L	0.5 Min.	0.80	0.72	0.60
4	Biochemical Oxygen Demand (BOD)	mg/L	20	14	17	13
5	Fecal Coliform	CFU/100ml	<1000	28	30	28

### 3.4.3 Location: ETP Outlet Water Sample;

S.N	Parameter	Unit	SPCB Limit	Date of sampling		
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				13/10/2022	09/11/2022	12/12/2022
1	pH @ 25	--	6.5 – 8.5	7.12	7.08	7.11
2	Temperature	° C	40 Max.	30	30	28
3	Color	Pt. CO. Scale	100 Max.	10	10	10
4	Total Suspended Solids	mg/L	100 Max.	12	08	06
5	Oil & Grease	mg/L	10 Max.	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Chemical Oxygen Demand (COD)	mg/L	100 Max.	16.1	12.1	16.0
7	Biochemical Oxygen Demand (BOD)	mg/L	30 Max.	4	3	6
8	Chloride as Cl <sup>-</sup>	mg/L	600 Max.	291.0	272.0	365.1
9	Total Dissolved Solids	mg/L	2100 Max.	1720	1690	1672
10	Sulphate as SO <sub>4</sub>	mg/L	1000 Max.	52.6	44.2	36.6
11	Ammonical Nitrogen	mg/L	50 Max.	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
12	% Sodium(Na)	mg/L	60 Max.	33.1	34.2	34.77
13	Sodium Absorption Ratio(SAR)	mg/L	26 Max.	0.97	1.04	1.08
14	Sulphide as S <sup>-2</sup>	mg/L	02 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
15	Total Chromium	mg/L	02 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
16	Hexavalent Chromium as Cr+6	mg/L	0.1 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
17	Phosphate as PO <sub>4</sub>	mg/L	5.0 Max.	0.18	0.15	0.13
18	Copper as Cu	mg/L	03 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
19	Lead as Pb	mg/L	0.1 Max.	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
20	Zinc as Zn	mg/L	05 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
21	Residual Free Chlorine	mg/L	0.5 Max.	BDL(MDL:0.2)	BDL(MDL:0.2)	BDL(MDL:0.2)
22	Iron (as Fe)	mg/L	1.0 Max.	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)

**Note:** N.D. = Not Detected, MDL = Minimum Detection Limit

#### 3.4.4 Location: Bore-well – 1 to 4 (Nr. Emergency Ash Pond)

Bore well Water Testing is the analysis of the water quality for domestic consumption or industrial use against set parameters for your safety. Bore well Water test is done, as it is groundwater, which has a higher chance of being polluted with mud, metals and such elements.

Sr.No.	Parameter	Unit	Results			
			Borewell-1	Borewell-2	Borewell-3	Borewell-4
			15/12/2022	15/12/2022	15/12/2022	15/12/2022

1	pH @ 25 ° C	-	7.56	7.36	7.32	7.52
2	Conductivity (µS)	-	15730	16830	15030	16160
3	Total Dissolved Solids	mg/L	10030	10770	9962	10380
4	Chloride as Cl <sup>-</sup>	mg/L	4306	4425.9	4201	4411.4
5	Carbonate as CaCO <sub>3</sub>	mg/L	17.5	26.3	28.3	29.1
6	Bicarbonate as CaCO <sub>3</sub>	mg/L	159.8	207.1	183.8	159.8
7	Total Alkalinity	mg/L	379.5	383.8	355	354.1
8	Calcium as Ca	mg/L	302	328.7	272	311.7
9	Magnesium as Mg	mg/L	181.7	116.3	160.7	125.2
10	Sodium as Na	mg/L	1467	1940	1352	1640
11	Potassium as K	mg/L	52.6	108.6	74.5	74.2
12	Sulphate as SO <sub>4</sub> -2	mg/L	472	784	687.5	687.5
13	Nitrate as NO <sub>3</sub>	mg/L	18.2	22.6	22	23.1
14	Phosphate as PO <sub>4</sub>	mg/L	2.24	2.6	1.8	1.9
15	Fluoride as F	mg/L	2.48	2.32	2.3	2.2
16	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
17	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
18	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
19	Chromium as Cr	mg/L	BDL(MDL:0.05)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)
20	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
21	Iron (as Fe)	mg/L	BDL(MDL:0.1)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
22	Zinc (as Zn)	mg/L	BDL(MDL:0.05)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
23	Cobalt as Co	mg/L	BDL(MDL:0.1)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
24	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
25	Manganese as Mn	mg/L	BDL(MDL:0.1)	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)
26	Nickel as Ni	mg/L	BDL(MDL:0.02)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)
27	Salinity	ppt	7.78	7.99	7.59	7.97
28	Barium as Ba	mg/L	N.D.	N.D.	N.D.	N.D.
29	Ground Water Table (BGL)	Mtr.	1.1	2.3	2.7	2.0

**Note:** N.D. = Not Detected, MDL = Minimum Detection Limit

### 3.4.5 Location: Cooling Tower Blow down Water Sample

S.No.	Parameter	Unit	Limit	Results	
				Unit-6	Unit-9
Date of Sampling →				<b>21/12/2022</b>	<b>21/12/2022</b>
1	pH @ 25 ° C	--	-	7.69	7.82
2	Free available Chlorine	° C	Min.0.5	0.65	0.75
3	Zinc as Zn	Pt. CO. Scale	1.0	BDL(MDL:0.05)	BDL(MDL:0.05)
4	Hexavalent Chromium as Cr+6	mg/L	0.1	BDL(MDL:0.05)	BDL(MDL:0.05)
5	Total Chromium as Cr	mg/L	0.2	0.060	0.057
6	Phosphate as P	mg/L	5.0	0.29	0.36

Note: All other Units are in Shutdown.

### 3.4.6 Location: Condensate Cooling Tower Water Sample

S.No.	Parameter	Unit	Limit	Results	
				Unit-6	Unit-9
Date of Sampling →				<b>21/12/2022</b>	<b>21/12/2022</b>
1	pH @ 25 ° C	--	<b>6.5 to 8.5</b>	7.68	7.56
2	Temperature °C (Inlet)	°C	--	28.5	28.0
	Temperature °C (Outlet)	°C	--	30.5	30.5
	Temperature °C (Differential)	°C	<b>7</b>	2.0	2.5
3	Free available Chlorine	mg/L	<b>Min 0.5</b>	0.70	0.84

Note: All other Units are in Shutdown.

### 3.5 Soil Quality Monitoring:

Date: 20/12/2022

Soil is a three-dimensional natural growth medium supporting plants, with variable proportions of solid, liquid, and gaseous phases. We have carried out Soil monitoring at 05 Locations of surrounding villages within 05 KM radius.

Locations of soil sampling			Kandagra	Tunda	Desalpur	Siracha	Navinal
Sr. No.	Parameter	Unit	Results				
1	Magnesium as Mg	%	0.0049	0.0036	0.0054	0.0036	0.0079
2	Molybdenum as Mo	%	N.D.	N.D.	N.D.	N.D.	N.D.
3	Phosphorous as P	%	0.309	0.3381	0.2266	0.2866	0.2328
4	Calcium as Ca	%	0.038	0.020	0.012	0.022	0.014
5	Zinc as Zn	%	0.007	0.0016	0.0028	0.0023	0.0017
6	Manganese as Mn	%	0.019	0.021	0.0274	0.026	0.0232
7	Potassium as K	%	0.0047	0.0032	0.0038	0.0018	0.0026
8	Nitrogen as N	%	0.0065	0.0069	0.0071	0.0057	0.0074
9	Iron as Fe	%	0.333	0.459	0.4450	0.752	1.1324
10	Copper as Cu	%	0.0009	0.0002	0.0007	0.0002	0.0003
11	Boron as B	%	N.D.	N.D.	N.D.	N.D.	N.D.
12	Sulphur	%	0.0052	0.0071	0.0039	0.0064	0.0068
13	Chlorides as Cl	%	0.0058	0.0148	0.0142	0.0569	0.032

Note: N.D. = Not Detected,

### 4 AMBIENT NOISE LEVEL MONITORING

The main objective of noise monitoring in the study area is to establish the baseline noise levels and assess the impact of the total noise generated by the operation activities around it. Noise monitoring has been conducted at 10 locations within the periphery of industry premises.

Date of Monitoring: 13-14.10.2022

Sr. No.	Location	Noise Level dB(A)			
		Sampling Time	Day Time	Sampling Time	Night Time
			06 am - 10 pm		10 pm - 06 am
		Limit 75 dB(A)		Limit 70 dB(A)	
1.	Nr. LDO Pump House	10:30 am - 12:45 pm	62.8	22:20 pm - 00:15 am	56.6
2.	Nr. 20 MLD Plant		60.0		57.9
3.	Nr. Pump House		60.6		55.6
4.	Nr. Coal Handling plant		65.2		61.7
5.	Nr. Gate No.4		56.5		47.7
6.	Nr. Integrated Ash Silo		64.4		58.2
7.	Nr. Main Gate		58.6		50.5
8.	Nr. APCH Building		53.6		47.5
9.	Nr. Shantiniketan-I		52.1		48.0
10.	Nr. OHC Building		55.9		52.7

Remark: Calibrated instruments were used during monitoring of above identified sample.

Date of Monitoring: 08-09.11.2022

Sr.	Location	Noise Level dB(A)
-----	----------	-------------------

No.		Sampling Time	Day Time dB(A) 06 am - 10 pm	Sampling Time	Night Time dB(A) 10 pm - 06 am
			Limit 75 dB(A)		Limit 70 dB(A)
1.	Nr. LDO Pump House	10:35 am - 12:45 pm	57.8	22:40 pm - 00:20 am	56.2
2.	Nr. 20 MLD Plant		64.7		56.5
3.	Nr. Pump House		60.5		57.4
4.	Nr. Coal Handling plant		63.9		56.9
5.	Nr. Gate No.4		54.3		48.8
6.	Nr. Integrated Ash Silo		64.6		59.0
7.	Nr. Main Gate		59.0		54.0
8.	Nr. APCH Building		53.6		52.3
9.	Nr. Shantiniketan-I		55.8		50.5
10.	Nr. OHC Building		55.9		52.8

**Remark:** Calibrated instruments were used during monitoring of above identified sample.

**Date of Monitoring:** 21-22.12.2022

Noise Level dB(A)					
Sr. No.	Location	Sampling Time	Day Time dB(A) 06 am - 10 pm	Sampling Time	Night Time dB(A) 10 pm - 06 am
			Limit 75 dB(A)		Limit 70 dB(A)
1.	Nr. LDO Pump House	10:30 am - 12:15 pm	56.8	22:30 pm - 00:15 am	51.4
2.	Nr. 20 MLD Plant		60.4		54.3
3.	Nr. Pump House		56.9		53.9
4.	Nr. Coal Handling plant		61.9		54.1
5.	Nr. Gate No.4		52.1		49.0
6.	Nr. Integrated Ash Silo		61.4		58.7
7.	Nr. Main Gate		52.9		52.0
8.	Nr. APCH Building		53.6		51.1
9.	Nr. Shantiniketan-I		50.6		50.1
10.	Nr. OHC Building		51.2		49.8

**Remark:** Calibrated instruments were used during monitoring of above identified sample.

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# **ENVIRONMENTAL MONITORING REPORT**

**M/s. ADANI POWER (MUNDRA) LIMITED**



**Report Period: January 2023 to March 2023**



**PREPARED BY: M/S.UNISTAR ENVIRONMENT AND RESEARCH LABS PVT. LTD**

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**UniStar Environment and**  
**Research Labs Pvt. Ltd.**



**Mr. Jaivik Tandel**  
**(Authorized By)**





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## EXECUTIVE SUMMARY

Adani Power (Mundra) Limited (APMuL) places great emphasis on delivering long-term sustainable value for its respective stakeholders and is certain to fulfill them by sustaining perseverance in their actions. In ensuring to generate electricity at large scales and provide seamless access to electricity to households with generation capacity of 4620 in three phases. Mundra Thermal (coal Based) Power Plant near Village Tunda in Mundra, District Kutch, and Gujarat. APMuL received Consolidated consent AWH-102106 on dated 17.07.2019 valid up to 29/06/2024.

The phased wise development being undertaken for ultimate capacity of power plant is shown below.

- First Phase : 2 x 330 MW
- Second Phase : 2 x 330 MW + 2 x 660 MW
- Third Phase : 3 x 660 MW

The Thermal Power Plant is located near Village Tunda, Mundra Taluka in Kutch District. The Site is closed to the sea, making cooling water perennially available for the power plant. The Power Plant is based on supercritical technology using imported coal.

All three phase of the power plant is operational and as the part of the compliance to the statutory requirement, M/s. Adani Power (Mundra) Limited has entrusted the environmental quality monitoring study for the area surrounding the power plant. Towards achieving and sustaining Business excellence at the Plant, Adani Power (Mundra) Limited Implemented ISO-14001:2015 Environment Management System (EMS), ISO 46001:2019 Water Efficiency management and Accreditation of NABL in Environmental Laboratory (ISO/IEC 17025:2017) vide Certificate No. TC-5215.

Various environmental parameters have been monitored during the period of January 2023 to March 2023. The detail of the environmental parameters along with frequency of monitoring is shown in subsequent sections.

### 1. ENVIRONMENTAL PARAMETERS

Sr. No.	Environmental Indices	Parameter	No. of Location and Monitoring.	Frequency of Sampling
1.	Ambient Air Quality	PM <sub>10</sub> , PM <sub>2.5</sub> , Sulphur Dioxide and Nitrogen Dioxide	<b>Three Location</b> 1. Siracha Village, 2. Kandagara Village 3. Wandh Village	Twice a week
2.	Ambient Air Quality	PM <sub>10</sub> , PM <sub>2.5</sub> , Sulphur Dioxide, Nitrogen Dioxide, Ozone and Mercury	<b>Five Location</b> 1. Siracha, 2. Kandagara, 3. Wandh, 4. 20 MLD Desalination plant, 5. Shantiniketan-1)	Once in a month
3.	Stack Monitoring	PM, Sulphur Dioxide, Oxide of Nitrogen and Hg	Nine Location	Once in a month
4.	Meteorological Monitoring	Wind rose, Wind speed, Wind direction, Rainfall, Temperature, Relative Humidity	One location	Round the clock
5.	Ground Water Monitoring for Surrounding Villages	Colour, Odour, Taste, Turbidity, Dissolved Solids, pH value, Total Hardness, Calcium, Boron, Copper, Iron, Manganese, Chloride, Sulphate, Nitrate, Fluoride, Phenolic Compounds, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Anionic Detergents as MBAS, Chromium Cr+6, Mineral Oil, MPN Index for Coliform Bacteria per 100 ml, Residual Free Chlorine, Aluminium, Alkalinity, Magnesium as Mg, Escherichia Coli in 250 ml.	Five Location	Once in Quarter
6.	Effluent Water Sample	pH, Temperature, colour, SS, O & G, BOD <sub>3</sub> , COD, Chlorides, TDS, Sulphates, Ammonical Nitrogen, % Sodium, Sodium Absorption Ratio, Sulphides, Total Chromium, Hexavalent Chromium, Copper, Lead, Zinc, Free available chlorine, Phosphate, Iron	Four Location	Once in a month / Quarter
7.	Combined effluent Water Sample	pH, Temperature, colour, SS, O & G, BOD <sub>3</sub> , COD, Chlorides, TDS, Sulphates, Ammonical Nitrogen, % Sodium, Sodium Absorption Ratio, Sulphides, Total Chromium, Hexavalent Chromium, Copper, Lead, Zinc, Free available chlorine, Phosphate, Iron	One Location	Once in a month
8.	STP Water Analysis	pH, Residual Chlorine, SS, BOD, COD, Faecal coliform	Three Location	Once in month/ Quarter

9.	Borwell water Near Ash Dyke Area	pH @ 25 ° C, Conductivity (µS), Chloride as Cl <sup>-</sup> Salinity (ppt), Total Dissolved Solids, Carbonate as CaCO <sub>3</sub> , Bicarbonate as CaCO <sub>3</sub> , Mercury as Hg, Arsenic as As, Lead as Pb, Chromium as Cr, Cadmium as Cd.	Four Location	Once in a Quarter
10.	Surrounding Villages Soil Analysis	Magnesium as Mg %, Molybdenum as Mo in ppm, Phosphorus as P %, Calcium as Ca %, Zinc as Zn, Manganese as Mn, Potassium as K%, Nitrogen as N%, Iron as Fe%, Copper as Cu, Boron as B, Sulphur in %, Chloride as Cl%.	Five Location	Once in Six Month
11.	Noise Level Monitoring	Noise level monitoring in dB(A)	10 Location	Once in a Quarter
12.	Condensate Cooling tower	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 Location	Once in a Quarter
13.	Cooling tower Blow down	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 Location	Once in a Quarter
14.	Boiler Blow down	TSS, O & G, Total Copper, Total Iron	04 Location	Once in a Quarter

### 1.1 AMBIENT AIR QUALITY

The scenario of the Ambient Air Quality in the study region has been assessed through a network of 5 locations of Ambient Air Quality Monitoring. The design of monitoring network in the air quality surveillance program was based on the following considerations.

- Topography / Terrain of the study area.
- Human Settlements
- Wind pattern
- Health status
- Representation of regional Background levels.
- Accessibility of monitoring site.
- Resource availability.

Pre-calibrated Respirable Dust Samplers (PM<sub>10</sub>) & Fine Dust Samplers (PM<sub>2.5</sub>) have been used for monitoring the existing AAQM Status. Maximum, Minimum, Average, Standard Deviation and percentile have been computed from the raw data collected at all individual sampling stations to represent the Ambient Air Quality Status.

The significant parameters viz., PM<sub>10</sub>, PM<sub>2.5</sub>, Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxides (NO<sub>2</sub>) and Mercury were monitored within the study area of 10 km from the site.

### 1.2 FLUE GAS MONITORING

All three phases of the Thermal Power Plant is in operation. The flue gas emission from stack attached to individual boiler is monitored once in month during the monitoring period.

### 1.3 WATER QUALITY MONITORING

The water quality parameters as per IS: 10500 for water resource within the study area have been used for describing the water environment and assessing the impacts on it.

Groundwater samples of nearby villages were collected at five locations the parameters of prime importance selected under physicochemical characteristics were estimated to describe the baseline environmental status of the water resources during the monitoring period. Four bore well samples surrounding the ash dyke area were collected during the month of March 2022 along with outfall water sample.

### 1.4 AMBIENT NOISE LEVEL MONITORING

The Ambient Noise levels within the plant premises were relocated at a different location (10 nos.) for the implementation of effective noise control programs.

**METEOROLOGICAL MONITORING REPORT**  
Period: January 2023- March 2023



### 1.5 MICROMETEOROLOGY

Meteorological parameters are important factors in the study of Air Pollution. The Transport and diffusion of the pollutants in the atmosphere are governed by meteorological factors.

Primary / Basic Meteorological Parameters

- Wind Velocity
- Wind Direction

Since the dispersion and diffusion of pollutants mainly depend on the above factors hence these factors are considered as primary meteorological parameters.

Secondary Meteorological Parameters

- Relative Humidity
- Ambient Temperature

The above-said factors are considered as secondary factors since these factors control the dispersion of the pollutant indirectly by affecting the primary factors.

**METEROLOGICAL DATA**

**METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF JANUARY-2023**

Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	Total
01.01.2023	19.9	29.2	51.5	76.2	0.0
02.01.2023	20.5	30.0	55.4	89.5	0.0
03.01.2023	20.6	29.4	43.8	76.5	0.0
04.01.2023	19.7	26.2	33.1	56.3	0.0
05.01.2023	18.4	26.4	30.1	45.3	0.0
06.01.2023	19.5	27.6	38.7	48.2	0.0
07.01.2022	22.8	31.2	47.3	63.2	0.0
08.01.2022	24.4	33.3	56.4	72.0	0.0
09.01.2022	24.0	32.5	55.2	73.2	0.0
10.01.2023	22.8	31.5	50.6	74.0	0.0
11.01.2023	22.4	29.6	66.9	99.0	0.0
12.01.2023	22.7	29.3	65.6	99.8	0.0
13.01.2023	18.9	26.6	54.6	75.3	0.0
14.01.2023	17.9	26.3	40.7	80.1	0.0
15.01.2023	16.8	26.1	35.5	66.1	0.0
16.01.2023	17.7	27.4	36.3	56.5	0.0
17.01.2023	18.6	28.4	26.7	44.6	0.0
18.01.2023	19.7	30.1	32.8	47.1	0.0
19.01.2023	21.7	32.1	36.5	53.1	0.0
20.01.2023	19.4	27.1	46.1	59.2	0.0
21.01.2023	19.8	26.4	43.8	67.5	0.0
22.01.2023	18.6	25.6	44.0	67.0	0.0
23.01.2023	18.4	24.3	42.3	56.4	0.0
24.01.2023	18.4	25.6	40.0	60.3	0.0
25.01.2023	17.8	26.2	34.4	61.2	0.0
26.01.2023	17.7	26.0	25.8	40.0	0.0
27.01.2023	19.2	27.1	31.4	48.0	0.0
28.01.2023	21.2	30.2	42.5	74.0	0.0
29.01.2023	21.7	30.2	39.8	66.1	0.0
30.01.2023	20.9	29.0	56.8	91.2	0.0
31.01.2023	21.2	29.5	40.6	65.3	0.0
Min	16.8	24.3	25.8	40.0	0.0
Max	24.4	33.3	66.9	99.8	0.0



**METEROLOGICAL DATA**

**METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF FEBRUARY -2023**

Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Min.	Max.	Min.	Max.	Total
01.02.2023	21.7	29.3	42.3	67.6	0.0
02.02.2023	21.5	32.6	37.7	54.2	0.0
03.02.2023	22.9	33.4	32.8	52.6	0.0
04.02.2023	23.0	33.0	38.8	58.2	0.0
05.02.2023	23.4	32.0	51.5	81.6	0.0
06.02.2023	23.5	31.0	81.1	99.5	0.0
07.02.2023	24.5	32.3	66.8	99.2	0.0
08.02.2023	24.6	34.2	48.1	80.2	0.0
09.02.2023	23.2	32.6	67.7	99.9	0.0
10.02.2023	22.7	31.5	55.7	99.6	0.0
11.02.2023	23.9	30.1	81.5	99.5	0.0
12.02.2023	25.8	34.3	44.9	98.3	0.0
13.02.2023	24.8	35.0	26.0	38.1	0.0
14.02.2023	24.0	34.4	31.1	53.1	0.0
15.02.2023	25.2	33.4	43.6	56.3	0.0
16.02.2023	26.9	37.5	43.0	61.5	0.0
17.02.2023	25.8	37.1	50.6	95.0	0.0
18.02.2023	27.0	35.5	56.5	97.1	0.0
19.02.2023	27.0	37.5	48.4	92.2	0.0
20.02.2023	22.4	32.0	78.1	98.9	0.0
21.02.2023	25.0	31.0	83.3	98.5	0.0
22.02.2023	24.3	30.2	82.1	99.5	0.0
23.02.2023	24.0	30.4	79.3	98.4	0.0
24.02.2023	22.9	33.0	78.4	99.0	0.0
25.02.2023	23.3	33.4	78.0	99.4	0.0
26.02.2023	25.1	33.4	73.6	99.2	0.0
27.02.2023	26.4	34.3	73.6	99.4	0.0
28.02.2023	27.8	36.6	48.8	78.1	0.0
Min	21.5	29.3	26.0	38.1	0.0
Max	27.8	37.5	83.3	99.9	0.0

**METEROLOGICAL DATA**

**METEROLOGICAL DATA AVERAGE DAILY METEROLOGICAL DATA OF MARCH -2023**

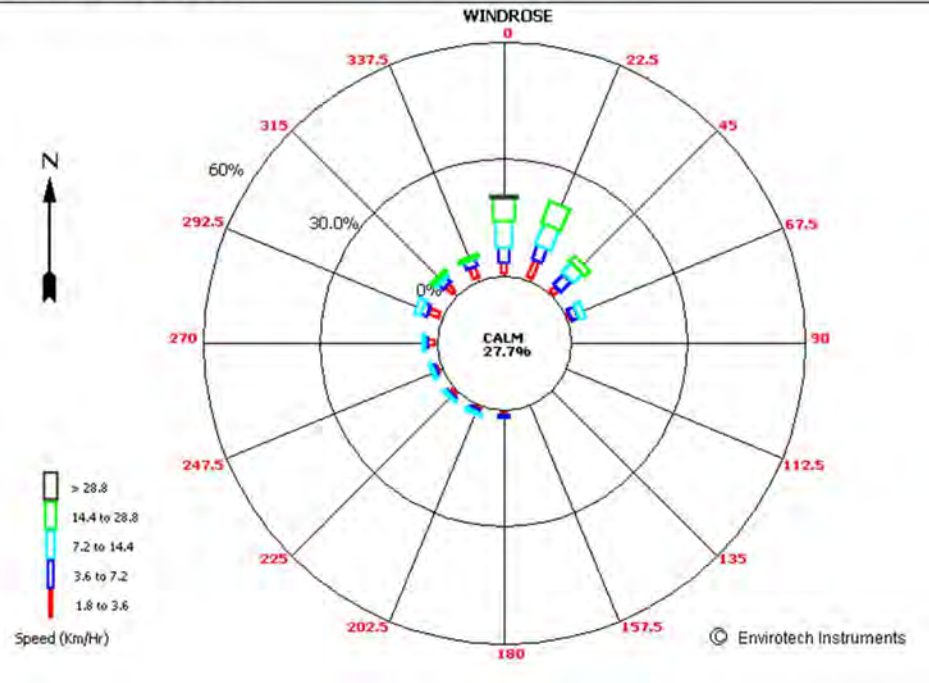
Date	Temp (Deg C)		Relative Humidity (%)		Rainfall (mm)
	Min.	Max.	Min.	Max.	Total
01.03.2023	26.5	35.6	55.4	96.6	0.0
02.03.2023	28.8	38.6	48.4	76.0	0.0
03.03.2023	30.0	38.0	40.9	59.5	0.0
04.03.2023	30.0	38.4	41.2	57.3	0.0
05.03.2023	30.6	39.0	37.8	58.3	0.0
06.03.2023	29.9	37.0	40.2	72.3	0.0
07.03.2023	28.1	35.4	55.7	85.4	0.0
08.03.2023	27.8	38.1	59.0	97.4	0.0
09.03.2023	28.9	38.4	41.0	73.5	0.0
10.03.2023	29.4	38.1	26.0	40.4	0.0
11.03.2023	29.7	38.1	25.2	39.2	0.0
12.03.2023	28.8	36.5	31.9	56.2	0.0
13.03.2023	30.3	39.2	33.3	62.2	0.0
14.03.2023	29.2	37.0	34.9	51.1	0.0
15.03.2023	27.5	35.1	49.9	70.2	0.5
16.03.2023	27.1	35.2	66.0	90.2	0.0
17.03.2023	27.4	35.0	73.5	99.2	0.0
18.03.2023	27.5	34.1	69.3	97.5	0.0
19.03.2023	27.9	35.4	55.7	74.1	0.0
20.03.2023	26.9	32.4	61.8	90.4	0.0
21.03.2023	26.6	32.3	61.2	88.0	0.0
22.03.2023	26.8	33.0	62.0	77.1	0.0
23.03.2023	27.7	33.2	69.4	85.3	0.0
24.03.2023	27.6	31.5	56.4	85.3	0.0
25.03.2023	27.0	33.2	54.2	76.3	0.0
26.03.2023	27.2	32.6	57.7	80.2	0.0
27.03.2023	28.1	34.1	56.1	90.3	0.0
28.03.2023	27.8	34.0	59.5	88.1	0.0
29.03.2023	26.5	32.0	71.6	86.1	0.0
30.03.2023	28.0	32.5	67.3	88.5	0.0
31.03.2023	27.2	32.4	66.1	87.2	0.0
Min	26.5	31.5	25.2	39.2	0.0
Max	30.6	39.2	73.5	99.2	0.5

**1.5.1 Wind Rose Diagram**

**ADANI POWER (MNDRA) LIMITEMUNDRA WINDROSE FOR THE SEASON OF January to March 2023**

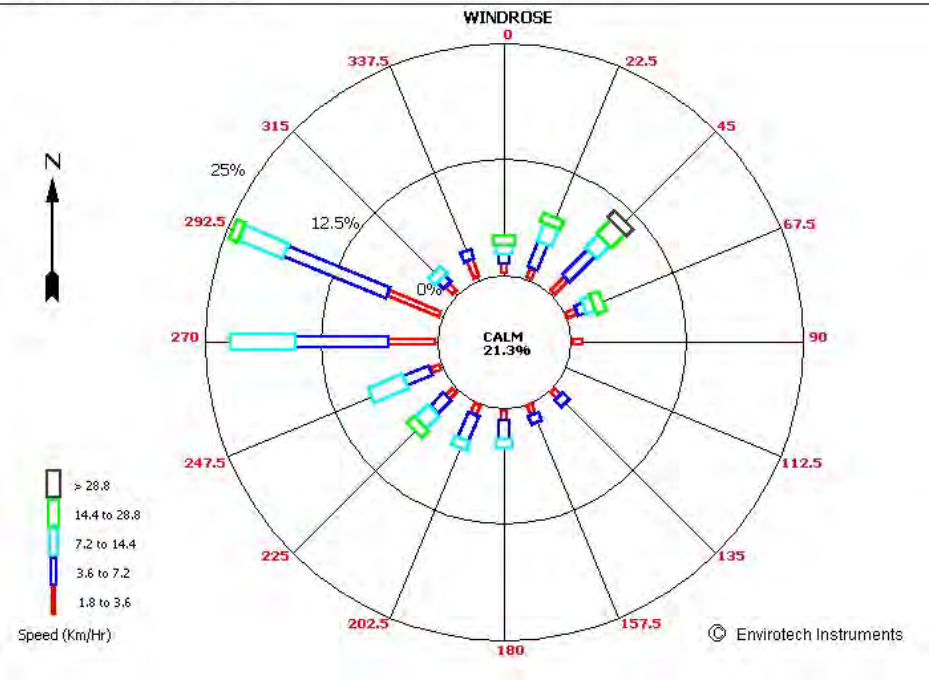
Time : 00:00 - 23:00  
Date : 02/01/23 - 31/01/23

ADANI POWER (MUNDRA) LIMITED



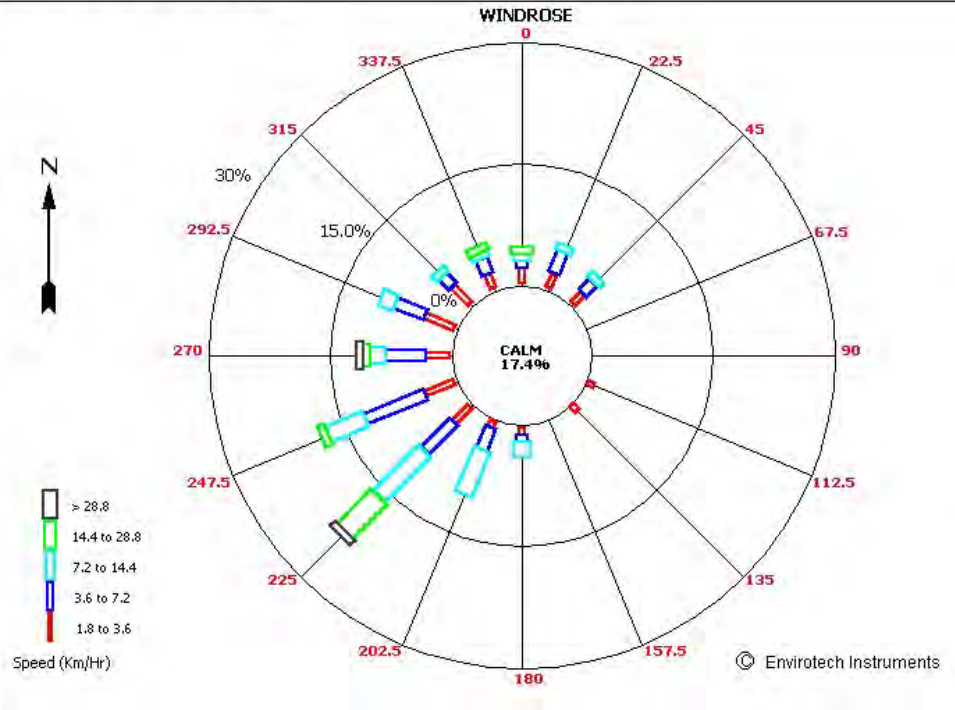
Time : 00:00 - 23:00  
Date : 01/02/23 - 28/02/23

ADANI POWER (MUNDRA) LIMITED



Time : 00:00 - 23:00  
Date : 01/03/23 - 31/03/23

ADANI POWER (MUNDRA) LIMITED



Project	: Adani Power (Mundra) Limited (APMuL)	Period	: January 2023 to March 2023
Location	: Village – Tunda, Dist. - Kutch		
<b>January 2023</b>			
Wind Direction		NE	
Average Wind Speed		6.4 Km/Hr	
<b>February 2023</b>			
Wind Direction		WNW	
Average Wind Speed		5.2 Km/Hr	
<b>March 2023</b>			
Wind Direction		SW	
Average Wind Speed		6.3 Km/Hr	

## 2 SCOPE & METHODOLOGY ADOPTED FOR ENVIRONMENTAL MONITORING

### 2.1 Introduction

The scope of the study includes detailed characterization of various environmental like air, water and noise within an area of 10 km radius in and around the power plant area at 20 MLD Plant, Shantiniketan-1 and surrounding villages named as Siracha, Wandh and Kandagara of Dist. Kutch. The above-mentioned environmental components were monitored at the study area and frequency of monitoring, number of samples along with methodology is as shown in below table.

### 2.2 Scope and Methodology for Monitoring of Various Environmental Attributes

Sr. No	Environmental Attributes	Sampling Locations	Sampling Parameters	Sampling Frequency	Total No of samples	Methodology
1	Ambient Air Quality	3	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub>	Twice a week (24 hourly Samples)	72	IS : 5182 & Reference APHA(AIR)
2	Ambient Air Quality	5	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , Mercury	Once in month (24 hourly Samples)	15	IS : 5182 & Reference APHA(AIR)
2	Flue Gas Stack Analysis	Unit 1 to 9 Boiler	PM, SO <sub>2</sub> , NOx	Once in month	27	As per IS : 11255
3	Surrounding Villages Ground Water Analysis	5 water sample	Test specification as per IS : 10500 - 1991	Once in Quarter	5	AS per APHA Method
4	Water Quality of Outfall for APMuL	1	As per CTO	Once in month	3	As Per APHA Method
5	STP Outlet	1	As per CTO	Once in month	3	As Per APHA Method
6	Bore well water Near Ash Dyke Area	4	Test specification as per IS : 10500 - 1991	Once in Quarter	4	As Per APHA Method
7	Cooling Tower Blow down Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method
8	Condensate Cooling Tower Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method
9	Boiler Blow down Water Sample	9	As per CTO	Once in Quarter	9	As Per APHA Method

### 3 ENVIRONMENT AIR QUALITY AND FLUE GAS EMISSION MONITORING

The principal objective of the ambient air quality was to assess the existing levels of the air pollution as well as the regional background concentration in the plant area. Air pollution forms important and critical factors to study the environmental issues in the study areas. Thus, air quality has to be frequently monitored to know the extent of pollution due to power plant activity and other ancillary activities. Details are provided in Section 3.1.1.

Flue gas monitoring analysis has been conducted by M/s. UniStar Environment and Research Labs Pvt. Ltd. Details are provided in Section 3.2.

#### 3.1 Ambient Air Monitoring Data

##### 3.1.1 Details of Ambient Air Quality Monitoring Stations

The detail of the ambient air monitoring locations including the distance from the project site with direction is as shown below.

S.No.	Code	Name of sampling location	Distance	Frequency
1	A - 1	Siracha Village	2.6 km (NE)	Twice a week
2	A - 2	Kandagara Village	3.2 km (NW)	Twice a week
3	A - 3	Wandh Village	2.0 km (SW)	Twice a week
4	A - 4	Nr.20 MLD Plant	1.2 Km	Once in month
5	A - 5	Nr. Shantiniketan-1	0.8 Km	Once in month



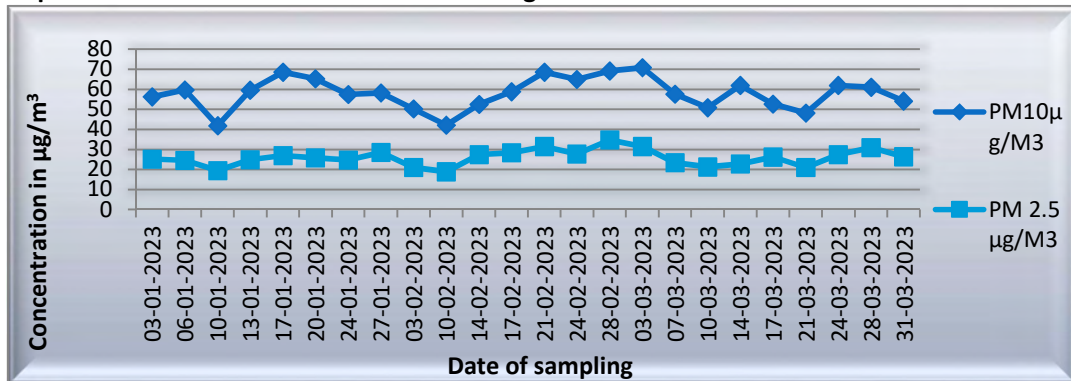
**3.1.2 Location: Siracha Village**

The Sampling station was located in the Siracha village. The Station is located at about 3.5 km away in Northwest Direction from the core zone area. The Respirable Dust Sampler & PM<sub>2.5</sub> was placed at a height of 3.0 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (January 2023- March 2023) are as follows.

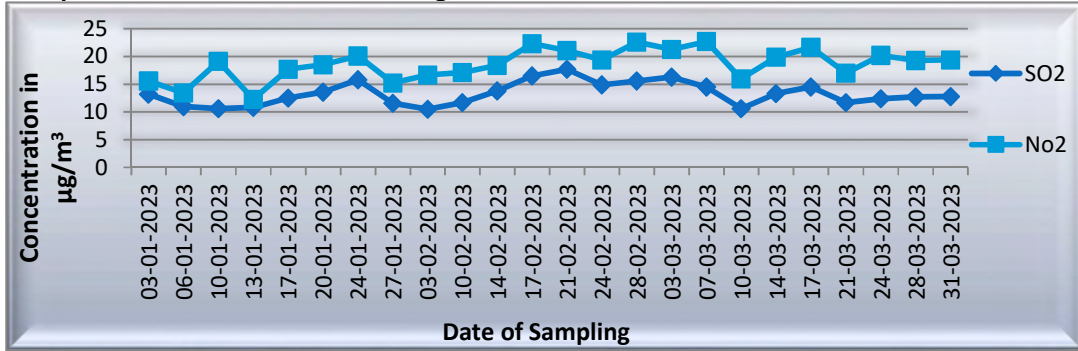
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
03-01-2023	56.2	25.2	13.2	15.6	-
06-01-2023	59.7	24.5	11	13.4	-
10-01-2023	41.8	19.5	10.6	19.1	14.8
13-01-2023	59.5	24.9	10.8	12.3	-
17-01-2023	68.6	26.9	12.5	17.7	-
20-01-2023	65.2	25.7	13.6	18.5	-
24-01-2023	57.4	24.7	15.8	20.1	-
27-01-2023	58.2	28.5	11.6	15.2	-
03-02-2023	50.2	21	10.5	16.7	-
10-02-2023	42.1	18.9	11.7	17.1	-
14-02-2023	52.5	27.4	13.8	18.4	-
17-02-2023	58.8	28.3	16.5	22.3	-
21-02-2023	68.5	31.5	17.7	21.1	17.2
24-02-2023	64.9	27.7	14.9	19.4	-
28-02-2023	69.1	34.7	15.6	22.6	-
03-03-2023	70.8	31.4	16.3	21.3	-
07-03-2023	57.6	23.4	14.5	22.7	-
10-03-2023	50.9	21.2	10.6	16	17.8
14-03-2023	61.9	22.8	13.3	19.9	-
17-03-2023	52.6	26.2	14.5	21.7	-
21-03-2023	48.1	20.9	11.7	17	-
24-03-2023	61.9	27.4	12.4	20.2	-
28-03-2023	61	30.8	12.7	19.3	-
31-03-2023	54.2	26.4	12.8	19.4	-
Maximum Value	70.8	34.7	17.7	22.7	17.8
Minimum Value	41.8	18.9	10.5	12.3	14.8
Average Value	58.0	25.8	13.3	18.6	16.6
Standard Deviation	8.0	4.0	2.1	2.8	1.5
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 1: Particulate Matter Level Siracha Village**



**Graph 2: SO<sub>2</sub>, NO<sub>2</sub> Level Siracha Village**



**3.1.3 Location: Kandagara Village**

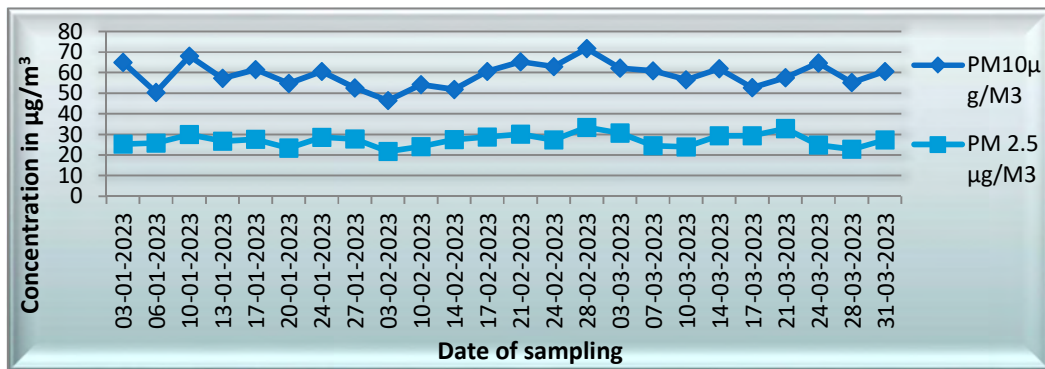
The Sampling station was located in the core zone. The Station is located at about 3 km away in Northwest Direction from the Company premises. The Respirable Dust Sampler (PM<sub>10</sub>) & PM<sub>2.5</sub> Sampler were placed at a height of 2.5 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (January 2023- March 2023) are as follows.

Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
03-01-2023	65.1	25.3	8.8	11.3	-
06-01-2023	50.4	25.8	11.7	18.8	-
10-01-2023	68.1	30	10.1	14.3	14.1
13-01-2023	57.3	26.7	14.6	19.1	-
17-01-2023	61.5	27.6	11.2	16.9	-
20-01-2023	54.8	23.4	9.7	12.5	-
24-01-2023	60.6	28.7	12.7	19.7	-
27-01-2023	52.6	27.8	11.8	17.3	-
03-02-2023	46.4	21.7	12.4	18.3	-
10-02-2023	54.2	24.1	14.2	21.8	-
14-02-2023	51.9	27.4	15.7	18.5	-
17-02-2023	60.7	28.8	12.6	15.7	-
21-02-2023	65.3	30.1	17.3	24.2	18.9
24-02-2023	63	27.3	19.7	27.4	-
28-02-2023	71.8	33.5	15.4	20.8	-
03-03-2023	62.2	30.7	16.9	22.7	-
07-03-2023	61	24.6	15.8	20.2	-
10-03-2023	56.5	23.9	13.4	16.9	18.3
14-03-2023	62	29.3	11.1	14.1	-
17-03-2023	52.8	29.4	13.8	22.6	-
21-03-2023	57.6	32.9	12.6	25.8	-
24-03-2023	64.8	24.8	13.9	19	-
28-03-2023	55.2	22.8	14.1	18.9	-
31-03-2023	60.6	27.3	12.5	20.6	-
Maximum Value	71.8	33.5	19.7	27.4	18.9
Minimum Value	46.4	21.7	8.8	11.3	14.1
Average Value	59.0	27.2	13.4	19.1	17.1
Standard Deviation	6.0	3.1	2.6	3.9	2.6
Permissible Limits	100	60	80	80	100

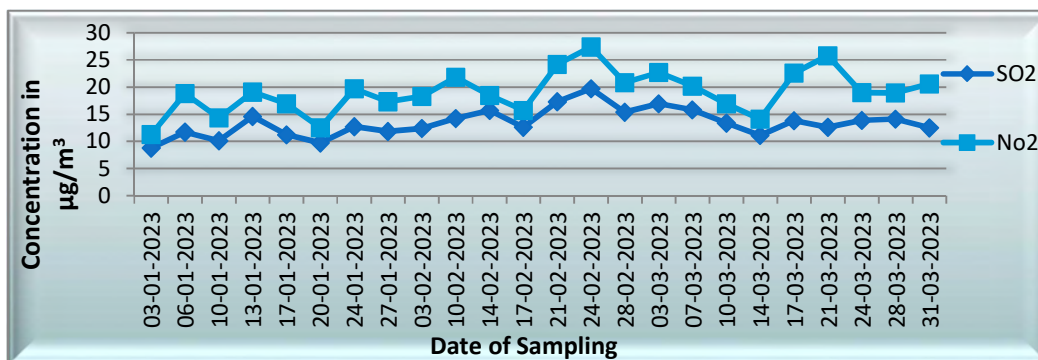
Units: µg/m<sup>3</sup>



**Graph 3: Particulate Matter Level Kandagara Village**



**Graph 4: SO2, NO2 Level Kandagara Village**



**3.1.4 Location: Wandh Village**

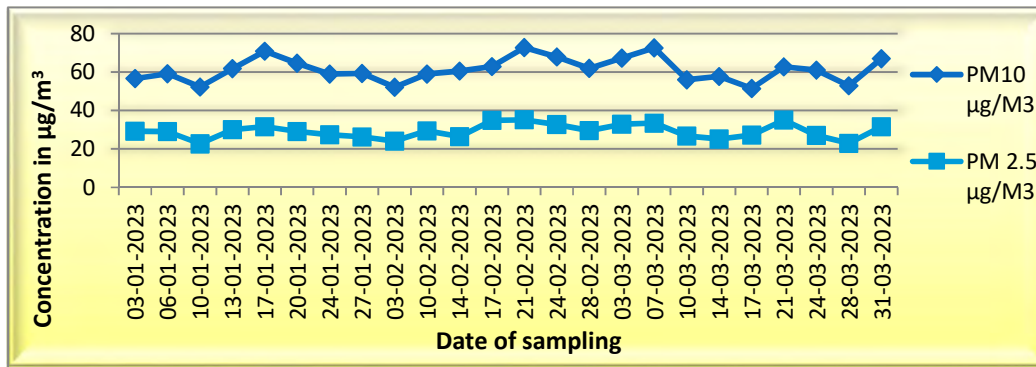
The Sampling station was located in the core zone in Wandh village. The Station is located at about 3.0 km away in Southwest Direction from the Company premises. The Respirable Dust Sampler Was placed at a height of 3.0 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during the monitoring period (January 2023- March 2023) are as follows.

Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
03-01-2023	56.6	29.2	15.6	18.8	-
06-01-2023	59.1	29.1	12.9	14.3	-
10-01-2023	52.2	22.7	11.4	18.7	18.1
13-01-2023	61.7	30	16.1	19.5	-
17-01-2023	70.8	31.5	13.7	16.4	-
20-01-2023	64.5	29	12.3	21.8	-
24-01-2023	59	27.4	15.6	18.1	-
27-01-2023	59.3	26.3	12.3	19.6	-
03-02-2023	52.1	24	13.8	21.6	-
10-02-2023	59	29.4	14.3	20.1	-
14-02-2023	60.5	26.4	14.6	19.4	-
17-02-2023	62.8	34.8	18.6	22.7	-
21-02-2023	72.7	35.1	19.1	24.6	22.2
24-02-2023	67.9	32.7	18.7	26.2	-

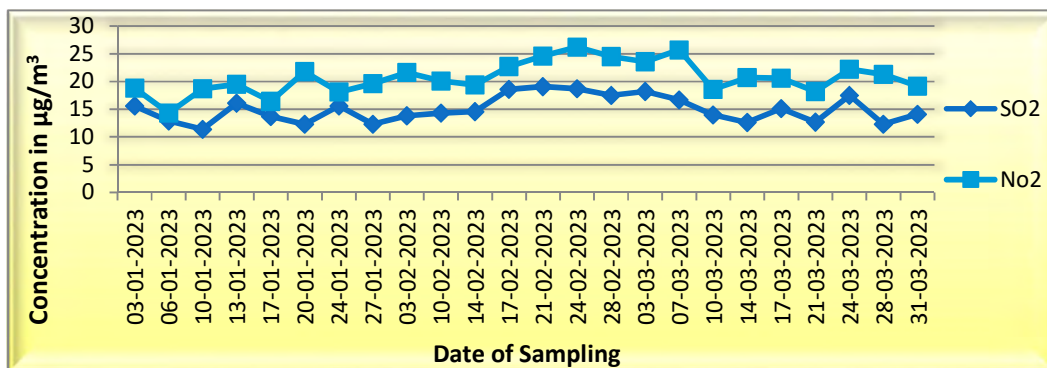
28-02-2023	61.9	29.5	17.5	24.5	-
03-03-2023	67.2	32.8	18.2	23.6	-
07-03-2023	72.5	33.4	16.7	25.7	-
10-03-2023	55.9	26.8	14	18.6	19.6
14-03-2023	57.7	25.1	12.6	20.7	-
17-03-2023	51.5	27.2	15.1	20.6	-
21-03-2023	62.7	35	12.7	18.2	-
24-03-2023	60.9	27	17.5	22.2	-
28-03-2023	52.9	23	12.3	21.3	-
31-03-2023	66.9	31.6	14.1	19.2	-
Maximum Value	72.7	35.1	19.1	26.2	22.2
Minimum Value	51.5	22.7	11.4	14.3	18.1
Average Value	61.2	29.1	15.0	20.7	19.9
Standard Deviation	6.2	3.7	2.3	2.9	2.0
Permissible Limits	100	60	80	80	100

Units:  $\mu\text{g}/\text{m}^3$

**Graph 5: Particulate Matter Level Wandh Village**



**Graph 6: SO<sub>2</sub>, NO<sub>2</sub> Level Wandh Village**



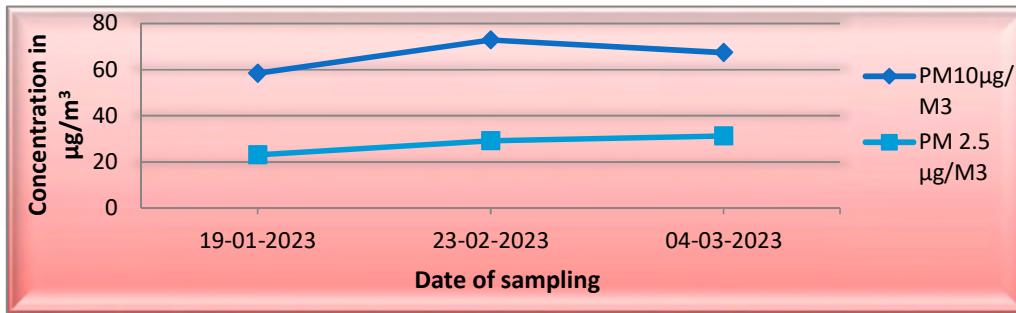
**3.1.5 Location: Nr.20 MLD Plant**

The Sampling station was located in the core zone in Company premises. The Respirable Dust Sampler (PM<sub>10</sub>) & (PM<sub>2.5</sub>) Sampler were placed at a height of 3 m above the ground level. Assess present pollution level the observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during monitoring period (January 2023- March 2023) are as follows:

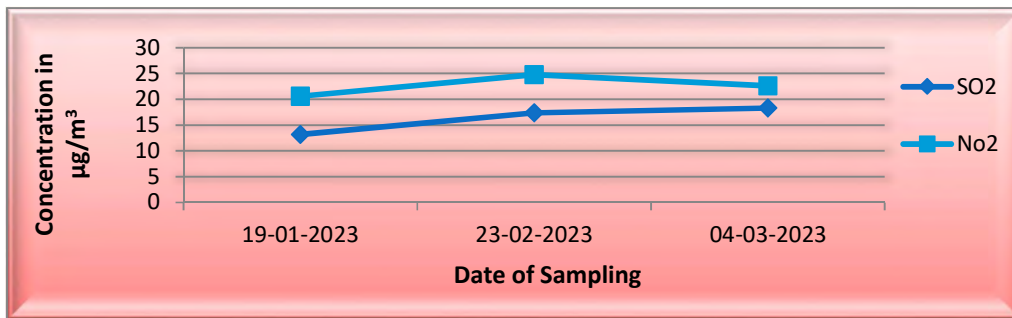
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
19-01-2023	58.4	23.1	13.2	20.6	16.2
23-02-2023	72.8	29.2	17.4	24.8	20.7
04-03-2023	67.4	31.3	18.3	22.6	20.4
Maximum Value	72.8	31.3	18.3	24.8	20.7
Minimum Value	58.4	23.1	13.2	20.6	16.2
Average Value	66.2	27.9	16.3	22.7	19.1
Standard Deviation	7.3	4.3	2.7	2.1	2.5
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 7: Particulate Matter Level Nr.20 MLD Plant**



**Graph 8: SO<sub>2</sub>, NO<sub>2</sub> Nr.20 MLD Plant**



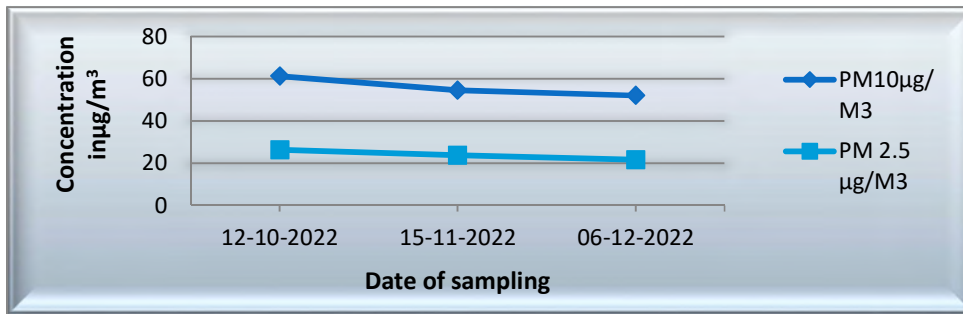
**3.1.6 Location: Nr. Shantiniketan-1**

The Sampling station was located in the core zone in company premises. The Respirable Dust Sampler PM<sub>10</sub> & PM<sub>2.5</sub> Sampler were placed at a height of 3 m above the ground level. The observed levels of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> collected during monitoring period (January 2023- March 2023) are as follows

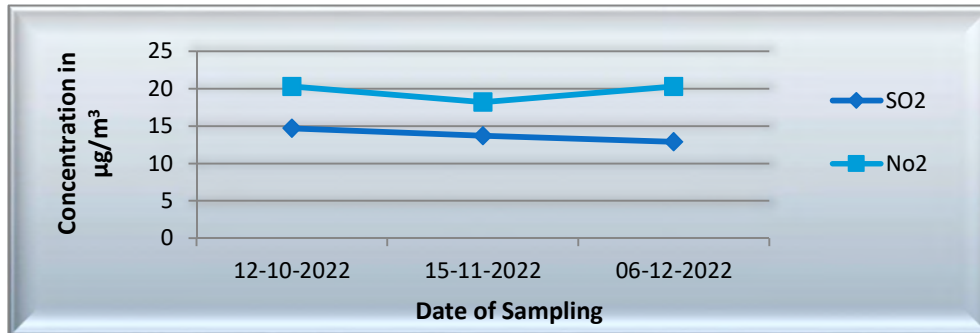
Observations	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>
19-01-2023	48.7	20.6	11.8	18.8	14.3
23-02-2023	61.4	25.8	14.8	21.3	17.8
04-03-2023	57.2	27.4	13.9	19.4	19.6
Maximum Value	61.4	27.4	14.8	21.3	19.6
Minimum Value	48.7	20.6	11.8	18.8	14.3
Average Value	55.8	24.6	13.5	19.8	17.2
Standard Deviation	6.5	3.6	1.5	1.3	2.6
Permissible Limits	100	60	80	80	100

Units: µg/m<sup>3</sup>

**Graph 9: Particulate Matter Level Nr. Shantiniketan-1**



**Graph 10: SO<sub>2</sub>, NO<sub>2</sub> Nr. Shantiniketan-1**



**3.1.7 Ambient Air Quality Monitoring:**

The principal objective of the ambient air quality was to assess the existing levels of air pollution as well as the regional background concentration in the plant area. Air pollution forms critical factor to study the environmental issues in the study areas. Ambient Air Quality Monitoring has been carried out of 12 parameters at 05 Locations near surrounding villages within a 05 KM radius of the plant as per CEA guidelines.

Locations →			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date →			10/01/23	10/01/23	10/01/23	19/01/23	19/01/23
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	41.8	68.1	52.2	58.4	48.7
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	19.5	30.0	22.7	23.1	20.6
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	10.6	10.1	11.4	13.2	11.8
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	19.1	14.3	18.7	20.6	18.8
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.08	1.10	1.20	1.17	1.14
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	14.8	14.1	18.1	16.2	14.3
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

Note: BDL: Below Detection Limit:1) Hg: 0.001 µg/M<sup>3</sup>, 2) Ozone: 5.0 µg/M<sup>3</sup>

Locations →			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date →			21/02/23	21/02/23	21/02/23	23/02/23	23/02/23
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	68.5	65.3	72.7	72.8	61.4
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	31.5	30.1	35.1	29.2	25.8
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	17.7	17.3	19.1	17.4	14.8
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	21.1	24.2	24.6	24.8	21.3
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.23	1.26	1.38	1.37	1.28
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	17.2	18.9	22.2	20.7	17.8
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

Note: BDL: Below Detection Limit:1) Hg: 0.001 µg/M<sup>3</sup>, 2) Ozone: 5.0 µg/M<sup>3</sup>

Locations →			Siracha	Kandagara	Wandh	Nr.20 MLD Plant	Nr. Shantiniketan - 1
Date →			10/03/23	10/03/23	10/03/23	10/03/23	10/03/23
Sr. No.	Parameter	Unit	Results				
1	Particulate Matter as PM <sub>10</sub>	µg/m <sup>3</sup>	50.9	56.5	55.9	67.4	57.2
2	Particulate Matter as PM <sub>2.5</sub>	µg/m <sup>3</sup>	21.2	23.9	26.8	31.3	27.4
3	Sulphur Dioxide as SO <sub>2</sub>	µg/m <sup>3</sup>	10.6	13.4	14.0	18.3	13.9
4	Nitrogen Dioxide as NO <sub>2</sub>	µg/m <sup>3</sup>	16.0	16.9	18.6	22.6	19.4
5	Carbon Monoxide as CO	mg/m <sup>3</sup>	1.21	1.20	1.31	1.33	1.27
6	Ozone as O <sub>3</sub>	µg/M <sup>3</sup>	17.8	18.3	19.6	20.4	19.6
7	Ammonia as NH <sub>3</sub>	µg/m <sup>3</sup>	<5.0	<5.0	<5.0	<5.0	<5.0
8	Lead as Pb	µg/m <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	<0.50
9	Nickel as Ni	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
10	Arsenic as As	ng/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
11	Benzene as C <sub>6</sub> H <sub>6</sub>	µg/m <sup>3</sup>	<1.0	<1.0	<1.0	<1.0	<1.0
12	Benzo (a) Pyrene (BaP)	ng/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1
13	Mercury	µg/m <sup>3</sup>	<0.1	<0.1	<0.1	<0.1	<0.1

### 3.2 Flue Gas Monitoring Data

Stack Emission monitoring procedure includes tasks of Measurement, testing, sampling and analysis. Stack Emission testing is the process of evaluation of those gases and their degree of presence in atmosphere from industries to meet environmental standards.

Date	Location	PM in mg/Nm <sup>3</sup>	SO <sub>2</sub> in mg/Nm <sup>3</sup>	NO <sub>x</sub> in mg/Nm <sup>3</sup>	Mercury	Stack Velocity
16-01-2023	Boiler (Unit - 1)	40.1	528.6	231.1	BDL	22.6
21-02-2023	Boiler (Unit - 1)	41.3	548.4	242.6	BDL	22.2
12-01-2023	Boiler (Unit - 3)	30.2	544.2	256.4	BDL	23.3
17-02-2023	Boiler (Unit - 3)	29.8	504.9	238.4	BDL	23.6
04-03-2023	Boiler (Unit - 3)	33.7	538.9	267.8	BDL	23.1
12-01-2023	Boiler (Unit - 4)	31.1	562.3	248.9	BDL	23.5
17-02-2023	Boiler (Unit - 4)	32.3	501.2	241.9	BDL	23.8
04-03-2023	Boiler (Unit - 4)	35.8	556.7	256.9	BDL	23.3
20-01-2023	Boiler (Unit - 5)	36.8	458.6	264.8	BDL	23.8
24-02-2023	Boiler (Unit - 5)	35.4	462.5	266.8	BDL	23.2
03-03-2023	Boiler (Unit - 5)	32.9	424	251.9	BDL	23.5
20-01-2023	Boiler (Unit - 6)	37.9	506.7	286.5	BDL	23.2
24-02-2023	Boiler (Unit - 6)	37.5	504.8	289.5	BDL	23.5
03-03-2023	Boiler (Unit - 6)	37.4	490.7	282.4	BDL	23.8
07-01-2023	Boiler (Unit - 9)	33.6	156.4	284.6	BDL	23.4
25-02-2023	Boiler (Unit - 9)	38.3	172.3	294.7	BDL	23.7
22-03-2023	Boiler (Unit - 9)	31.6	132.7	286.8	BDL	23.9
Permissible Limits		50	<500 MWH-600 >500 MWH-200	450		

As per CPCB letter No B-33014/07/2017/IPC-II/TPP/15872 dated 11.12.2017, & MOEF Gazette No. CG-DL-E-05092022-238614 dated 05.09.2022 SO<sub>2</sub> (For Unit#1 to 6) and NO<sub>x</sub> (For all units) Permissible limits will be applicable after installation of FGD by year 2026. As per MOEFCC letter CG-DL-E-22102020-222659 dt. 22.10.2020 revised NO<sub>x</sub> limit

### 3 Ground Water Quality Monitoring

Groundwater is a vital natural resource, being increasingly under pressure of climate change and human activities. The main objective of Ground Water monitoring in the study area is to monitoring ground water quality and assess the impact on groundwater by the operation activities. Ground water monitoring has been conducted at 05 locations within 10 Km Radius Villages.

#### 3.3.1 Location: Tunda Village Water Sample

DATE: 17/03/2023

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	--	7.56	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	<5	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	159	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	38.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	25.6	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1480	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	471.3	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	561.4	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	178.6	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	4.6	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.3	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.69	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent

35	Total Bacterial Count	(CFU/ml)	14	100 CFU/ml	100 CFU/ml
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Note: BDL= Below Detection Limit. N.D. = Not Detected

### 3.3.2 Location: Kandagra Village Water Sample

DATE: 17/03/2023

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.82	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	<5	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	152.8	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	29.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	18.5	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1430	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	351.5	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	360.3	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	134.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.8	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.32	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.78	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	N.D.(MDL:0.001)
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	N.D.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	N.D.(MDL:0.01)
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	N.D.(MDL:0.003)
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	N.D.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.(MDL:0.1)
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	N.D.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	N.D.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	N.D.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	N.D.(MDL:0.001)
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	20	100 CFU/ml	100 CFU/ml

Note: BDL= Below Detection Limit. N.D. = Not Detected



### 3.3.3 Location: Siracha Village Water Sample

DATE: 17/03/2023

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.32	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	<5	5	15
3	Odour	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	314.2	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	52.4	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	56.8	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1400	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	400.4	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	442.2	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	230.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.9	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.44	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.69	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	18	100 CFU/ml	100 CFU/ml

Note: BDL= Below Detection Limit. N.D. = Not Detected

**3.3.4 Location: Navinal Village Water Sample**
**DATE: 17/03/2023**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.79	6.5 – 8.5	6.5 – 8.5
2	Colour	Pt-Co	<5	5	15
3	Odour	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	0.1	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	202.8	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	49.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	36.5	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1322	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	351.5	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	430.3	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	144.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	2.8	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	0.28	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.68	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	12	100 CFU/ml	100 CFU/ml

Note: BDL= Below Detection Limit. N.D. = Not Detected

**3.3.5 Location: Desalpur Village Water Sample**
**DATE: 17/03/2023**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.71	6.5 – 8.5	6.5 – 8.5
2	Color	Pt-Co	<5	5	15
3	Odor	mg/L	Agreeable	Unobjectionable	Unobjectionable
4	Taste	mg/L	Agreeable	Agreeable	Agreeable
5	Turbidity(NTU)	mg/L	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as CaCO <sub>3</sub>	mg/L	141.7	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	181.7	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	48.9	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1210	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	35.2	200 mg/lit.	600 mg/lit.
11	Chloride as Cl <sup>-</sup>	mg/L	371.7	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO <sub>4</sub> <sup>-2</sup>	mg/L	389.7	200 mg/lit.	400 mg/lit.
13	Nitrate as NO <sub>3</sub>	mg/L	16.6	45 mg/lit.	45 mg/lit.
14	Copper as Cu	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	1.5 mg/lit.
15	Manganese as Mn	mg/L	BDL(MDL:0.1)	0.1 mg/lit.	0.3 mg/lit.
16	Iron as Fe	mg/L	BDL(MDL:0.1)	0.3 mg/lit.	0.3 mg/lit.
17	Residual Free Chlorine	mg/L	3.4	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.36	1.0 mg/lit.	1.5 mg/lit.
19	Zinc as Zn	mg/L	BDL(MDL:0.05)	5 mg/lit.	15 mg/lit.
20	Phenolic Compound	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.002 mg/lit.
21	Mercury as Hg	mg/L	BDL(MDL:0.001)	0.001 mg/lit.	0.001 mg/lit.
22	Cadmium as Cd	mg/L	BDL(MDL:0.003)	0.003 mg/lit.	0.003 mg/lit.
23	Selenium as Se	mg/L	N.D.	0.01 mg/lit.	0.01 mg/lit.
24	Arsenic as as	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.05 mg/lit.
25	Cyanide as CN	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
26	Lead as Pb	mg/L	BDL(MDL:0.01)	0.01 mg/lit.	0.01 mg/lit.
27	Anionic Detergent	mg/L	N.D.	0.2 mg/lit.	1.0 mg/lit.
28	Hexavalent Chromium	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
29	Mineral Oil	mg/L	N.D.	0.5 mg/lit.	0.5 mg/lit.
30	Aluminum as Al	mg/L	BDL(MDL:0.003)	0.03 mg/lit.	0.2 mg/lit.
31	Boron as B	mg/L	BDL(MDL:0.5)	0.5 mg/lit.	1 mg/lit.
32	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	0.05 mg/lit.	0.05 mg/lit.
33	Total Coliform	(CFU/100 ml)	Absent	Absent	Absent
34	E. coli	(CFU/100 ml)	Absent	Absent	Absent
35	Total Bacterial Count	(CFU/ml)	14	100 CFU/ml	100 CFU/ml

Note: Colour = 1(10) = 10 APHA, BDL= Below Detection Limit. N.D. = Not Detected

### 3.4 Water Quality Monitoring – Plant area

Water quality monitoring is being monitored for impact study. Defined here as the sampling and analysis of water constituents and conditions. Constituents found naturally in water that can nevertheless be affected by human sources, such as dissolved oxygen, bacteria, and nutrients

#### 3.4.1 Location: Outfall Channel

Sr. No.	Parameter	Unit	Date of sampling		
			19/01/2023	21/02/2023	21/03/2023
1	pH @ 25	--	7.36	7.29	7.35
2	Temperature	°C (Intake)	20.5	24	26.5
		°C (Outfall)	24.5	27.5	28.5
		°C (Differential)	4.0	3.5	2.0
3	Color	Pt. CO. Scale	10	10	10
4	Total Suspended Solids	mg/L	24	20	22
5	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Ammonical Nitrogen	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
7	Sulphide as S-2	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
8	Total Chromium	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
9	Hexavalent Chromium as Cr+6	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
10	Phosphate as PO <sub>4</sub>	mg/L	0.3	0.11	0.26
11	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
12	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
13	Zinc as Zn	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
14	Iron (as Fe)	mg/L	0.108	0.109	0.125
15	Chemical Oxygen Demand(COD)	mg/L	52.3	48.4	42.2
16	Biochemical Oxygen Demand (BOD)	mg/L	14	14	10

#### 3.4.2 Location: STP Outlet Water Sample;

Sr. No.	Parameter	Unit	SPCB Limit	Date of sampling		
				19/01/2023	21/02/2023	21/03/2023
1	pH @ 25 ° C	--	<b>6.5-8.5</b>	7.31	7.26	7.39
2	Total Suspended Solids	mg/L	<b>30</b>	18	12	18
3	Residual Chlorine	mg/L	<b>0.5 Min.</b>	0.74	0.70	0.79
4	Biochemical Oxygen Demand (BOD)	mg/L	<b>20</b>	10	10	12
5	Fecal Coliform	CFU/100ml	<b>&lt;1000</b>	30	22	26

### 3.4.3 Location: ETP Outlet Water Sample;

S.N	Parameter	Unit	SPCB Limit	Date of sampling		
				19/01/2023	21/02/2023	21/03/2023
1	pH @ 25	--	6.5 – 8.5	7.06	7.12	7.19
2	Temperature	° C	40 Max.	27	27	29
3	Color	Pt. CO. Scale	100 Max.	10	10	10
4	Total Suspended Solids	mg/L	100 Max.	08	12	16
5	Oil & Grease	mg/L	10 Max.	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Chemical Oxygen Demand (COD)	mg/L	100 Max.	20.1	12.1	16.4
7	Biochemical Oxygen Demand (BOD)	mg/L	30 Max.	6	3	4
8	Chloride as Cl <sup>-</sup>	mg/L	600 Max.	377.1	363.0	378.2
9	Total Dissolved Solids	mg/L	2100 Max.	1690	1674	1728
10	Sulphate as SO <sub>4</sub>	mg/L	1000 Max.	54.8	42.6	48.2
11	Ammonical Nitrogen	mg/L	50 Max.	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
12	% Sodium(Na)	mg/L	60 Max.	35.89	28.51	29.1
13	Sodium Absorption Ratio(SAR)	mg/L	26 Max.	1.15	0.87	0.9
14	Sulphide as S <sup>-2</sup>	mg/L	02 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
15	Total Chromium	mg/L	02 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
16	Hexavalent Chromium as Cr+6	mg/L	0.1 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
17	Phosphate as PO <sub>4</sub>	mg/L	5.0 Max.	0.14	0.12	0.17
18	Copper as Cu	mg/L	03 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
19	Lead as Pb	mg/L	0.1 Max.	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
20	Zinc as Zn	mg/L	05 Max.	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
21	Residual Free Chlorine	mg/L	0.5 Max.	BDL(MDL:0.2)	BDL(MDL:0.2)	BDL(MDL:0.2)
22	Iron (as Fe)	mg/L	1.0 Max.	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)

**Note:** N.D. = Not Detected, MDL = Minimum Detection Limit

### 3.4.4 Location: Bore-well – 1 to 4 (Nr. Emergency Ash Pond)

Bore well Water Testing is the analysis of the water quality for domestic consumption or industrial use against set parameters for your safety. Bore well Water test is done, as it is groundwater, which has a higher chance of being polluted with mud, metals and such elements.

Sr.No.	Parameter	Unit	Results			
			Borewell-1 21/03/2023	Borewell-2 21/03/2023	Borewell-3 21/03/2023	Borewell-4 21/03/2023
1	pH @ 25 ° C	-	7.48	7.41	7.52	7.58
2	Conductivity (µS)	-	16370	17560	16060	24700
3	Total Dissolved Solids	mg/L	10478	11240	10280	16553
4	Chloride as Cl <sup>-</sup>	mg/L	4384.0	4572.0	4290.0	4423.0
5	Carbonate as CaCO <sub>3</sub>	mg/L	22.6	29.8	17.8	31.7
6	Bicarbonate as CaCO <sub>3</sub>	mg/L	145	205	169	171
7	Total Alkalinity	mg/L	391.4	371.3	341.6	336.6
8	Calcium as Ca	mg/L	322.00	307.20	252.50	336.20
9	Magnesium as Mg	mg/L	196	110	156	137
10	Sodium as Na	mg/L	1510	1872	1721	1704
11	Potassium as K	mg/L	59.6	89.1	63.4	71.5
12	Sulphate as SO <sub>4</sub> -2	mg/L	520.4	654.0	605.3	728.4
13	Nitrate as NO <sub>3</sub>	mg/L	20	20	21	26
14	Phosphate as PO <sub>4</sub>	mg/L	2.4	2.1	1.6	2.1
15	Fluoride as F	mg/L	2.51	2.27	1.94	2.32
16	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
17	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
18	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
19	Chromium as Cr	mg/L	BDL(MDL:0.05)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)
20	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
21	Iron (as Fe)	mg/L	BDL(MDL:0.1)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
22	Zinc (as Zn)	mg/L	BDL(MDL:0.05)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
23	Cobalt as Co	mg/L	BDL(MDL:0.1)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
24	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
25	Manganese as Mn	mg/L	BDL(MDL:0.1)	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)
26	Nickel as Ni	mg/L	BDL(MDL:0.02)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)
27	Salinity	ppt	7.92	8.06	7.80	7.99
28	Barium as Ba	mg/L	N.D.	N.D.	N.D.	N.D.
29	Ground Water Table (BGL)	Mtr.	1.1	2.3	2.7	2.0

Note: N.D. = Not Detected, MDL = Minimum Detection Limit

### 3.4.5 Location: Cooling Tower Blow down Water Sample

S.No.	Parameter	Unit	Limit	Results			
				Unit-3	Unit-4	Unit-5	Unit-9
<b>Date of Sampling</b> →				<b>17/02/2023</b>	<b>17/02/2023</b>	<b>17/02/2023</b>	<b>17/02/2023</b>
1	pH @ 25 °C	--	-	7.63	7.58	7.47	7.92
2	Free available Chlorine	°C	Min.0.5	0.84	0.90	0.84	1.0
3	Zinc as Zn	Pt. CO. Scale	1.0	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
4	Hexavalent Chromium as Cr+6	mg/L	0.1	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
5	Total Chromium as Cr	mg/L	0.2	0.061	0.081	0.060	0.073
6	Phosphate as P	mg/L	5.0	0.46	0.91	0.30	0.46

Note: All other Units are in Shutdown.

### 3.4.6 Location: Condensate Cooling Tower Water Sample

S.No.	Parameter	Unit	Limit	Results			
				Unit-3	Unit-4	Unit-5	Unit-9
<b>Date of Sampling</b> →				<b>17/02/2023</b>	<b>17/02/2023</b>	<b>17/02/2023</b>	<b>17/02/2023</b>
1	pH @ 25 °C	--	6.5 to 8.5	7.79	7.61	7.75	7.67
2	Temperature °C (Inlet)	°C	--	28.0	28.5	28.0	28.5
	Temperature °C (Outlet)	°C	--	30.5	30	30.0	30
	Temperature °C (Differential)	°C	7	2.5	1.5	2.0	1.5
3	Free available Chlorine	mg/L	Min 0.5	0.70	0.65	0.92	0.80

### 3.4.7 Location: Boiler Blow Down Water Sample

Parameter	Unit	Limit	Results		
			Unit -1	Unit -3	Unit -4
<b>Date of Sampling</b> →			<b>17/02/2023</b>	<b>17/02/2023</b>	<b>17/02/2023</b>
Total Suspended Solids	mg/L	100	N.D. (MDL:5.0)	N.D. (MDL:5.0)	N.D. (MDL:5.0)
Oil & Grease	mg/L	10	N.D. (MDL:4.0)	N.D. (MDL:4.0)	N.D. (MDL:4.0)
Total Copper as Cu	mg/L	1.0	0.008	N.D. (MDL:0.002)	N.D. (MDL:0.002)
Total Iron (as Fe)	mg/L	1.0	0.022	0.032	0.034

Note: All other Units are in Shutdown.

### 3.5 Soil Quality Monitoring:

Date: 17/03/2023

Soil is a three-dimensional natural growth medium supporting plants, with variable proportions of solid, liquid, and gaseous phases. We have carried out Soil monitoring at 05 Locations of surrounding villages within 05 KM radius.

Locations of soil sampling			Kandagra	Tunda	Desalpur	Siracha	Navinal
Sr. No.	Parameter	Unit	Results				
1	Magnesium as Mg	%	0.0052	0.0034	0.0046	0.0031	0.0071
2	Molybdenum as Mo	%	N.D.	N.D.	N.D.	N.D.	N.D.
3	Phosphorous as P	%	0.314	0.3274	0.2191	0.2795	0.2199
4	Calcium as Ca	%	0.040	0.016	0.011	0.018	0.012
5	Zinc as Zn	%	0.009	0.0011	0.0024	0.0019	0.0218
6	Manganese as Mn	%	0.021	0.014	0.0261	0.023	0.0022
7	Potassium as K	%	0.0050	0.0026	0.0029	0.0014	0.0069
8	Nitrogen as N	%	0.0071	0.0064	0.0066	0.0049	1.0084
9	Iron as Fe	%	0.341	0.407	0.4121	0.732	0.0002
10	Copper as Cu	%	0.0011	0.0004	0.0005	0.0003	0.0014
11	Boron as B	%	N.D.	N.D.	N.D.	N.D.	N.D.
12	Sulphur	%	0.0055	0.0057	0.0033	0.0058	0.0060
13	Chlorides as Cl	%	0.0060	0.0127	0.0131	0.0539	0.027

Note: N.D. = Not Detected,

### 4 AMBIENT NOISE LEVEL MONITORING

The main objective of noise monitoring in the study area is to establish the baseline noise levels and assess the impact of the total noise generated by the operation activities around it. Noise monitoring has been conducted at 10 locations within the periphery of industry premises.

Date of Monitoring: 19-20.01.2023

Sr. No.	Location	Sampling Time	Noise Level dB(A)	
			Day Time dB(A) 06 am - 10 pm	Night Time dB(A) 10 pm - 06 am
			Limit 75 dB(A)	Limit 70 dB(A)
1.	Nr. LDO Pump House	10:30 am - 12:15 pm	59.4	54.7
2.	Nr. 20 MLD Plant		60.4	54.2
3.	Nr. Pump House		60.2	52.5
4.	Nr. Coal Handling plant		64.7	60.6
5.	Nr. Gate No.4		54.8	45.8
6.	Nr. Integrated Ash Silo		67.0	59.0
7.	Nr. Main Gate		55.9	52.7
8.	Nr. APCH Building		53.6	48.5
9.	Nr. Shantiniketan-I		54.9	50.1
10.	Nr. OHC Building		52.3	48.0

Remark: Calibrated instruments were used during monitoring of above identified sample.



Date of Monitoring: 06-07.02.2023

Sr. No.	Location	Noise Level dB(A)			
		Sampling Time	Day Time dB(A) 06 am - 10 pm	Sampling Time	Night Time dB(A) 10 pm - 06 am
			Limit 75 dB(A)		Limit 70 dB(A)
1.	Nr. LDO Pump House	11:00 am - 12:35 pm	58.9	22:40 pm - 00:35 am	57.2
2.	Nr. 20 MLD Plant		60.7		56.2
3.	Nr. Pump House		60.0		55.5
4.	Nr. Coal Handling plant		65.4		60.0
5.	Nr. Gate No.4		52.9		46.5
6.	Nr. Integrated Ash Silo		60.9		58.4
7.	Nr. Main Gate		56.9		53.9
8.	Nr. APCH Building		53.7		52.7
9.	Nr. Shantiniketan-I		52.2		49.5
10.	<b>Nr. OHC Building</b>		<b>54.0</b>		<b>48.1</b>

Remark: Calibrated instruments were used during monitoring of above identified sample.

Date of Monitoring: 16-17.03.2023

Sr. No.	Location	Noise Level dB(A)			
		Sampling Time	Day Time dB(A) 06 am - 10 pm	Sampling Time	Night Time dB(A) 10 pm - 06 am
			Limit 75 dB(A)		Limit 70 dB(A)
1.	Nr. LDO Pump House	11:10 am - 12:45 pm	64.0	22:45 pm - 00:40 am	59.7
2.	Nr. 20 MLD Plant		63.9		60.7
3.	Nr. Pump House		66.9		62.7
4.	Nr. Coal Handling plant		63.9		59.0
5.	Nr. Gate No.4		55.0		50.5
6.	Nr. Integrated Ash Silo		62.5		58.6
7.	Nr. Main Gate		55.1		50.7
8.	Nr. APCH Building		56.5		52.1
9.	Nr. Shantiniketan-I		54.0		52.7
10.	<b>Nr. OHC Building</b>		<b>54.4</b>		<b>53.2</b>

Remark: Calibrated instruments were used during monitoring of above identified sample.

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Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 1			Unit 2			Unit 3		
	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)
1-Oct-22							23.6	502.2	212.7
2-Oct-22							23.9	524.6	230.4
3-Oct-22							23.3	531.4	233.6
4-Oct-22							23.8	475.9	201.9
5-Oct-22									
6-Oct-22									
7-Oct-22	19.3	467.2	186.9	22.5	437.8	177.9			
8-Oct-22	34.8	495.2	278.2	21.5	404.2	178.7			
9-Oct-22									
10-Oct-22									
11-Oct-22									
12-Oct-22	20.7	278.9	116.9						
13-Oct-22	35.2	539.0	229.5						
14-Oct-22	18.8	312.2	138.4						
15-Oct-22									
16-Oct-22									
17-Oct-22									
18-Oct-22									
19-Oct-22									
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26-Nov-22									
27-Nov-22									
28-Nov-22									
29-Nov-22									
30-Nov-22									

Note : Blank colour -Unit is in shutdown





**Adani Power (Mundra) Limited, Mundra**

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 1			Unit 2			Unit 3		
	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)
1-Feb-23									
2-Feb-23									
3-Feb-23									
4-Feb-23									
5-Feb-23									
6-Feb-23									
7-Feb-23									
8-Feb-23									
9-Feb-23									
10-Feb-23									
11-Feb-23									
12-Feb-23									
13-Feb-23									
14-Feb-23									
15-Feb-23									
16-Feb-23									
17-Feb-23	25.5	472.4	178.5				24.8	453.9	212.1
18-Feb-23	37.8	511.5	207.6				25.3	478.9	218.3
19-Feb-23							25.4	469.1	216.2
20-Feb-23	34.3	320.4	130.9				27.6	520.1	230.5
21-Feb-23	23.1	305.4	125.3				28.4	506.4	225.6
22-Feb-23							26.2	489.4	227.6
23-Feb-23							31.1	446.0	207.9
24-Feb-23							30.4	447.5	216.9
25-Feb-23							29.8	478.2	234.0
26-Feb-23							23.3	498.6	234.6
27-Feb-23	35.0	458.0	198.2				29.7	500.6	235.2
28-Feb-23	39.6	542.2	231.0	21.8	391.5	153.6	29.7	446.2	203.0
1-Mar-23	39.7	542.1	230.9	29.5	559.0	213.2	27.0	533.1	254.9
2-Mar-23	37.7	546.2	234.4	30.4	566.4	207.1	27.0	503.6	246.5
3-Mar-23	15.0	415.1	179.7				26.7	495.3	245.0
4-Mar-23							25.5	497.0	244.0
5-Mar-23							23.1	445.5	217.8
6-Mar-23							26.3	547.1	232.8
7-Mar-23							24.0	465.8	212.9
8-Mar-23									
9-Mar-23									
10-Mar-23									
11-Mar-23									
12-Mar-23									
13-Mar-23									
14-Mar-23									
15-Mar-23									
16-Mar-23									
17-Mar-23							21.1	473.3	163.9
18-Mar-23							25.0	322.6	136.9
19-Mar-23									
20-Mar-23									
21-Mar-23									
22-Mar-23									
23-Mar-23									
24-Mar-23									
25-Mar-23									
26-Mar-23									
27-Mar-23									
28-Mar-23									
29-Mar-23									
30-Mar-23									
31-Mar-23									

**Note : Blank colour -Unit is in shutdown**



Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 4			Unit 5			Unit 6		
	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)
1-Oct-22	25.9	533.9	227.9	31.3	387.1	232.4	32.0	411.1	261.7
2-Oct-22	23.4	429.9	200.7	31.3	394.7	233.2	31.8	405.8	262.9
3-Oct-22				31.4	396.0	241.2	32.3	414.1	269.9
4-Oct-22				31.9	393.1	235.7	33.2	422.7	266.3
5-Oct-22				30.9	355.2	224.2	31.6	412.5	268.8
6-Oct-22				21.7	434.4	148.8	34.1	441.6	272.7
7-Oct-22	27.5	542.2	221.4	24.3	356.9	196.1	32.0	410.0	268.0
8-Oct-22	30.4	542.4	228.2	30.7	396.3	240.2	31.5	367.6	253.6
9-Oct-22	23.1	419.5	171.1	31.2	377.4	229.0	31.6	386.8	258.1
10-Oct-22				29.6	320.7	213.6	31.0	410.1	272.7
11-Oct-22				29.7	334.1	219.9	27.0	354.4	234.4
12-Oct-22	20.2	315.9	125.5	30.3	406.8	244.3			
13-Oct-22	26.5	536.7	221.6	30.6	379.4	236.6			
14-Oct-22	24.8	458.9	186.2	31.2	382.6	230.9			
15-Oct-22				30.8	380.5	231.9			
16-Oct-22				28.9	392.4	201.4			
17-Oct-22									
18-Oct-22									
19-Oct-22									
20-Oct-22									
21-Oct-22									
22-Oct-22									
23-Oct-22									
24-Oct-22									
25-Oct-22									
26-Oct-22									
27-Oct-22									
28-Oct-22									
29-Oct-22									
30-Oct-22									
31-Oct-22									
1-Nov-22									
2-Nov-22									
3-Nov-22									
4-Nov-22									
5-Nov-22									
6-Nov-22									
7-Nov-22									
8-Nov-22							32.0	410.0	268.0
9-Nov-22							31.5	367.6	253.6
10-Nov-22									
11-Nov-22									
12-Nov-22									
13-Nov-22									
14-Nov-22							20.3	380.6	180.7
15-Nov-22							29.9	548.5	277.2
16-Nov-22							29.2	548.4	271.6
17-Nov-22							29.3	529.7	268.6
18-Nov-22							24.7	436.5	207.8
19-Nov-22									
20-Nov-22									
21-Nov-22									
22-Nov-22									
23-Nov-22									
24-Nov-22									
25-Nov-22									
26-Nov-22									
27-Nov-22									
28-Nov-22									
29-Nov-22									
30-Nov-22									

Note : Blank colour -Unit is in shutdown





**Adani Power (Mundra) Limited, Mundra**

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 4			Unit 5			Unit 6		
	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SOx mg/Nm <sup>3</sup> (Avg)	NOx mg/Nm <sup>3</sup> (Avg)
1-Feb-23									
2-Feb-23									
3-Feb-23									
4-Feb-23									
5-Feb-23									
6-Feb-23									
7-Feb-23									
8-Feb-23									
9-Feb-23									
10-Feb-23									
11-Feb-23									
12-Feb-23									
13-Feb-23									
14-Feb-23									
15-Feb-23									
16-Feb-23				33.9	423.7	253.0			
17-Feb-23	28.7	440.6	213.8	32.6	413.5	251.4			
18-Feb-23	29.3	499.1	229.9	32.1	410.0	251.1			
19-Feb-23	28.7	477.1	235.1	31.3	415.4	248.6	21.5	472.3	218.4
20-Feb-23	30.5	514.2	226.2	32.4	419.9	250.8	35.1	488.0	280.3
21-Feb-23	28.2	536.0	222.2	31.4	411.9	245.4	34.8	502.4	276.4
22-Feb-23	27.5	532.2	221.9	30.8	403.6	251.8	34.7	497.6	280.7
23-Feb-23	29.4	493.9	225.9	31.9	414.0	251.2	34.1	497.3	275.3
24-Feb-23	27.8	488.7	226.0	32.0	416.5	246.0	34.9	499.3	279.3
25-Feb-23	29.7	512.8	236.6	32.3	415.7	249.8	34.8	501.0	277.9
26-Feb-23	27.8	534.4	250.5	32.0	421.4	248.8	35.0	499.5	281.4
27-Feb-23	33.0	539.6	250.5	34.1	430.5	254.6	35.1	503.5	276.4
28-Feb-23	30.5	517.1	255.8	32.8	425.4	250.1	34.8	505.2	276.2
1-Mar-23	30.4	546.8	251.2	32.1	414.5	251.9	35.0	501.3	276.0
2-Mar-23	30.4	535.3	240.7	33.1	419.6	250.7	34.9	504.9	275.9
3-Mar-23	29.5	513.7	212.4	32.9	424.0	251.9	34.4	500.8	279.3
4-Mar-23	29.7	507.6	228.0	32.9	423.7	250.1	34.6	501.1	277.6
5-Mar-23	18.6	235.3	114.7	28.0	373.2	227.1	32.1	479.1	263.1
6-Mar-23	24.8	489.1	206.7						
7-Mar-23									
8-Mar-23									
9-Mar-23									
10-Mar-23									
11-Mar-23									
12-Mar-23									
13-Mar-23									
14-Mar-23									
15-Mar-23									
16-Mar-23									
17-Mar-23	25.3	237.4	173.3						
18-Mar-23	21.9	350.6	155.9						
19-Mar-23									
20-Mar-23									
21-Mar-23									
22-Mar-23									
23-Mar-23									
24-Mar-23									
25-Mar-23									
26-Mar-23									
27-Mar-23									
28-Mar-23									
29-Mar-23									
30-Mar-23									
31-Mar-23									

**Note : Blank colour -Unit is in shutdown**



Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 7			Unit 8			Unit 9		
	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)
1-Oct-22							21.5	138.5	212.4
2-Oct-22									
3-Oct-22									
4-Oct-22									
5-Oct-22									
6-Oct-22									
7-Oct-22									
8-Oct-22									
9-Oct-22									
10-Oct-22									
11-Oct-22									
12-Oct-22									
13-Oct-22									
14-Oct-22									
15-Oct-22									
16-Oct-22									
17-Oct-22									
18-Oct-22									
19-Oct-22									
20-Oct-22									
21-Oct-22									
22-Oct-22									
23-Oct-22									
24-Oct-22									
25-Oct-22									
26-Oct-22									
27-Oct-22									
28-Oct-22									
29-Oct-22									
30-Oct-22									
31-Oct-22							28.9	122.4	208.6
1-Nov-22							24.5	123.8	212.1
2-Nov-22							25.0	126.7	217.4
3-Nov-22							28.4	126.9	216.8
4-Nov-22							31.1	126.8	218.0
5-Nov-22							31.2	120.1	208.8
6-Nov-22							29.9	121.0	207.8
7-Nov-22							30.9	129.0	221.8
8-Nov-22							30.9	130.3	221.2
9-Nov-22							30.9	132.3	225.2
10-Nov-22							30.7	130.2	222.1
11-Nov-22							30.5	125.4	217.8
12-Nov-22							30.2	128.6	219.0
13-Nov-22							29.9	126.1	211.9
14-Nov-22							31.2	132.8	224.1
15-Nov-22							31.9	140.2	234.9
16-Nov-22							31.5	139.1	232.4
17-Nov-22							30.8	143.9	238.5
18-Nov-22							31.5	142.9	239.3
19-Nov-22							31.5	145.3	242.1
20-Nov-22							30.8	150.5	244.5
21-Nov-22							32.7	156.9	262.5
22-Nov-22							33.6	161.1	266.5
23-Nov-22							33.7	153.8	256.6
24-Nov-22							32.5	149.4	248.1
25-Nov-22							28.9	144.5	242.2
26-Nov-22							25.7	142.8	238.0
27-Nov-22							24.6	132.7	220.1
28-Nov-22							26.1	138.2	237.0
29-Nov-22							25.8	147.7	247.1
30-Nov-22							25.2	149.8	248.6

Note : Blank colour -Unit is in shutdown







**Adani Power (Mundra) Limited, Mundra**

Continues Environment Monitoring System Reports (Oct' 2022 TO Mar'2023)

Date	Unit 7			Unit 8			Unit 9		
	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	PM mg/Nm <sup>3</sup> (Avg)	SO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)	NO <sub>x</sub> mg/Nm <sup>3</sup> (Avg)
1-Feb-23									
2-Feb-23									
3-Feb-23									
4-Feb-23									
5-Feb-23									
6-Feb-23									
7-Feb-23									
8-Feb-23									
9-Feb-23									
10-Feb-23									
11-Feb-23									
12-Feb-23									
13-Feb-23									
14-Feb-23							20.6	153.5	192.4
15-Feb-23							32.3	156.2	285.3
16-Feb-23							33.4	158.9	289.2
17-Feb-23							32.6	151.4	283.4
18-Feb-23							33.2	149.6	282.5
19-Feb-23							28.9	151.6	276.0
20-Feb-23							31.2	151.8	279.0
21-Feb-23							32.8	157.9	288.5
22-Feb-23							31.7	155.5	284.0
23-Feb-23							32.8	161.5	295.9
24-Feb-23							34.7	165.9	302.9
25-Feb-23							36.1	164.8	304.9
26-Feb-23							35.6	163.6	302.7
27-Feb-23							38.0	167.9	310.6
28-Feb-23							36.2	164.1	301.9
1-Mar-23							38.2	162.9	308.2
2-Mar-23				32.7	111.4	256.4	37.1	163.7	304.9
3-Mar-23	20.1	113.2	157.0	36.1	123.4	338.5	35.1	158.8	295.8
4-Mar-23	39.8	189.9	151.4	37.3	156.2	271.9	37.4	166.3	287.6
5-Mar-23	32.7	172.3	235.2	32.7	149.0	232.9	33.7	152.8	245.6
6-Mar-23	22.9	149.3	178.8				33.4	155.4	247.3
7-Mar-23							27.1	153.8	241.3
8-Mar-23							26.2	151.6	236.3
9-Mar-23							23.4	124.4	181.8
10-Mar-23							23.1	112.0	167.4
11-Mar-23							23.3	127.0	183.6
12-Mar-23							23.8	142.0	202.9
13-Mar-23							23.6	128.8	212.8
14-Mar-23							25.3	116.8	261.3
15-Mar-23							25.4	130.7	284.2
16-Mar-23							25.0	124.9	274.6
17-Mar-23							26.4	130.0	283.9
18-Mar-23							28.9	127.4	279.3
19-Mar-23							28.9	137.1	294.3
20-Mar-23							28.9	142.2	305.8
21-Mar-23							28.6	131.0	284.7
22-Mar-23							28.6	119.5	266.7
23-Mar-23							28.9	126.4	277.0
24-Mar-23							29.7	133.8	300.7
25-Mar-23							28.6	124.2	274.0
26-Mar-23							29.5	142.7	313.1
27-Mar-23							32.3	139.8	314.3
28-Mar-23							32.5	151.1	329.8
29-Mar-23							34.5	146.8	334.7
30-Mar-23							32.4	147.0	320.7
31-Mar-23							26.3	149.1	290.8

**Note : Blank colour -Unit is in shutdown**

# Terrestrial Ecology Report (October 2022 to March 2023)



**Environment Department,  
Adani Power (Mundra) Limited,  
Village Tunda & Siracha, Taluka Mundra,  
Mundra Kutch, 370 435  
Gujarat, India.**

### **List of Abbreviations**

APMuL	:	Adani Power (Mundra) Limited, Mundra
CBH	:	Circumference at Breast Height
DBH	:	Diameter at Breast Height
EIA	:	Environmental Impact Assessment
GPS	:	Global Positioning System
H'	:	Shannon-Wiener Diversity Index
Ha	:	Hectare
IUCN	:	International Union for Conservation of Nature
IVI	:	Importance Value Index
MoEF&CC	:	Ministry of Environment, Forest & Climate Change, India
SEZ	:	Special Economic Zone

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## **1. The Study Area**

The Mundra coast falls in Gulf of Kutch, an ecologically important area, supports variety of fishes and birds and other associated ecosystems and hence it is necessary to monitor the ecological environment to know if any changes are happening or not due to the operation activities of power plant.

The study area has been marked as 10 Km radial distance from the existing thermal power plant boundary near village Tunda, Mundra Taluka of Kutch district of Gujarat. The study area around the plant premises comprises of terrestrial ecosystem (Fallow and barren land) and coastal ecosystem (Sea and Creeks). Topography of the study area is plain. Part of Study area falls in notified industrial zone (SEZ).

## **2. Sampling Period and Sampling Locations**

The study has been carried out during the months of **October 2022 to March 2023** in two different seasons comprising post-monsoon and winter seasons

Sampling locations were selected based on topography, land use, vegetation pattern, etc. as per the objectives and guidelines of MoEF&CC. All observations were taken in and around sampling locations for quantitative representation of different species. List of sampling location for ecological study are given in **Table 1** and Study area map is presented in **Plate 1**.

**Table 1: List of Sampling Location**

<b>Sr. No.</b>	<b>Name of Location</b>	<b>Aerial Distance from Plant (Approx. Km)</b>	<b>GPS Location</b>
1	Near Siracha Village	2.0	N 22° 50' 21.42" E 69° 33' 46.55"
2	Near Tunda Village	1.5	N 22° 50' 13.58" E 69° 32' 10.31"
3	Near Kandagra Village	3.0	N 22° 50' 22.61" E 69° 31' 32.75"
4	Near Navinal Creek	8.5	N 22° 48' 14.68" E 69° 37' 57.12"
5	Near Vandh Village	0.5	N 22° 48' 44.47" E 69° 32' 33.51"
6	Near Desalpar Village	7.0	N 22° 52' 51.41" E 69° 34' 44.67"
7	Common Intake Channel area	3.8	N 22° 47' 31.75" E 69° 32' 10.51"
8	Outfall Channel and Kotdi creek area	3.5	N 22° 48' 08.66" E 69° 34' 33.75"



**Plate 1: Map showing Ecological Sampling Locations around 10 km radial distance**

### 3. Collection of Primary Data

#### A. Vegetation Diversity

##### Methodology

The study area is dominated by the vegetation of dry deciduous scrub of small tree, shrub and very few large trees along with agricultural fields towards the northern part. Therefore, the observation of vegetation was made by visiting different sampling stations and accordingly among available plants, the dominant plants species were recorded.

##### Observation

**Forest Type:** According to Champion and Seth, the vegetation in the study area can be classified as "VI – B Northern Tropical Forest" Sub type C-I Desert Thorn Forest (Kutch, Saurashtra, Gujarat). The forest patches falling under this category have mono-dominant *Prosopis juliflora*. *Acacia spp.*, *Cassia auriculata* *Euphorbia spp.*, *Zyziphus mauritiana* and *Zyziphus nummularis* are also found in these scrubs.

**Vegetation Structure and Composition:** Trees Composition varies considerably in condition, composition, and density with change in location. The vegetation has a very open appearance and is widely spaced with scanty natural growth typical of a saline soil with hot and humid climate mainly composed of co-dominant, thorny trees and shrubs which are xerophytic in nature. The dominant tree species vary from 5-10m in height and tends to be collected in clumps. Regeneration by root suckers is common, especially in *Prosopis* and *Capparis*. The perennial grasses grow in clumps and tussocks (Bunch). There is a thin growth of annual grasses after the rains. They wither after the rainy season.

Vegetation generally occurs near human settlement areas and agricultural bunds. The most dominant species in this region is *Prosopis juliflora*. Other tree species observed are namely *Salvadora oleoides*, *Salvadora persica*, *Phoenix sylvestris* and *Ficus religiosa*. Large horticulture crops of Chiku (*Manilkara zapota*), Coconut (*Cocos nucifera*), Mango (*Mangifera indica*), Guava (*Psidium guajava*) and Date Palm (*Phoenix dactylifera*) are observed near northern part of the study area. Medicinal trees like *Aegle marmelos* (Bel), *Azadirachta indica* (Neem), *Tamarindus indica* (Amla) etc are also commonly observed in the study area.

The vertical structure of the vegetation shows three distinguished layers i.e. Top, Middle and Ground. *Azadirachta indica*, *Borassus flabellifer*, *Ficus bengalensis*, *Ficus racemosa*, *Mangifera indica*, *Tamarindus indica*, *salvadora persica* etc. comprises top layer of the vegetation.

*Salvadora oleoides*, *Phoenix sylvestris*, *Cassia auriculata*, *Capparis deciduas*, *Pithecellobium dulce*, *Calotropis procera*, *Euphorbia nebulia*, *Prosopis juliflora*, *Zizyphus mauritiana*, *Zizyphus nummularia*, *Tamarix dioica*, etc. forms middle layer of vegetation.

Ground layer vegetation consists of *Aloe vera*, *Achyranthes aspera*, *Boerhavia repens*, *Citrullus colocynthis*, *Cynodon dactylon*, *Ipomoea biloba* *Indigofera cordifolia*, *Suaeda fruticosa*, *Suaeda nudiflora*, *Solanum xanthocarpum*, *Tridax procumbens*, *Sporolobus maderaspatenus* etc.

**Dominance, Density and Frequency:** The floristic composition assessment of the study area has been evaluated. Phyto sociological studies were carried out by using least count quadrant method. Trees, shrubs and herbs were sampled by taking randomly distributed 10 quadrates of 100 m<sup>2</sup>, 25 m<sup>2</sup> and 1 m<sup>2</sup> respectively. The data obtained was further used to estimate Relative Density, Relative Frequency, Relative Dominance and calculation of Importance Value Index (IVI).

The Importance Value Index (IVI) for trees varies between 21.15 and 48.99. The highest IVI of studied tree recorded in study area is of *Cocos nucifera* (48.99) and lowest IVI recorded is of *Casuarina equisetifolia* (21.15) during study period. For shrubs, IVI varies between 11.55 and 36.85. The highest IVI of studied shrubs recorded in study area is of *Cassia auriculata* (36.85) and lowest IVI recorded is of *Aerva javanica* (11.55) during study period. The undergrowth vegetation (herbs) shows IVI in between 8.92 and 31.21. The highest IVI of studied herbs recorded in study area is of *Salicornia brachiata* (31.21) and lowest IVI recorded is of *Solanum xanthocarpum* (8.92) during study period. The details of IVI are presented in **Table 2 to 4** for tree shrubs and herbs respectively.

**Diversity Index:** Diversity means variety or variability. Species diversity therefore refers to the variation that exists among the different living forms. Species indicates the extent of biodiversity in the ecosystem. Species diversity is a statistical



abstraction with two components. These are the number of species or richness and evenness or equitability. For better understanding of plant diversity, the Shannon-Wiener diversity index was used. The index considers two important characters of vegetation, i.e. floristic richness and proportional abundance of the species. Diversity index increases with floral spectra (more species means that more wide diversity) which represents actual scenario of ecosystem. The index is given as:

$$H' = - \sum_{i=1}^s P_i \ln (P_i)$$

Where H' = Shannon-Wiener diversity index

P<sub>i</sub> = Proportional abundance of the i<sup>th</sup> (individual) species

S = species richness (total number of species present)

ln = natural log (base e)

The species diversity of the study area found to be **2.05**, **2.21** and **2.21** for tree, shrub, and herbs respectively. The details are presented in **Table 2 to 4** for trees, shrubs and herbs respectively.

**Table 2: Study of Diversity Indices for Trees**

Scientific Name	IUCN Category	No. of Plots in Sp. Occ.	Total No. Sp.	Total CBH (cm)	Radius (cm)	DBH (cm)	Total Basal Cover (Sq. Meter)	Density/ ha	R-Density	Domin.	R-Domin.	Freq.	R-Freq.	IVI	Pi	ln (Pi)	Pi X Ln (Pi)
<i>Acacia nilotica</i>	NE	8	18	41	6.52	13.05	0.01	180	7.26	0.13	4.13	0.8	12.31	23.69	0.0726	-2.6231	0.19
<i>Azadiracta indica</i>	NE	10	25	68	10.82	21.64	0.04	250	10.08	0.37	11.36	1	15.38	36.82	0.1008	-2.2946	0.23
<i>Borassus flabellifer</i>	NE	6	7	85	13.53	27.05	0.06	70	2.82	0.57	17.74	0.6	9.23	29.80	0.0282	-3.5675	0.10
<i>Casuarina equisetifolia</i>	NE	5	32	15	2.39	4.77	0.00	320	12.90	0.02	0.55	0.5	7.69	21.15	0.1290	-2.0477	0.26
<i>Cocos nucifera</i>	NE	8	36	95	15.12	30.24	0.07	360	14.52	0.72	22.16	0.8	12.31	48.99	0.1452	-1.9299	0.28
<i>Mangifera indica</i>	DD	9	34	57	9.07	18.14	0.03	340	13.71	0.26	7.98	0.9	13.85	35.53	0.1371	-1.9871	0.27
<i>Phoenix dactylifera</i>	NE	7	23	91	14.48	28.96	0.07	230	9.27	0.66	20.34	0.7	10.77	40.38	0.0927	-2.3779	0.22
<i>Prosopis juliflora</i>	NE	6	61	37	5.89	11.78	0.01	610	24.60	0.11	3.36	0.6	9.23	37.19	0.2460	-1.4026	0.34
<i>Salvadora persica</i>	NE	6	12	71	11.30	22.60	0.04	120	4.84	0.40	12.38	0.6	9.23	26.45	0.0484	-3.0285	0.15
<b>Total</b>			<b>248</b>					<b>2480</b>	<b>100.00</b>	<b>3.24</b>	<b>100.00</b>	<b>6.5</b>	<b>100.00</b>	<b>300.00</b>			<b>2.05</b>
																<b>Shannon-Wiener</b>	<b>2.05</b>

**NE:** Not Evaluated, **DD:** Data Deficient

**Table 3: Study of Diversity Indices for Shrubs**

Scientific Name	IUCN Category	No. of Plots in Sp. Occ.	Total No. of Sp.	Density/ ha	Relative Density	Frequency	Relative Frequency	IVI	Pi	ln (Pi)	Pi X Ln (Pi)
<i>Aerva javanica</i>	NE	2	8	20	5.84	0.20	5.71	11.55	0.0584	-2.8405	0.17
<i>Calotropis gigantea</i>	NE	4	6	15	4.38	0.40	11.43	15.81	0.0438	-3.1282	0.14
<i>Calotropis procera</i>	NE	5	13	33	9.49	0.50	14.29	23.77	0.0949	-2.3550	0.22
<i>Capparis deciduas</i>	NE	3	9	23	6.57	0.30	8.57	15.14	0.0657	-2.7228	0.18
<i>Cassia auriculata</i>	NE	6	27	68	19.71	0.60	17.14	36.85	0.1971	-1.6241	0.32
<i>Euphorbia spp.</i>	NE	3	14	35	10.22	0.30	8.57	18.79	0.1022	-2.2809	0.23
<i>Tamarix dioica</i>	NE	2	21	53	15.33	0.20	5.71	21.04	0.1533	-1.8755	0.29
<i>Thevetia peruviana</i>	NE	4	16	40	11.68	0.40	11.43	23.11	0.1168	-2.1474	0.25
<i>Zizyphus mauritiana</i>	NE	2	11	28	8.03	0.20	5.71	13.74	0.0803	-2.5221	0.20
<i>Zizyphus numularia</i>	NE	4	12	30	8.76	0.40	11.43	20.19	0.0876	-2.4351	0.21
		<b>Total</b>	<b>137</b>	<b>343</b>	<b>100.00</b>	<b>3.50</b>	<b>100.00</b>	<b>200.00</b>			<b>2.21</b>
<b>Shannon-Wiener</b>											<b>2.21</b>

NE: Not Evaluated, DD: Data Deficient

**Table 4: Study of Diversity Indices for Herbs**

Scientific Name	IUCN Category	No. of Plots in Sp. Occ.	Total No. of Sp.	Density/ ha	Relative Density	Frequency	Relative Frequency	IVI	Pi	ln (Pi)	Pi X Ln (Pi)
<i>Achyranthes aspera</i>	NE	4	16	0.16	8.56	0.4	11.43	19.98	0.0856	-2.4585	0.21
<i>Aloe vera</i>	NE	4	18	0.18	9.63	0.4	11.43	21.05	0.0963	-2.3407	0.23
<i>Boerhavia diffusa</i>	NE	2	11	0.11	5.88	0.2	5.71	11.60	0.0588	-2.8332	0.17
<i>Citrullus colocynthis</i>	NE	4	18	0.18	9.63	0.4	11.43	21.05	0.0963	-2.3407	0.23
<i>Ipomoea biloba</i>	NE	3	16	0.16	8.56	0.3	8.57	17.13	0.0856	-2.4585	0.21
<i>Salicornia brachiata</i>	NE	4	37	0.37	19.79	0.4	11.43	31.21	0.1979	-1.6202	0.32
<i>Solanum xanthocarpum</i>	NE	2	6	0.06	3.21	0.2	5.71	8.92	0.0321	-3.4393	0.11
<i>Indigofera cordifolia</i>	NE	3	18	0.18	9.63	0.3	8.57	18.20	0.0963	-2.3407	0.23
<i>Sporolobus maderaspatenus</i>	NE	4	28	0.28	14.97	0.4	11.43	26.40	0.1497	-1.8989	0.28
<i>Suaeda fruticosa</i>	NE	5	19	0.19	10.16	0.5	14.29	24.45	0.1016	-2.2867	0.23
<i>Tridax procumbens</i>	NE	4	16	0.16	8.56	0.4	11.43	19.98	0.0856	-2.4585	0.21
		<b>Total</b>	<b>187</b>	<b>1.87</b>	<b>100.00</b>	<b>3.5</b>	<b>100.00</b>	<b>200.00</b>			<b>2.21</b>
<b>Shannon-Wiener</b>											<b>2.21</b>

NE: Not Evaluated, DD: Data Deficient

**B. Faunal Diversity**

**Methodology**

For animals, since they are capable of moving from one place to another, this makes their study entirely different. Therefore, specific methods were adopted for counting these animals in the field. The on-site information (observation and interview with local people) collected during survey was further enriched by the information collected from different secondary sources.

**Observation**

**Mammals.** The diversity in fauna basically depends upon density and diversity of flora. The richer the diversity among the flora better will be the diversity in fauna. Present conditions (sparse, dry and thorny vegetation) of the area do not support higher mammals, however animals like Fox and Jackal are commonly observed. Vermin animals like Nilgai, Wild Boar and Hare also observed from the study area. **Plate-4** shows the mammals observed during the study.

**Reptiles and amphibians.** Area is devoid of good agricultural land, however standing orchards of coconut, mango and chiku attracts many rodents and birds, which ultimately attracts many reptiles and amphibians. Lizards such as monitor lizard and garden lizards observed in the study area. The faunal elements observed in the study area during this period are given in **Table 5**.

**Table 5: Fauna Observed in the Study Area**

Sr. No.	Common Name	Scientific Name	IUCN Red List Category	Wildlife Schedule The Indian Wildlife (Protection) Act, 1972
<b>Mammals</b>				
1	Nilgai	<i>Boselaphus tragocamelus</i>	LC	Schedule III
2	Indian Jackal	<i>Canis aureus</i>	LC	Schedule II
3	Common Mongoose	<i>Herpestes edwardsii</i>	LC	Schedule II
4	Indian Hare	<i>Lepus nigricollis</i>	LC	Schedule IV
5	Wild Boar	<i>Sus scrofa</i>	LC	Schedule III
6	Stripped palm squirrel	<i>Funambulus palmarum</i>	LC	Schedule IV
7	Fruit Bat	<i>Cyanopterus sphynx</i>	LC	Schedule V
<b>Reptiles</b>				
1	Garden lizard	<i>Calotes versicolor</i>	NE	Schedule IV
2	Indian Monitor lizard	<i>Varanus bengalensis</i>	LC	Schedule I
3	Indian cobra	<i>Naja naja</i>	LC	Schedule II
4	Rat Snake	<i>Ptyas mucosus</i>	NE	Schedule II
5	Common Indian krait	<i>Bungarus caeruleus</i>	NE	Schedule IV
6	Russel's viper	<i>Vipera russelli/ Daboia russelii</i>	NE	Schedule II
7	Saw scaled viper	<i>Echis carinatus</i>	LC	Schedule II
8	Indian Flap shell Turtle	<i>Lissemys punctatea</i>	Vulnerable	Schedule I

Amphibians				
1	Indian Skipping Frog	<i>Euphlyctis cyanophlyctis</i>	LC	Schedule IV
2	Indian bullfrog	<i>Hoplobatrachus tigerinus</i>	LC	Schedule IV

LC: Least Concern, NT: Near Threatened, NE: Not Evaluated.

### C. Avifauna

#### Methodology

For survey of the birds, the area around APMUL power plant and adjacent areas of the study area was carried out from **October 2022 to March 2023**. Birds were observed once a week. A working day was divided into two parts, *viz.*, morning (0600 to 0800hr) and afternoon (1700 to 1900hr). Existing roads, bridle paths, embankments, cattle trails, plantation areas, shore lines, canal and pond banks, etc., were used to cover the study area. The trail length varied from 500m to 1000m and the visibility of these trails was 50m to 100m width on both sides. All types of habitats were visited weekly. Maximum field visits were carried on foot but sometimes vehicles were also used to cover long distance of the study area. Birds were observed either by a pair of binoculars (**Nikon Action 8x40CF**) or by naked eyes depending on the distance of the object. Long notes were taken on whether the observed birds were singing, feeding or flying over. For identification, external morphology and other modes i.e., colour, size, shape, flight, walk, habitat, call, and sitting postures were considered, followed by the use of Field guide by Ali (1996), Ali and Ripley (1983). A camera camera (**Nikon Coolpix P900**) with **83x zoom** lens was used for photography.

The estimates of the survey provide an index of the various species of birds in the study area and allow species comparison between them. For better understanding of avian diversity, the Shannon-Wiener diversity index was used. The index considers two important characters of birds, i.e. its richness and proportional abundance of the species. Diversity index increases with the avian spectra (more species means that more wide diversity) which represents actual scenario of ecosystem. The index is given as:

$$H' = - \sum_{i=1}^s P_i \ln ( P_i )$$

Where H' = Shannon-Wiener diversity index

P<sub>i</sub> = Proportional abundance of the i<sup>th</sup> (individual) species

S = species richness (total number of species present)

ln = natural log (base e)

#### Observation

Mundra coast provides very good grounds for roosting and food to the avifauna. The coastal wetlands in Mundra coast with broad intertidal mudflats, mangroves and salt pans offer a great diversity of habitats for birds to utilize for roosting, nesting and breeding.

The study area supports three habitat types of birds namely water birds, grassland birds and coastal birds. The birds like Mynas, Crows, Sparrows, Bulbuls, Babblers and Pigeons were commonly observed in and around villages. Areas with or near the agriculture fields, grain eating herbivorous species were dominant. These species includes Doves, Sparrows, Pigeons, etc. Insectivorous bird species viz. Bee-Eaters, Bulbuls, Wagtails, Desert Wheatears, Drongos, etc. were observed in the study area. Fruit eating birds like Bulbuls, Mynas and Sunbirds usually observed near the village settlements. Water habitat and fish eating birds like Curlews, Kingfishers, Herons, Lapwings, Plovers, Sandpipers, Indian Rollers, and Egrets were observed near the water bodies and in low-lying marshy areas. View of migratory birds & resident birds observed in the study area are shown in **(Plate 2 to 4)**. List of birds observed during the study period in the study area are given in **Table 6**.

The Shannon Weiner Diversity Index for birds in the study area is found to be **3.82** during this period and total 5628 birds were recorded during the monitoring. The Species richness for the study area is found to be **68**. Proportional abundance of the individual species varies between 0.0157 and 0.1478. The highest abundance recorded was of **Blue Rock Pigeon (*Columba livia*)** (0.1478) and the lowest recorded were of Snake Bird/ Darter (***Anhinga melanogaster***) (0.0157) which is observed in study area for the first time ever. The details are presented in **Table 6**.



**Red Vented Bulbul (*Pycnonotus cafer*)**



**Painted Stork (*Mycteria leucocephala*)**



**Common Coot (*Fulica atra*)**



**Common Babbler (*Turdoides caudata*)**



**Wire-tailed Swallow (*Hirundo smithii*)**



**White Wagtail (*Motacilla alba*)**

**Plate 2: Resident Birds Observed in the Study Area of 10 Km**



Greater Flamingo (*Phoenicopterus roseus*)



Eurasian Whimbrel (*Numenius phaeopus*)



Small Blue Kingfisher (*Alcedo atthis*)



Little Egret (*Egretta garzetta*)



Black-Winged Stilt (*Himantopus himantopus*)



Dalmatian Pelican (*Pelecanus crispus*)

Plate 3: Resident Birds Observed in the Study Area of 10 Km





Common Greenshank (*Tringa nebularia*)



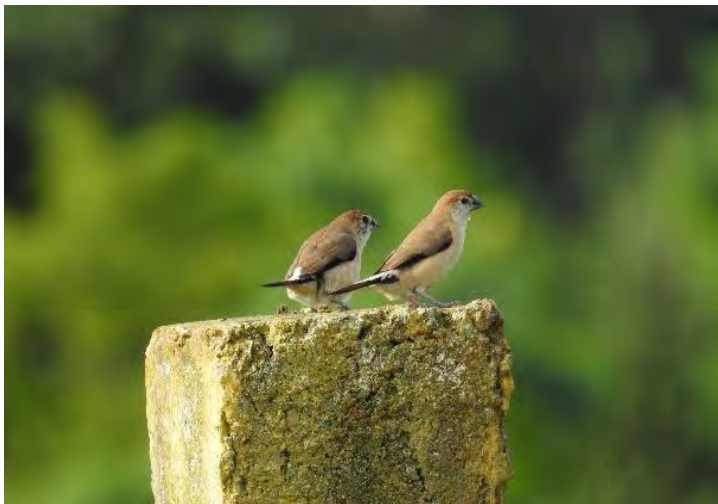
Desert Wheatear (*Oenanthe deserti*)



Eurasian Spoonbill (*Platalea leucorodia*)



Common Crane (*Grus grus*)



White-Throated Munia (*Lonchura malabarica*)



Black-Shouldered Kite (*Elanus caeruleus*)

Plate 4: Birds Observed in the Study Area of 10 Km

**Table 6: Study of Diversity Indices for Birds (Avi-Fauna)**

Sr. No.	Common Name	Scientific Name	IUCN Category	Wildlife Schedule	Total	Pi	In Pi	SWI
1	Asian Koel	<i>Eudynamis scolopaceus</i>	LC	Schedule IV	33	0.0058	-5.146	0.0300
2	Black-crowned sparrow-lark	<i>Eremopterix nigriceps</i>	LC	Schedule IV	56	0.0099	-4.618	0.0456
3	Black Drongo	<i>Dicrurus macrocercus</i>	LC	Schedule IV	99	0.0175	-4.048	0.0707
4	Black Headed Gull	<i>Chroicocephalus ridibundus</i>	LC	Schedule IV	112	0.0198	-3.924	0.0775
5	Black Ibis/Glossy Ibis	<i>Pseudibis papillosa</i>	LC	Schedule IV	94	0.0166	-4.1	0.0680
6	Black Necked Stork	<i>Ephippiorhynchus asiaticus</i>	NT	Schedule IV	28	0.0049	-5.311	0.0262
7	Black-Winged Stilt	<i>Himantopus himantopus</i>	LC	Schedule IV	159	0.0280	-3.574	0.1002
8	Black-Shouldered Kite	<i>Elanus caeruleus</i>	LC	Schedule IV	35	0.0062	-5.088	0.0314
9	Blue Cheeked Bee Eater	<i>Merops persicus</i>	LC	Schedule IV	99	0.0175	-4.048	0.0707
10	Blue Rock Pigeon	<i>Columba livia neglecta</i>	NE	Schedule IV	278	0.0490	-3.015	0.1478
11	Black-Headed ibis	<i>Threskiornis melanocephalus</i>	NT	Schedule IV	25	0.0044	-5.424	0.0239
12	Brahminy Starling	<i>Sturnia pagodarum</i>	NE	Schedule IV	30	0.0053	-5.242	0.0277
13	Cattle Egret	<i>Bubulcus ibis</i>	LC	Schedule IV	177	0.0312	-3.467	0.1082
14	Common Babbler	<i>Turdoides caudata</i>	LC	Schedule IV	114	0.0201	-3.907	0.0785
15	Common Coot	<i>Fulica atra</i>	LC	Schedule IV	190	0.0335	-3.396	0.1138
16	Common Crane	<i>Grus grus</i>	LC	Schedule IV	145	0.0256	-3.666	0.0938
17	Common Crested Lark	<i>Galerida cristata</i>	LC	Schedule IV	57	0.0101	-4.6	0.0462
18	Common Hoopoe	<i>Upupa epops</i>	LC	Schedule IV	27	0.0048	-5.347	0.0255
19	Common Iora	<i>Aegithina tiphia</i>	LC	Schedule IV	17	0.0030	-5.81	0.0174
20	Common Myna	<i>Acridotheres tristis</i>	LC	Schedule IV	68	0.0120	-4.423	0.0531
21	Common Quail	<i>Coturnix coturnix</i>	LC	Schedule IV	46	0.0081	-4.814	0.0391
22	Common Redshank	<i>Tringa totanus</i>	LC	Schedule IV	94	0.0166	-4.1	0.0680
23	Common Greenshank	<i>Tringa nebularia</i>	LC	Schedule IV	68	0.0120	-4.423	0.0531
24	Common Swallow	<i>Hirundo rustica</i>	LC	Schedule IV	93	0.0164	-4.11	0.0674
25	Common Teal	<i>Anas crecca</i>	LC	Schedule IV	116	0.0205	-3.889	0.0796
26	Dalmatian Pelican	<i>Pelecanus crispus</i>	LC	Schedule IV	99	0.0175	-4.048	0.0707
27	Great White Pelican	<i>Pelecanus onocrotalus</i>	LC	Schedule IV	17	0.0030	-5.81	0.0174
28	Demoiselle crane	<i>Anthropoides virgo</i>	LC	Schedule IV	101	0.0178	-4.028	0.0717
29	Desert Wheatear	<i>Oenanthe deserti</i>	LC	Schedule IV	77	0.0136	-4.299	0.0584
30	Great Stone Plover	<i>Esacus recurvirostris</i>	NT	Schedule IV	96	0.0169	-4.079	0.0691
31	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	LC	Schedule IV	111	0.0196	-3.933	0.0770
32	Eurasian Curlew	<i>Numenius arquata</i>	NT	Schedule IV	10	0.0018	-6.34	0.0112
33	Eurasian Spoonbill	<i>Platalea leucorodia</i>	LC	Schedule IV	99	0.0175	-4.048	0.0707
34	Eurasian Whimbrel	<i>Numenius phaeopus</i>	LC	Schedule IV	35	0.0062	-5.088	0.0314
35	Greater Flamingo	<i>Phoenicopterus roseus</i>	LC	Schedule IV	177	0.0312	-3.467	0.1082
36	Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	LC	Schedule IV	48	0.0085	-4.772	0.0404
37	Green Bee Eater	<i>Merops orientalis</i>	LC	Schedule IV	98	0.0173	-4.058	0.0701
38	Green Sandpiper	<i>Tringa ochropus</i>	LC	Schedule IV	16	0.0028	-5.87	0.0166

39	Grey Heron	<i>Ardea cinerea</i>	LC	Schedule IV	68	0.0120	-4.423	0.0531
40	Grey Francolin	<i>Francolinus pondicerianus</i>	LC	Schedule IV	74	0.0131	-4.339	0.0566
41	Heuglin's Gull	<i>Larus heuglini</i>	LC	Schedule IV	50	0.0088	-4.731	0.0417
42	House Crow	<i>Corvus splendens</i>	LC	Schedule V	130	0.0229	-3.775	0.0866
43	House Sparrow	<i>Passer domesticus</i>	LC	Schedule IV	290	0.0511	-2.973	0.1521
44	Indian Pond Heron	<i>Ardeola grayii</i>	LC	Schedule IV	63	0.0111	-4.5	0.0500
45	Indian Robin	<i>Saxicoloides fulicatus</i>	LC	Schedule IV	48	0.0085	-4.772	0.0404
46	Indian Roller/ Neelkanth	<i>Coracias benghalensis</i>	LC	Schedule IV	37	0.0065	-5.032	0.0328
47	Large Egret	<i>Ardea alba</i>	LC	Schedule IV	111	0.0196	-3.933	0.0770
48	Laughing Dove	<i>Spilopelia senegalensis</i>	LC	Schedule IV	132	0.0233	-3.76	0.0875
49	Little Cormorant	<i>Microcarbo niger</i>	LC	Schedule IV	97	0.0171	-4.068	0.0696
50	Little Tern	<i>Sternula albifrons</i>	LC	Schedule IV	56	0.0099	-4.618	0.0456
51	Oriental White Ibis / Black-Headed ibis	<i>Threskiornis melanocephalus</i>	NT	Schedule IV	57	0.0101	-4.6	0.0462
52	Painted Stork	<i>Mycteria leucocephala</i>	NT	Schedule IV	181	0.0319	-3.444	0.1100
53	Purple Sunbird	<i>Nectarinia asiatica</i>	LC	Schedule IV	59	0.0104	-4.565	0.0475
54	Pied Kingfisher	<i>Ceryle rudis</i>	LC	Schedule IV	69	0.0122	-4.409	0.0537
55	Red Vented Bulbul	<i>Pycnonotus cafer</i>	LC	Schedule IV	125	0.0220	-3.815	0.0841
56	Red Wattled Lapwing	<i>Vanellus indicus</i>	LC	Schedule IV	83	0.0146	-4.224	0.0618
57	Ring Dove	<i>Streptopelia capicola</i>	LC	Schedule IV	64	0.0113	-4.484	0.0506
58	Rose-Ringed Parakeet	<i>Psittacula krameri</i>	LC	Schedule IV	69	0.0122	-4.409	0.0537
59	Shikra	<i>Accipiter badius</i>	LC	Schedule IV	26	0.0046	-5.385	0.0247
60	Small Blue Kingfisher	<i>Alcedo atthis</i>	LC	Schedule IV	48	0.0085	-4.772	0.0404
61	Snake Bird/ Darter	<i>Anhinga melanogaster</i>	NT	Schedule IV	15	0.0026	-5.935	0.0157
62	Spot billed duck	<i>Anas poecilorhyncha</i>	LC	Schedule IV	99	0.0175	-4.048	0.0707
63	Western Reef Heron	<i>Egretta gularis</i>	LC	Schedule IV	60	0.0106	-4.549	0.0481
64	White Breasted Kingfisher	<i>Halcyon smyrnensis</i>	LC	Schedule IV	45	0.0079	-4.836	0.0384
65	White Wagtail	<i>Motacilla alba</i>	LC	Schedule IV	62	0.0109	-4.516	0.0494
66	White-Eared Bulbul	<i>Pycnonotus leucotis</i>	LC	Schedule IV	73	0.0129	-4.352	0.0560
67	White-Throated Munia	<i>Lonchura malabarica</i>	LC	Schedule IV	71	0.0125	-4.38	0.0548
68	Wire-tailed Swallow	<i>Hirundo smithii</i>	LC	Schedule IV	64	0.0113	-4.484	0.0506
<b>Total</b>					<b>5670</b>			<b>3.82</b>
<b>Shannon Wiener</b>								<b>3.82</b>

LC: Least Concern, NT: Near Threatened.

#### **4. Green Belt Activities**

Horticulture Department of Adani Power (Mundra) Limited, Mundra has taken many steps to develop plantation in and around the power plant premises.

The main objectives are:

- To improve the soil fertility
- To reduce the use of chemical fertilizers,
- To produce organic manure facility by utilizing the fly ash

To achieve the above objectives, APMuL Mundra had constructed Vermicompost which is useful for growth of plants. From October 2022 to March 2023 total 265.52 MT of Vermicompost manure was produced and all are utilized in development of greenbelt in the plant premises. In addition to this Environment department had developed an Eco-Park, which is prepared with waste and reusable material. It spreads in 4.1366 ha of land. Eco-Park is based on Concept 4-R: Reduce, Reuse, Recover and Recycle. Eco-Park has an Organic Waste converter unit which converts kitchen waste into organic compost. From October 2022 to March 2023 total 6512 kg of organic manure was produced from kitchen waste.

New nursery is established to cater the needs of new plantation and gap filling activities. Native trees species plantation are carried out to suppress the dust and for maintaining the aesthetic beauty of the region. The tree species include *Azadirachta indica*, *Casuarina equisetifolium*, *Jatropha*, *Salvadora oleoides* and *Cocos nucifera* were recently planted for greenbelt development. Plant species planted for landscaping are mainly evergreen species. These are *Caesalpinia pulcherrima*, *Ficua Panda*, *Hibiscus rosa-sinensis*, *Ixora hybrid* and *Plumeria alba*. Many orchard species are also grown inside the plant premises such as mango, chicku, Sapota and pomegranate.

The greenbelt details regarding area, species, and number of trees, palm & shrubs planted is given in Annexure: III.

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# MARINE MONITORING REPORT

January 2023

FOR

M/s. ADANI POWER (MUNDRA) LIMITED



At  
Tunda & Siracha,  
Tal. Mundra, Dist.: Kutch.  
KUTCH, GUJARAT - 370 435

Prepared by



## PREFACE

**M/s. Adani Power (Mundra) Limited (APMuL)** is a subsidiary company of Adani Group engaged in imported coal-based thermal power generation located near village Tunda and Siracha, Taluka Mundra District Kutch, Gujarat. APMuL has commissioned the first supercritical 660 MW unit in the country. This is also the World's First supercritical technology project to have received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). Currently, the total power production capacity of the APMuL has increased to 4620 MW.

APMuL has engaged **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi** to carry out the seasonal Marine Monitoring Study along with the seawater intake and outfall (discharge) channels of Mundra power plant. This marine monitoring study involved the assessment of Physio-chemical parameters at the earlier prescribed locations. The distribution and diversity of marine flora and fauna were assessed through water sampling from sub-tidal regions. Furthermore, the distribution of the benthic community was evaluated from the sediment samples collected along the sub-tidal and inter-tidal regions. The overall objective of this study is to monitor the status of prevailing ecology along the intake and discharge (outfall) channels, in terms of water and sediment quality through assessment of physico-chemical parameters and marine biota. This marine monitoring report provides a comprehensive analysis of the Data obtained through a monitoring study undertaken during January 2023.

Date: 27/01/2023

**M/S. UniStar Environment and Research Labs Pvt. Ltd.**

White House, Char Rasta,

Vapi-396 191

**Approved by**



**Mr. Jaivik Tandel  
(Authorized By)**

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## 1. INTRODUCTION

### 1.1 OVERVIEW

Adani Power (Mundra) Limited (APMuL) is an imported coal-based thermal power plant located near village Tunda and Siracha, Taluka Mundra, District Kutch, Gujarat, India. APMuL is the largest single location private coal-based power plant in India. Mundra plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW (Phase I and II) and 5 units of 660MW (Phase III and IV). The 330 MW units are based on subcritical technology and the 660 MW units are based on supercritical technology. APMuL has created history by synchronizing the first super-critical technology-based 660 MW generating unit. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra project, which is based on supercritical technology, has received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

**M/S. UniStar Environment and Research Labs Pvt. Ltd.**, Vapi, India have carried out the routine Marine Monitoring Study in the vicinity of the APMuL Mundra plant during 27 and 28 January 2023. The sampling was carried out along the integrated sea intake channel (2 stations) and at vicinity of discharge/outfall channel water mixing region (2 stations). One station was situated in between these two locations. This assessment involves the collection of Physico-chemical parameters from 5 subtidal locations (Table 1). The distribution and diversity of marine microflora (phytoplankton and pigments) and fauna (zooplankton) were assessed from water samples collected from 5 subtidal stations (Table 1). The assemblage of the microbenthic community was studied from 5 sub-tidal and 3 inter-tidal stations. The present report presents a detailed account of the results observed during the Marine Monitoring Study at the vicinity of the APMuL during January 2023.

### 1.2 OBJECTIVES

- a) To analyses the Physico-chemical seawater parameter for understanding the water quality in the study area.
- b) Evaluation of the prevailing status of marine biota through the quantitative and qualitative analysis of marine flora (phytoplankton and pigments) and fauna (zooplankton and macrobenthos).
- c) To recommend adequate marine environmental management measures.

## 2. STUDY PROGRAM

### 2.1 STUDY PERIOD

The field investigation was carried out on 27 and 28 January 2023. The sampling strategy was planned in such a manner as to get a detailed characteristic of the marine environment of the study area. Sampling and analysis for the marine environment have been carried out by **M/s. UniStar Environment and Research Labs Pvt. Ltd, Vapi, India.**

### 2.2 SAMPLING LOCATIONS

Sampling was carried out at 5 subtidal stations and 3 intertidal transects along with the sea intake and outfall channels. Out of 5 subtidal stations, 2 were in the sea intake channel, 2 along the discharge mixing (outfall channel) region and remaining 1 in between these two locations. One intertidal station was located along the sea intake channel and 2 were along the discharge region. The detailed geographic coordinates of sampling stations are given in Table 1 and Figure 1.1.

**Table 1: Geographic coordinates, water, and sediment parameters at the subtidal sampling stations, APMuL during January 2023.**

Subtidal station							
Station	Station code	Locations	Coordinates		Water depth	Tide	Sediment texture
1	St-1	Intake point	22°48'30.'50"N	69°32'57.84"E	5 m	Flood	Silty-sand
2	St-2	Mouth of intake point	22°47'07.20"N	69°32'06.50"E	5.5 m	Flood	Silty-sand
3	St-3	West port area	22°45'27.70"N	69°34'50.63"E	5.2 m	Ebb	Silty-sand
4	St-4	Outfall area	22°44'40.56"N	69°36'26.61"E	4.5 m	Ebb	Silty clay
5	St-5	Outfall area	22°45'12.60"N	69°36'44.54"E	4.0 m	Ebb	Silty clay

**Table 2: Geographic coordinates, water, and sediment parameters at the intertidal sampling stations, APMuL during January 2023.**

Intertidal transect						
Station	Station code	Tide Level	Coordinates	Water depth	Intertidal exposed area	Sediment texture
I	IT-1 (HW)	High Tidewater level	22°47'07.55" N	69°32'16.91" E	5.2 m	Silty-sand
	IT-1 (LW)	Low Tide water level	22°47'06.38"N	69°32'11.62"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°45'58.72" N	69°34'35.41" E	5.3 m	Silty-Sandy
	IT-2 (LW)	Low Tidewater level	22°45'57.74" N	69°34'35.05" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°44' 52.21" N	69°36'41.64"E	7.5 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°44' 51.23" N	69°36'39.28" E		Sandy



**Figure 1: Map of the study area illustrating the subtidal and intertidal sampling stations.**

## 2.3 SAMPLING STRATEGY

### 2.3.1 Sampling frequency

A sampling at the subtidal stations was carried out during the flood to ebb tides. Surface and bottom water samples were collected in duplicate for assessing water quality and marine biota. Intertidal samples were collected in duplicate during low tide at each transect.

### 2.3.2 Sampling methodology

For estimation of Physico-chemical parameters and marine flora (phytoplankton and pigments), subsurface samples were collected using the Niskin water sampler (5-litre capacity) with a mechanism for closing at the desired depth. Surface water samples were collected using a clean polyethylene bucket. Phytoplankton samples were collected in clean polyethylene bottles (1 L) fitted with inert cap liners and preserved with 4% Lugol's iodine solution. For pigment analysis, water samples were stored in clean, dark polyethylene cans (5 L). Chemical parameters samples were collected in polyethylene or glass bottles. Samples for phenol were collected in polyethylene or glass bottles and Petroleum Hydrocarbon samples collected in glass bottles. Dissolve oxygen (DO) and Biological Oxygen Demand (BOD) samples were collected in glass BOD bottles. The temperature was measured on the field with a calibrated thermometer. Analysis of other parameters was carried out in the laboratory.

For zooplankton, oblique hauls were made using Heron Tranter net attached with calibrated flow meter. Samples were stored in clean polyethylene bottles (0.5 L) and fixed with 5% formaldehyde.

For the analysis of macrobenthos, subtidal sediment samples were collected using a Van Veen grab covering an area of 0.04 m<sup>2</sup>. Intertidal samples were collected using a metal quadrant. Samples were sieved with a 500 μ metal sieve and preserved with Rose Bengal-formalin solution and stored in plastic zip-lock bags.

## 2.4 SAMPLE ANALYSIS METHODS

### 2.4.1 Physico-chemical parameter:

Samples were analysed by using different analytical methods for estimations of Temperature, Turbidity, PH, Suspended Solid (SS), Salinity, DO, BOD, COD, Phosphate, Total

nitrogen, Nitrite, Nitrate, Phenols and PHc. The standard methods used for the analysis of each parameter are given in Table 3.

#### **2.4.2 Sediment Quality parameters:**

Sediment texture, Petroleum Hydrocarbon (PHc), Phosphorus, Organic Carbon, Aluminium, Iron, Chromium, Nickel, Zinc, Lead, Copper, Cobalt, Cadmium, Mercury, Arsenic. The standard methods used for the analysis of each parameter.

#### **2.4.3 Biological parameters:**

##### **2.4.3a Phytoplankton:**

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

##### **2.4.3b Phytoplankton pigments:**

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

##### **2.4.3c Zooplankton:**

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

##### **2.4.3d Benthos:**

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

### 3 WATER QUALITY MONITORING

#### 3.1 RESULT OF PHYSICO-CHEMICAL WATER PARAMETER ANALYSIS

The samples collected during the field visit were brought to the laboratory for further analysis of Physico-chemical parameters. The standard methods used for the analysis of water quality parameters are given in Table 3

**Table 3: Water quality parameters and their test methods.**

Sr. No.	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.1	8.0	8.1	8.0	IS 3025(Part 11)1983
2.	Temperature (°C)	28.5	28	28.5	28	IS 3025(Part 9) 1984
3.	Turbidity (NTU)	1	1	1	1	IS 3025(Part 10) 1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	74	92	70	86	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.6	37.7	37.2	37.6	By Calculation
3.	Dissolved Oxygen (mg/l)	4.8	4.1	4.9	4.2	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.2	3.0	3.8	3.5	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO <sub>4</sub> (mg/l)	2164	2480	2292	2304	APHA 23rd Ed.,2017,4500- SO <sub>4</sub> E
6.	Ammonical Nitrogen (µmol/l)	0.8	0.8	0.7	0.6	APHA 23rd Ed.,2017,4500- NH <sub>3</sub> B
7.	Total Nitrogen (µmol/l)	4.3	4.2	3.5	5.0	By Calculation
8.	PO <sub>4</sub> <sup>3-</sup> -P (µmol/l)	1.0	1.0	0.7	0.9	APHA 23rd Ed.,2017,4500 -P,D
9.	(NO <sub>3</sub> <sup>-</sup> -N) (µmol/l)	3.2	3.1	2.6	4.2	APHA 23rd Ed.,2017,4500 NO <sub>3</sub> -B
10.	(NO <sub>2</sub> <sup>-</sup> -N) Nitrite (µmol/l)	0.3	0.3	0.2	0.2	APHA 23rd Ed.,2017,4500 NO <sub>2</sub> B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL: 0.01)	BDL(MDL:0 .01)	BDL(MDL: 0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable  
 Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.2	8.1	8.1	7.9	IS 3025(Part 11)1983
2.	Temperature °C	28.2	28	28.5	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	84	92	74	92	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.0	37.3	37.2	37.4	By Calculation
3.	Dissolved Oxygen (mg/l)	4.6	4.3	5.1	4.9	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.1	3.7	3.2	3.2	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO <sub>4</sub> (mg/l)	2684	3102	2586	2697	APHA 23rd Ed.,2017,4500- SO <sub>4</sub> E
6.	Ammonical Nitrogen (µmol/l)	0.6	0.6	0.5	0.4	APHA 23rd Ed.,2017,4500- NH <sub>3</sub> B
7.	Total Nitrogen (µmol/l)	4.1	4.5	4.2	4.7	By Calculation
8.	PO <sub>4</sub> <sup>3-</sup> -P (µmol/l)	0.7	0.8	0.6	0.7	APHA 23rd Ed.,2017,4500 -P,D
9.	(NO <sub>3</sub> <sup>-</sup> -N) (µmol/l)	3.2	3.5	3.0	3.7	APHA 23rd Ed.,2017,4500 NO <sub>3</sub> -B
10.	(NO <sub>2</sub> <sup>-</sup> -N) Nitrite (µmol/l)	0.3	0.4	0.7	0.6	APHA 23rd Ed.,2017,4500NO <sub>2</sub> B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL :0.01)	BDL(MDL :0.01)	BDL(MD L:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable  
 Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU



Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25°C	8.1	7.9	IS 3025(Part 11)1983
2.	Temperature (°C)	28.5	28.2	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids (mg/l)	88	102	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.2	37.6	By Calculation
3.	Dissolved Oxygen (mg/l)	4.8	4.2	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.3	3.9	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO <sub>4</sub> (mg/l)	2364	2653	APHA 23rd Ed.,2017,4500-SO <sub>4</sub> E
6.	Ammonical Nitrogen(μmol/l)	0.8	0.7	APHA 23rd Ed.,2017,4500-NH <sub>3</sub> B
7.	Total Nitrogen (μmol/l)	3.8	4.5	By Calculation
8.	PO <sub>4</sub> <sup>3-</sup> -P (μmol/l)	0.7	0.8	APHA 23rd Ed.,2017,4500 – P,D
9.	(NO <sub>3</sub> <sup>-</sup> -N) (μmol/l)	2.6	3.6	APHA 23rd Ed.,2017,4500 NO <sub>3</sub> -B
10.	(NO <sub>2</sub> <sup>-</sup> -N) Nitrite (μmol/l)	0.4	0.2	APHA 23rd Ed.,2017,4500 NO <sub>2</sub> B
11.	Phenol (mg/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit and N.D. = Not detectable  
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

**3.1.1 Temperature:** Marine water temperature was checked on-site during the sampling. Surface and bottom water temperatures observed in the study area were in a range between 28<sup>0</sup>C to 28.5<sup>0</sup>C. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity, and seasonality.

**3.1.2 pH:** The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area was in the range of 7.9 to 8.2 at the surface and bottom water.

**3.1.3 Turbidity:** Seawater turbidity is the cloudiness caused by large numbers of individual particles such as very fine clay and minute marine organisms. This also varies seasonally due

to intrusion of land runoff and/or sediment resuspension. Surface and bottom water turbidity observed in the study area was in a range between 0.1 to 1 NTU.

**3.1.4 Total suspended solids (TSS):** The suspended solids generally constitute silt and clay eroded from the land or shore erosions and suspension of the benthic layers from the seabed. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in a polluted area. On a seasonal basis, high TSS in seawater could be observed during the active monsoon season. Suspended solid concentration in the study area was a little variable. In surface water, TSS was 70 to 88 mg/L and in the bottom water, it was ranged from 86 to 102 mg/L.

**3.1.5 Salinity:** Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 35, which may vary with the riverine or inland influx, rains, or evaporation in the region. The salinity variation during the present sampling was 37.0 to 37.6 at surface and 37.3 to 37.7 at the bottom water.

**3.1.6 DO and BOD:** High DO level is an indication of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained through oxygen production during photosynthesis, dissolution from the atmosphere consumption by the respiration and decay of organic matter in a manner that DO levels are close to or above saturation value. The DO level of the study area was varied from 4.6 to 5.1 mg/L at the water surface and 4.1 to 4.9 mg/L at the bottom water. The average DO value was 4.6 mg/L, which indicates the oxygenated conditions in the study region.

BOD is generally indicating the effective consumption of oxidizable matter in that water body. The industrial effluents contain high BOD levels. Thus, high BOD is also an indication of the intrusion of industrial polluted effluent into natural waters. BOD levels in the study area were varied from 3.1 to 3.8 mg/L at surface and 3.0 to 3.9 mg/L at bottom water.

**3.1.7 Nutrients:** Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton growth. The high nutrient concentrations in the seawater generally could be attributed to the anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. In the present study, Phosphate concentration was range from 0.6 to 1.0  $\mu\text{mol/L}$  on the surface and 0.7 to 1.0  $\mu\text{mol/L}$  bottom water. Nitrite concentration was range from 0.2 to 0.7  $\mu\text{mol/L}$  on the surface and 0.2 to 0.6  $\mu\text{mol/L}$  bottom water. Nitrate concentration was range from 2.6 to 3.2  $\mu\text{mol/L}$  on the surface and 3.1 to 4.2  $\mu\text{mol/L}$  bottom water.

**3.1.8 PHc and phenol:** The Phenol compounds and PHc were not detected in the present investigation.

❖ **Biological parameters:**

**Phytoplankton:**

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

**Phytoplankton pigments:**

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

**Zooplankton:**

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

**Benthos:**

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

**4 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)**

Marine ecosystems are subject to a multitude of direct human pressures, such as overexploitation, eutrophication, pollution, and species introductions. These stressors can have synergistic effects on marine ecosystems, altering its functioning. Anthropogenic involvements constantly compromise the health of the marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors

is an integral part of environmental assessment and monitoring study. During the present investigation at APMuL, the abundance and distribution of marine organisms (Plankton and benthos) were studied as part of routine environmental monitoring.

#### **4.1 PLANKTONIC FORMS**

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. As per definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into two broad functional groups i.e., Phytoplankton and Zooplankton.

##### **4.1.1 Phytoplankton**

Phytoplankton are microscopic, single-celled photosynthetic organisms that live suspended in all water niches, including oceans, freshwater, and marine niche. Like the terrestrial ecosystem where plants are an integral part of the ecosystem, phytoplankton play key role in the biogeochemistry of the oceans. As they are dependent on sunlight for energy, they mostly inhabit the euphotic zone. Therefore, they are responsible for production of half of the atmosphere’s oxygen and more than half of the primary production in the oceans. There are many species of phytoplankton, each of which has a characteristic shape, size, and function. Marine species of phytoplankton grow abundantly in oceans around the world and are the foundation of the marine food chain. Marine phytoplankton are the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients, and function.

##### **4.1.2 Zooplankton:**

Zooplankton occupies second position in the food web of the marine niche. They are the primary consumer’s organisms and generally feed on phytoplankton or small, microscopic group of organisms for they are nutritional needs. They are incapable of making their own food from sun-light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival.

## 4.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are vital to marine ecosystems. They are producers, or autotrophs, that form the foundation of most marine food webs. As photosynthetic organisms, they can convert solar energy into chemical energy and store it in form of sugars. They are responsible for half of the photosynthetic activity on the planet. The significance of zooplanktons is found in their role of transferring biological production from phytoplankton to large organisms in the marine food web and the seafloor. The microscopic protozoan, tunicates, copepods, and other crustaceans graze upon many phytoplankton species. These in turn become food for other animals further linking the food web. Therefore, variability in reproduction of copepods would affect the survival of young fish that feeds on them.

**Table 4: Test methods for phytoplankton and zooplankton analysis**

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 23, Part 10000, 10200 F
2	Chlorophyll <i>a</i> and Pheophytin	APHA, Edition 23, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 23, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 23, Part 10000,10500 A-10500 D

## 4.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. During the sampling period (January 2023) the phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 33 phytoplankton genera (Table 7) belonging to diatoms (29 genera) and dinoflagellates (4 genera). Diatoms Species belonged to *Chaetoceros* sp., *Corethron* sp., *Coscinodiscus* sp., *Cyclotella* sp., *Cymbella* sp., *Ditylum* sp., *Guinardia* sp., *Odontella* sp., *Paralia* sp., *Rhizosolenia* sp., *Thalassiosira* sp., *Amphora* sp., *Amphorprora* sp., *Sterionella* sp., *Bacillaria* sp., *Cylindrotheca* sp., *Diploneis* sp., *Gyrosigma* sp., *Lauderia* sp., *Leptocylindrus* sp., *Licmophora* sp., *Lithodesmium* sp., *Navicula* sp., *Nitzschia* sp., *Pinnularia* sp., *Pleurosigma* sp., *Pseudo-nitzschia* sp., *Synedra* sp. and *Thalassionema* sp. While

dinoflagellates belongs to *Alexandrium* sp., *Gymnodinium* sp., *Protoberidinium* sp. and *Prorocentrum* sp.

The phytoplankton abundance in the study region was ranged from 90 to 207 cells $\times$ 10<sup>2</sup>/L (Table 5, Figure 2). The highest phytoplankton abundance was observed at Station 2 in the surface (207 cells $\times$ 10<sup>2</sup>/L) and then at Station 5 in bottom water (171 cells $\times$ 10<sup>2</sup>/L). The lowest phytoplankton abundance (90 cells $\times$ 10<sup>2</sup>/L) was observed at Station 3 in bottom water (Table 5, Figure 2). The study shows that the marine water around was enriched with the diverse phytoplankton population.

**Table 5: Phytoplankton abundance (cells $\times$ 10<sup>2</sup>/L) at different sampling stations in the coastal waters of APMuL, Mundra during January 2023.**

Note: S=surface; B=bottom; St=station

Phytoplankton Genera	Sampling Stations									
	St-1	St-1	St-2	St-2	St-3	St-3	St-4	St-4	St-5	St-5
	S	B	S	B	S	B	S	B	S	B
<b>Diatoms</b>										
<i>Chaetoceros</i> sp.	2	5	6	3	6	4	3	1	7	1
<i>Corethron</i> sp.	0	0	1	0	0	0	1	0	0	1
<i>Coscinodiscus</i> sp.	24	19	31	20	25	10	25	8	21	3
<i>Cyclotella</i> sp.	0	2	4	0	0	4	0	0	6	1
<i>Cymbella</i> sp.	1	1	0	1	1	0	0	0	0	0
<i>Ditylum</i> sp.	5	4	3	1	0	1	11	8	7	1
<i>Guinardia</i> sp.	15	10	10	16	1	3	1	10	5	0
<i>Odontella</i> sp.	12	14	6	1	6	4	10	8	12	26
<i>Paralia</i> sp.	8	0	0	10	11	21	7	6	2	2
<i>Rhizosolenia</i> sp.	2	1	21	8	3	3	1	8	3	5
<i>Thalassiosira</i> sp.	2	0	14	7	6	0	11	0	0	1
<i>Amphora</i> sp.	0	0	1	3	3	1	1	0	7	5
<i>Amphorprora</i> sp.	0	0	0	0	2	2	5	1	0	1
<i>sterionella</i> sp.	25	18	30	15	13	3	12	3	31	21
<i>Bacillaria</i> sp.	4	1	0	1	4	2	0	0	4	4
<i>Cylindrotheca</i> sp.	2	0	0	0	5	1	0	4	0	2
<i>Diploneis</i> sp.	0	1	0	0	0	0	0	0	0	1
<i>Gyrosigma</i> sp.	4	2	0	0	4	0	2	0	1	0
<i>Lauderia</i> sp.	1	2	0	0	0	0	0	0	0	0
<i>Leptocylindrus</i> sp.	3	0	17	3	1	2	0	1	0	0
<i>Licmophora</i> sp.	0	3	1	0	0	1	0	2	0	0
<i>Lithodesmium</i> sp.	0	0	0	1	0	0	0	5	1	1
<i>Navicula</i> spp.	21	12	15	1	13	8	20	10	10	6
<i>Nitzschia</i> spp.	10	15	28	10	1	2	11	7	21	8
<i>Pinnularia</i> sp.	2	0	0	0	0	0	6	0	0	0
<i>Pleurosigma</i> spp	6	8	2	3	5	0	10	8	15	2
<i>Pseudo-nitzschia</i> sp.	0	0	2	0	0	1	2	4	1	1

<i>Synedra</i> sp.	1	1	1	0	3	1	0	0	1	1
<i>Thalassionema</i> sp.	12	7	10	2	11	10	15	10	11	7
<b>Dinoflagellates</b>										
<i>Alexandrium</i> sp.	1	1	0	0	1	0	0	1	1	1
<i>Gymnodinium</i> sp.	1	0	1	2	4	2	0	1	2	2
<i>Protoperidinium</i> sp.	2	1	2	1	1	2	2	2	1	1
<i>Prorocentrum</i> sp.	1	0	1	2	0	2	1	2	1	0
<b>Total Phytoplankton (nos. x 10<sup>2</sup>/L)</b>	<b>167</b>	<b>128</b>	<b>207</b>	<b>111</b>	<b>130</b>	<b>90</b>	<b>156</b>	<b>110</b>	<b>171</b>	<b>105</b>

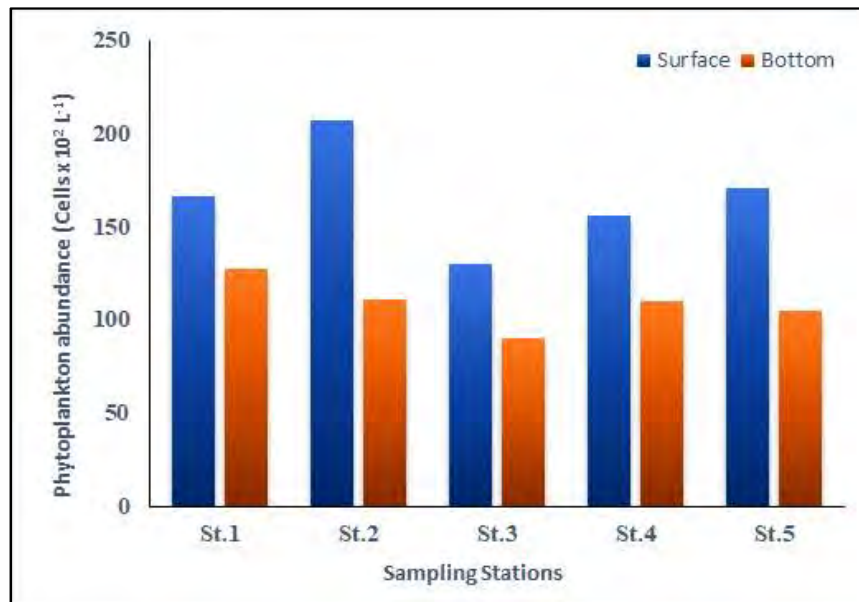


Figure 2: Phytoplankton abundance (cells×10<sup>2</sup>/L) reported in the surface and bottom waters along the APMuL coast, Mundra during January 2023. Note: St=Station



*Coscinodiscus* sp.



*Odontella*

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APMuL, Mundra during January 2023.

#### 4.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL $\alpha$ AND PHEOPHYTIN):

Marine phytoplankton contains essential as well as accessory pigments like that of terrestrial plants. Phytoplankton pigments capture sunlight. The resulting photosynthesis and its products, especially the oxygen and organic compounds, all rely on the light energy captured by the different phytoplankton pigments. Chlorophyll  $\alpha$  is the major pigment for light harvesting, and plays a significant role in photosynthesis and photoprotection, by extending the light collection window and protecting the cell from the damage of high irradiance levels or high ultraviolet light exposure.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells. The nature of these degradation products depends on which part of the chlorophyll molecule is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the center of the molecule or the loss of the phytol tail. This results in the formation of the molecule, phaeophytin. Depending on the parent molecule several distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus, in addition to Chlorophyll  $\alpha$  filtered seawater contains color degradation products of phytoplankton pigments.

#### 4.4a CHLOROPHYLL $\alpha$ AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll  $\alpha$  (Chl- $\alpha$ ) and Pheophytin at selected stations in the coastal region of APMuL, Mundra is presented in Table 6. The Chl- $\alpha$  concentrations in the study region were ranged from 1.6  $\mu\text{g/L}$  to 2.2  $\mu\text{g/L}$ . The Pheophytin content was ranged from 0.7  $\mu\text{g/L}$  to 1.0  $\mu\text{g/L}$ . The Chl- $\alpha$  and Pheophytin concentrations were more in the surface water as compared to the bottom water. The variations observed between the surface and bottom waters could be due to several natural biological variability. The highest Chl- $\alpha$  and Pheophytin concentrations were observed at Station 3, 4 and 5 surface waters.



**Table 6: Chlorophyll  $\alpha$ , Pheophytin concentrations along with their ratios (Chl $\alpha$ : Pheophytin) in the marine waters of APMuL, Mundra during January 2023.**

Sampling stations		Chlorophyll $\alpha$ ( $\mu\text{g/L}$ )	Phaeophtin ( $\mu\text{g/L}$ )	Chl $\alpha$ :Phaeophtin ratio
St-1	Surface	2	1	2.2
St-1	Bottom	1.7	0.8	1.5
St-2	Surface	2.1	0.9	1.9
St-2	Bottom	1.9	0.8	2.5
St-3	Surface	2.2	0.7	2.1
St-3	Bottom	2	0.9	2
St-4	Surface	2.2	1	1.9
St-4	Bottom	1.9	0.8	2.2
St-5	Surface	2.1	1	2.4
St-5	Bottom	1.6	0.8	2

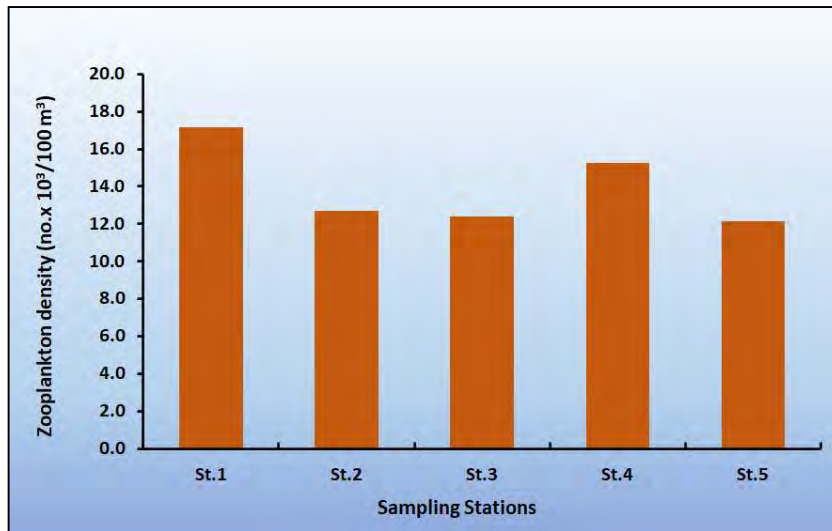
Note: ST= Station

The concentration of Pheophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to a deterioration of Chl- $\alpha$ . The ratio from concentrations of Chl- $\alpha$  and Pheophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton. In healthy environments, ratios of Chl- $\alpha$  to Pheophytin generally exceed 1.1. In the present study, this ratio was ranged from 1.5 to 2.5 (Table 8). The Chl- $\alpha$  and Pheophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl- $\alpha$  and Pheophytin concentration in the study region were generally high (>1), indicating that the appropriate conditions prevailed for the phytoplankton growth.

#### 4.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of population and biomass revealed substantial spatial variation within all 5 stations (Table 7). The maximum zooplankton population ( $17.16 \text{ no} \times 10^3 / 100 \text{ m}^3$ ) and biomass ( $2.2 \text{ ml} / 100 \text{ m}^3$ ) were recorded at station 1. The lowest zooplankton population ( $12.12 \text{ no} \times 10^3 / 100 \text{ m}^3$ ) and biomass ( $1.8 \text{ ml} / 100 \text{ m}^3$ ) was observed at station 5 (Figure 4). Different groups of identified zooplankton groups are mentioned in the Table 9. A total of 14 groups of zooplankton including Copepods, Copepod nauplii, Brachyuran crab larvae, Anomuran crab larvae, Decapod (shrimps), Fish and shellfish eggs, Fish larvae, Gastropod larvae, Chaetognaths, Polychaete larvae, Siphonophora, Ostracods, Oikopleura and Amphipods were identified during this study (Table 7, Figure 5). Among these groups

Copepod (74.28 %) and Copepods nauplii (15.63 %) were most dominant (Figure 6). Brachyuran crab larvae (2.64 %), Anomuran crab larvae (3.16 %) and fish & shellfish eggs (2.42 %) were also contributed to zooplankton population (Figure 5). The occurrence of copepods and their nauplii together with decapods and fish larvae/eggs in zooplankton samples highlights the fair production potential of live food resources (organisms) to support the fish and crustacean population in the study region.



**Figure 4: Zooplankton density (nos. ×10<sup>3</sup> /100 m<sup>3</sup>) reported in the subtidal waters (Station 1 to 5) along the APMuL coast, Mundra during January 2023.**

**Table 7: Density (nos. ×10<sup>3</sup>/100 m<sup>3</sup>) and biomass (ml/100 m<sup>3</sup>) of various zooplankton groups in the coastal waters at the APMuL, Mundra during January 2023.**

Zooplankton Groups	St-1	St-2	St-3	St-4	St-5
Copepods	11.92	9.74	9.85	12.15	8.24
Copepod nauplii	3.02	2.09	1.65	1.69	2.42
Brachyuran crab larvae	0.68	0.23	0.29	0.48	0.25
Anomuran crab larvae	0.88	0.24	0.25	0.48	0.45
Decapod (shrimps)	0.05	0.03	0.07	0.05	0.00
Fish and shellfish eggs	0.41	0.26	0.16	0.29	0.54
Fish larvae	0.00	0.00	0.00	0.02	0.02
Gastropod larvae	0.06	0.02	0.03	0.05	0.08
Chaetognaths	0.05	0.03	0.03	0.03	0.05
Polychaete larvae	0.02	0.02	0.00	0.00	0.02
Siphonophora	0.05	0.02	0.02	0.00	0.02
Ostracods	0.00	0.02	0.00	0.02	0.00
Oikopleura	0.03	0.02	0.03	0.02	0.05

Amphipods	0.02	0.00	0.00	0.00	0.00
Population (nos.× 10 <sup>3</sup> /100 m <sup>3</sup> )	17.17	12.70	12.38	15.24	12.12
Biomass (ml./100 m <sup>3</sup> )	2.2	1.9	1.9	1.8	1.9

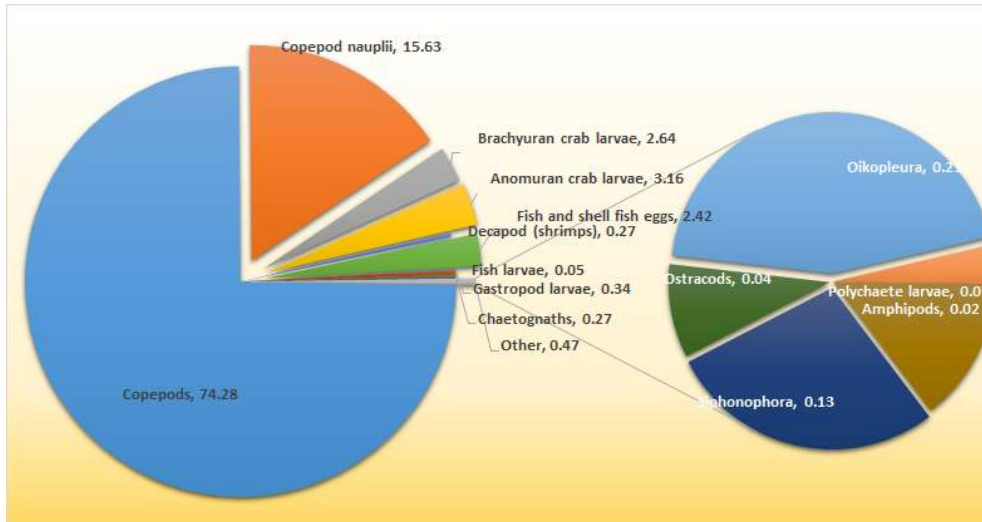


Figure 5: Dominant groups of Zooplankton reported from APMuL coast, Mundra during January 2023.



Copepod



Ostracods



Copepod nauplii



Anomuran crab larvae

Figure 6: Microphotographs of zooplankton reported from APMuL coast, Mundra during January 2023

#### **4.6 Microbenthic fauna**

The benthic zone is the lowest ecological zone of a water body which usually involves the sediments at the seafloor. The benthic environment is divided into distinctive ecological zones based on depth, seafloor topography, and vertical gradients of physical parameters. These are the supralittoral, littoral, sublittoral, bathyal, abyssal, and hadal zones. The number of phyla and species of benthic animals exceeds those of pelagic species, at least partly because of the greater physical variety of benthic habitats. Benthic animals are separated into infaunal and epifaunal species, depending upon whether they live within sediments or on the surface of the seafloor, respectively. Size categories of the zoobenthos consist of the larger macrofauna (>0.5 mm), the small meiofauna which are characteristically found in sand and mud, and the microfauna which consists mostly of protozoans.

Benthic organisms are morphologically different from those planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats, they can be considered dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts of the water column. Since light does not penetrate very deep ocean water, the benthic organisms often depend on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms are scavengers or detritivores. These organisms under being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthos population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of water, the nature of the substratum, food, predation, and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

##### **4.6.1 Significance of macrobenthic organisms**

The biomass of microbenthic organisms in estuaries and coastal embayment is often high. It declines if communities affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbation) help to mix the sediment and enhance the decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macrobenthos. The loss of benthic suspension-feeders can further enhance turbidity

levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (i.e., voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna is also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons, the benthic organisms are extremely important indicators of environmental change.

#### 4.6.2 Benthic Diversity

##### 4.6.2a Subtidal region:

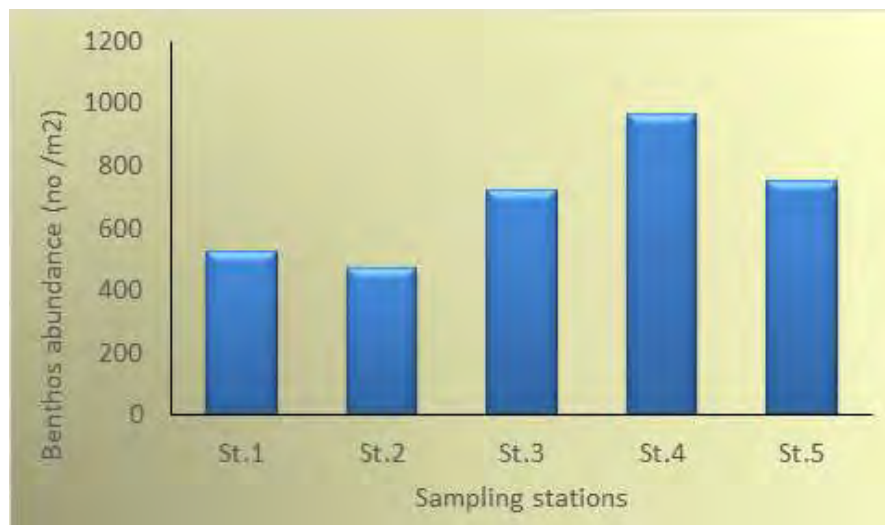
During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APMuL, Mundra (Table 8). At sub-tidal stations, the macrobenthos density ranged from 475 nos./m<sup>2</sup> to 969 nos./m<sup>2</sup> at sampling stations (Table 8; Figure 7). The biomass of the macrobenthic community in the study region was ranged from 0.67 g/m<sup>2</sup> to 6.91 g/m<sup>2</sup> in the study region. The maximum abundance of benthic microorganisms was reported at Station 4 (969 no/m<sup>2</sup>). The highest biomass of macrobenthic species was observed at Station 4 (6.91 g/m<sup>2</sup>). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Orbiniidae, Cossuridae, Eunicidae, Nereidae, Capitellidae, Spionidae, Sabellidae, Syllidae and Nephtyidae were abundant contributing ~68% to macrobenthic population. Overall, the presence of Polychaete, Sipuncula worms and amphipods suggest the availability of food organisms for benthic predators in the area.

**Table 8: Faunal composition, density (no/m<sup>2</sup>) and biomass (g/m<sup>2</sup>) of the macrobenthos community in the subtidal region at APMuL, Mundra during January 2023.**

Taxa	Stations				
	St-1	St-2	St-3	St-4	St-5
<b>Phylum Polychaeta</b>					
Paraonidae	50	150	375	669	575
Orbiniidae	0	0	0	100	25
Cossuridae	0	0	25	0	25
Eunicidae	0	25	0	25	0
Nereidae	25	0	25	0	25
Capitellidae	25	25	50	50	25
Spionidae	75	0	0	0	0
Sabellidae	0	0	0	0	0
Syllidae	25	50	0	0	0

Nephtyidae	25	0	0	0	0
<b>Phylum Protozoa</b>					
Foraminifera	25	25	0	25	50
<b>Phylum Mollusca</b>					
Gastropoda/Bivalvia	25	50	25	25	0
<b>Phylum Arthropoda</b>					
Amphipoda	100	125	150	25	25
Isopoda	25	0	0	0	0
<b>Phylum Sipuncula</b>					
Sipunculids	125	25	75	50	0
<b>Total abundance (no/m<sup>2</sup>)</b>	<b>525</b>	<b>475</b>	<b>725</b>	<b>969</b>	<b>750</b>
<b>Biomass (g/m<sup>2</sup>)</b>	<b>0.86</b>	<b>0.67</b>	<b>4.13</b>	<b>6.91</b>	<b>3.12</b>

Note: ST=Station



**Figure 7: Subtidal macrobenthos abundance (no/m<sup>2</sup>) at different sampling stations at APMuL, Mundra during January 2023**

#### 4.6.2b Intertidal region

The sandy substratum with low organic matter affects the occurrence of the microbenthic community in the intertidal region. Low macrobenthos biomass was measured (0.24 g/m<sup>2</sup> to 0.52 g/m<sup>2</sup>) in the intertidal region at the APMuL (Table 9). The lowest density of macrobenthic organisms was reported at station IT-2 (HW) (100 nos./m<sup>2</sup>), whereas the highest density was reported at Station IT-1 (LW) (250 nos./m<sup>2</sup>). No macrobenthic community was observed at station 3 (HW and LW) may be due to sandy sediment.

**Table 9: Faunal composition, density (no/m<sup>2</sup>) of macrobenthos from the sediments collected at High tide water level (HW) and Low tide water level (LW) in the inter-tidal region at APMuL, Mundra during January 2023.**

(Note: LW=low water during low tide; HW=high water during high tide; St=Station)

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
<b>Phylum Annelida</b>						
Polychaetes	100	150	75	75	-	-
<b>Phylum Mollusca</b>						
Bivalve	0	25	0	0	-	-
<b>Phylum Arthropoda</b>						
Amphipoda	25	50	25	25	-	-
Isopoda	25	25	0	25	-	-
<b>Phylum Sipuncula</b>						
Sipunculids	0	0	0	25	-	-
<b>Total density (no/m<sup>2</sup>)</b>	<b>150</b>	<b>250</b>	<b>100</b>	<b>150</b>	-	-
<b>Biomass (g/m<sup>2</sup>)</b>	<b>0.48</b>	<b>0.53</b>	<b>0.25</b>	<b>0.45</b>	-	-



*Amphipoda*



*Bivalvia*

**Figure 8: Microphotographs of microbenthic organisms observed in the sediment samples collected in the vicinity of APMuL, Mundra during January 2023.**

## 5 CONCLUSIONS

A diversified planktonic and benthic population was observed during the current study along the APMuL's integrated seawater intake and outfall channels, developed by APSEZ. The diverse phytoplankton and zooplankton population indicates that the water conditions along the channels are favourable for their survival and growth.

This enriched planktonic flora, together with subtidal benthic fauna, especially along the outfall channel region, could substantially support the fishery population in this area. These findings are consistent with the results of our recent bioassay investigation, which

demonstrated that fish of the species *Mugil cephalus* had a 90% survival rate in absolute outfall water. For bioassay study, these fishes were collected from Kotadi Creek. 90% survival of the fish population in bioassay and the diverse biota near outfall channel (present study) indicate that the abiotic characteristics, mainly temperature, of discharge water does not have the adverse biological impact. The well-constructed 11km long outfall channel with aqueduct over the Kotadi Creek enables cooling of outfall water, avoid mixing and facilitate the natural flow of creek water as per the compliance condition.

Overall, the physicochemical and biological characteristics of the marine environment did not significantly deviate from the baseline monitoring data, according to these seasonal marine monitoring studies.

**Table 10: Names of the Marine Monitoring Team Members**

Sr. No.	Name of Person
1.	Mr. Vijay Thanki (Env. Chemist)
2.	Mr. Pravin Singh (Env. Chemist)
3.	Ms. Shweta A. Rana (Env. Microbiologist)
4.	Mr. Bhavin Patel (Env. Engineer)
5.	Dr. Ashwini Sanaye (Marine Biologist)





**PHOTOGRAPHS OF DIFFERENT TYPES OF SAMPLING**

\*\*\*\*\*



**Adani Power Limited - Mundra**

**Annexure-IV**

Summary of Continues Ambient Air Quality Monitoring System Reports (Oct'2022 To Mar'2023)

		Station: ECO Park				Station: Near Main Gate				Station: Near Ash Pond			
Parameters		PM10	PM2.5	SO <sub>2</sub>	NO <sub>2</sub>	PM10	PM2.5	SO <sub>2</sub>	NO <sub>2</sub>	PM10	PM2.5	SO <sub>2</sub>	NO <sub>2</sub>
UNIT		ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>
MONTH	GPCB LIMIT	100	60	80	80	100	60	80	80	100	60	80	80
Oct'22	Minimum	40.2	14.2	13.6	17.7	36.9	14.8	15.1	18.2	43.0	21.4	19.5	23.5
	Maximum	55.2	21.2	21.1	27.1	51.4	23.4	26.7	28.2	61.9	27.2	23.4	28.5
	Average	47.2	18.1	17.5	22.9	45.5	19.3	19.8	24.2	51.5	23.6	21.2	26.2
Nov'22	Minimum	39.0	13.5	14.1	18.8	36.0	14.0	16.4	19.6	41.3	16.3	18.6	22.7
	Maximum	54.0	20.5	21.6	28.2	50.5	22.6	28.0	29.6	60.2	26.0	22.8	28.5
	Average	46.0	17.4	17.9	24.0	44.6	18.5	21.1	25.7	49.4	21.4	20.4	25.4
Dec'22	Minimum	37.8	12.4	10.1	14.4	34.7	14.0	10.5	13.9	40.2	15.5	13.0	15.5
	Maximum	52.8	22.1	15.7	22.4	49.2	21.4	22.1	23.9	59.1	25.2	17.2	22.8
	Average	44.8	16.4	12.5	18.2	43.3	17.6	15.2	19.9	47.5	20.8	14.9	19.5
Jan'23	Minimum	34.9	12.0	8.7	15.4	36.2	10.5	7.6	14.8	43.4	16.6	10.2	14.7
	Maximum	54.1	22.9	16.8	23.8	51.4	22.1	21.4	25.4	62.3	26.3	24.2	26.4
	Average	45.0	16.2	12.7	19.2	44.3	17.3	15.4	20.5	49.9	21.1	16.9	20.0
Feb'23	Minimum	34.2	21.5	8.0	14.7	35.5	20.9	6.9	14.1	46.9	25.2	9.5	14.0
	Maximum	66.4	30.6	16.2	26.3	59.1	30.6	23.5	20.6	67.5	29.9	17.2	26.1
	Average	44.2	25.3	11.8	20.3	43.8	25.9	13.9	17.3	52.4	27.7	13.6	19.4
Mar'23	Minimum	39.4	24.6	12.2	16.9	41.6	23.8	12.3	17.3	39.6	25.2	11.6	14.3
	Maximum	65.9	29.7	23.1	28.5	51.3	33.5	28.9	23.8	58.4	30.6	19.4	25.1
	Average	50.1	27.1	16.6	22.6	46.6	28.9	19.9	20.7	50.4	27.7	15.3	19.6

**Annexure V**

<b>Month: October'2022</b>			
<b>Date</b>	<b>Intake Reservoir (°C)</b>	<b>Outfall channel (°C)</b>	<b>Temp. difference (°C)</b>
01/10/2022	31.0	33.5	2.5
02/10/2022	31.0	34.0	3.0
03/10/2022	31.5	34.5	3.0
04/10/2022	31.0	34.0	3.0
05/10/2022	31.5	34.0	2.5
06/10/2022	31.0	34.5	3.5
07/10/2022	31.0	34.0	3.0
08/10/2022	31.5	34.0	2.5
09/10/2022	31.5	34.0	2.5
10/10/2022	32.0	34.0	2.0
11/10/2022	32.5	34.5	2.0
12/10/2022	32.0	34.5	2.5
13/10/2022	31.5	34.0	2.5
14/10/2022	31.5	34.0	2.5
15/10/2022	31.0	34.5	3.5
16/10/2022	31.0	OTS	OTS
17/10/2022	30.5	OTS	OTS
18/10/2022	30.5	OTS	OTS
19/10/2022	31.0	OTS	OTS
20/10/2022	30.5	OTS	OTS
21/10/2022	30.0	OTS	OTS
22/10/2022	30.5	OTS	OTS
23/10/2022	30.0	OTS	OTS
24/10/2022	30.5	OTS	OTS
25/10/2022	30.5	OTS	OTS
26/10/2022	29.5	OTS	OTS
27/10/2022	30.0	OTS	OTS
28/10/2022	29.5	OTS	OTS
29/10/2022	29.0	OTS	OTS
30/10/2022	29.0	OTS	OTS
31/10/2022	29.5	OTS	OTS
<b>Min.</b>	<b>29.0</b>	<b>33.5</b>	<b>2.0</b>
<b>Max.</b>	<b>32.5</b>	<b>34.5</b>	<b>3.5</b>
<b>*Average</b>	<b>31.4</b>	<b>34.1</b>	<b>2.7</b>

**Note:** OTS=Outfall Temporary Shutdown

\*Intake Channel temperature data during OTS not considered in calculation.

<b>Month: November'2022</b>			
<b>Date</b>	<b>Intake Reservoir (°C)</b>	<b>Outfall channel (°C)</b>	<b>Temp. difference (°C)</b>
01/11/2022	30.0	33.5	3.5
02/11/2022	29.5	32.5	3.0
03/11/2022	29.5	32.5	3.0
04/11/2022	29.0	32.0	3.0
05/11/2022	29.0	32.5	3.5
06/11/2022	29.5	33.0	3.5
07/11/2022	29.0	32.5	3.5
08/11/2022	29.0	32.0	3.0
09/11/2022	29.5	32.5	3.0
10/11/2022	29.5	32.5	3.0
11/11/2022	29.0	32.0	3.0
12/11/2022	29.0	31.5	2.5
13/11/2022	29.5	31.5	2.0
14/11/2022	29.5	31.5	2.0
15/11/2022	29.0	31.5	2.5
16/11/2022	29.0	31.5	2.5
17/11/2022	28.5	31.5	3.0
18/11/2022	28.5	32.0	3.5
19/11/2022	28.0	31.5	3.5
20/11/2022	28.5	31.5	3.0
21/11/2022	28.5	31.0	2.5
22/11/2022	28.0	31.0	3.0
23/11/2022	27.5	31.0	3.5
24/11/2022	27.5	30.5	3.0
25/11/2022	27.0	30.5	3.5
26/11/2022	27.0	30.0	3.0
27/11/2022	26.5	29.5	3.0
28/11/2022	26.5	29.5	3.0
29/11/2022	27.0	29.5	2.5
30/11/2022	26.0	29.5	3.5
<b>Min.</b>	<b>26.0</b>	<b>29.5</b>	<b>2.0</b>
<b>Max.</b>	<b>30.0</b>	<b>33.5</b>	<b>3.5</b>
<b>Average</b>	<b>28.5</b>	<b>31.5</b>	<b>3.0</b>

<b>Month: December'2022</b>			
<b>Date</b>	<b>Intake Reservoir (°C)</b>	<b>Outfall channel (°C)</b>	<b>Temp. difference (°C)</b>
01/12/2022	26.0	29.0	3.0
02/12/2022	26.0	29.0	3.0
03/12/2022	25.5	28.5	3.0
04/12/2022	25.5	28.5	3.0
05/12/2022	25.0	29.0	4.0
06/12/2022	24.5	28.5	4.0
07/12/2022	24.0	28.0	4.0
08/12/2022	24.5	28.5	4.0
09/12/2022	24.5	28.5	4.0
10/12/2022	24.0	27.5	3.5
11/12/2022	24.0	27.0	3.0
12/12/2022	24.0	27.0	3.0
13/12/2022	24.5	26.5	2.0
14/12/2022	25.0	27.0	2.0
15/12/2022	24.5	26.5	2.0
16/12/2022	24.0	OTS	OTS
17/12/2022	23.5	OTS	OTS
18/12/2022	23.5	OTS	OTS
19/12/2022	23.0	26.5	3.5
20/12/2022	23.0	26.0	3.0
21/12/2022	22.5	26.5	4.0
22/12/2022	22.5	26.0	3.5
23/12/2022	22.5	26.0	3.5
24/12/2022	22.0	26.0	4.0
25/12/2022	22.5	26.5	4.0
26/12/2022	22.5	26.0	3.5
27/12/2022	22.5	26.0	3.5
28/12/2022	23.0	26.0	3.0
29/12/2022	22.5	25.5	3.0
30/12/2022	23.0	26.0	3.0
31/12/2022	22.5	25.5	3.0
<b>Min.</b>	<b>22.0</b>	<b>25.5</b>	<b>2.0</b>
<b>Max.</b>	<b>26.0</b>	<b>29.0</b>	<b>4.0</b>
<b>*Average</b>	<b>23.8</b>	<b>27.1</b>	<b>3.3</b>

**Note:** OTS=Outfall Temporary Shutdown

\*Intake Channel temperature data during OTS not considered in calculation.

Month: January'2023			
Date	Intake Reservoir (°C)	Outfall channel (°C)	Temp. difference (°C)
01/01/2023	22.5	26.0	3.5
02/01/2023	23.0	26.5	3.5
03/01/2023	22.5	26.0	3.5
04/01/2023	22.0	25.5	3.5
05/01/2023	21.0	24.0	3.0
06/01/2023	21.5	24.0	2.5
07/01/2023	21.5	24.5	3.0
08/01/2023	21.0	24.0	3.0
09/01/2023	20.5	24.5	4.0
10/01/2023	21.0	24.5	3.5
11/01/2023	20.5	23.5	3.0
12/01/2023	20.0	23.5	3.5
13/01/2023	20.5	23.5	3.0
14/01/2023	20.5	24.0	3.5
15/01/2023	20.5	24.0	3.5
16/01/2023	21.0	24.0	3.0
17/01/2023	20.5	23.5	3.0
18/01/2023	20.0	24.0	4.0
19/01/2023	20.5	24.0	3.5
20/01/2023	20.5	24.0	3.5
21/01/2023	20.5	24.0	3.5
22/01/2023	21.0	24.5	3.5
23/01/2023	20.5	23.5	3.0
24/01/2023	20.0	23.5	3.5
25/01/2023	20.0	23.5	3.5
26/01/2023	20.0	OTS	OTS
27/01/2023	20.0	OTS	OTS
28/01/2023	20.5	OTS	OTS
29/01/2023	20.5	OTS	OTS
30/01/2023	21.0	OTS	OTS
31/01/2023	21.0	OTS	OTS
<b>Min.</b>	<b>20.0</b>	<b>23.5</b>	<b>2.5</b>
<b>Max.</b>	<b>23.0</b>	<b>26.5</b>	<b>4.0</b>
<b>*Average</b>	<b>20.9</b>	<b>24.3</b>	<b>3.3</b>

**Note:** OTS=Outfall Temporary Shutdown

\*Intake Channel temperature data during OTS not considered in calculations.

<b>Month: February'2023</b>			
<b>Date</b>	<b>Intake Reservoir (°C)</b>	<b>Outfall channel (°C)</b>	<b>Temp. difference (°C)</b>
01/02/2023	20.5	OTS	OTS
02/02/2023	20.5	OTS	OTS
03/02/2023	21.0	OTS	OTS
04/02/2023	21.5	OTS	OTS
05/02/2023	21.5	OTS	OTS
06/02/2023	22.0	OTS	OTS
07/02/2023	22.5	OTS	OTS
08/02/2023	22.5	OTS	OTS
09/02/2023	23.0	OTS	OTS
10/02/2023	23.0	OTS	OTS
11/02/2023	23.0	OTS	OTS
12/02/2023	22.5	OTS	OTS
13/02/2023	22.5	OTS	OTS
14/02/2023	23.0	26.5	3.5
15/02/2023	22.5	27.0	4.5
16/02/2023	23.0	27.0	4.0
17/02/2023	23.5	27.0	3.5
18/02/2023	23.0	26.5	3.5
19/02/2023	23.5	27.0	3.5
20/02/2023	23.5	27.0	3.5
21/02/2023	24.0	27.5	3.5
22/02/2023	24.5	27.5	3.0
23/02/2023	24.5	27.0	2.5
24/02/2023	24.5	27.5	3.0
25/02/2023	24.0	27.0	3.0
26/02/2023	24.0	27.5	3.5
27/02/2023	24.0	28.0	4.0
28/02/2023	24.5	27.5	3.0
<b>Min.</b>	<b>20.5</b>	<b>26.5</b>	<b>2.5</b>
<b>Max.</b>	<b>24.5</b>	<b>28.0</b>	<b>4.5</b>
<b>*Average</b>	<b>23.7</b>	<b>27.2</b>	<b>3.4</b>

**Note:** OTS=Outfall Temporary Shutdown


\*Intake Channel temperature data during OTS not considered in calculation.

Month: March'2023			
Date	Intake Reservoir (°C)	Outfall channel (°C)	Temp. difference (°C)
01/03/2023	25.0	27.5	2.5
02/03/2023	25.0	27.5	2.5
03/03/2023	25.5	27.0	1.5
04/03/2023	25.5	27.5	2.0
05/03/2023	26.0	28.0	2.0
06/03/2023	26.0	28.5	2.5
07/03/2023	25.5	28.0	2.5
08/03/2023	26.0	28.5	2.5
09/03/2023	26.0	28.5	2.5
10/03/2023	26.5	28.5	2.0
11/03/2023	26.5	28.0	1.5
12/03/2023	26.0	28.0	2.0
13/03/2023	26.5	28.5	2.0
14/03/2023	27.0	28.5	1.5
15/03/2023	27.0	28.5	1.5
16/03/2023	27.0	29.0	2.0
17/03/2023	27.0	28.5	1.5
18/03/2023	27.0	28.5	1.5
19/03/2023	27.0	28.5	1.5
20/03/2023	27.5	29.0	1.5
21/03/2023	27.5	29.0	1.5
22/03/2023	27.0	28.5	1.5
23/03/2023	27.5	29.0	1.5
24/03/2023	27.5	29.0	1.5
25/03/2023	27.0	28.5	1.5
26/03/2023	27.0	29.0	2.0
27/03/2023	27.0	28.5	1.5
28/03/2023	27.0	28.5	1.5
29/03/2023	27.5	29.0	1.5
30/03/2023	27.5	29.0	1.5
31/03/2023	27.5	OTS	OTS
<b>Min.</b>	<b>25.0</b>	<b>27.0</b>	<b>1.5</b>
<b>Max.</b>	<b>27.5</b>	<b>29.0</b>	<b>2.5</b>
<b>*Average</b>	<b>26.6</b>	<b>28.4</b>	<b>1.8</b>

**Note:** OTS=Outfall Temporary Shutdown

\*Intake Channel temperature data during OTS not considered in calculation.



	<b>Adani Power (Mundra) Limited, Mundra</b>
	Greenbelt Details (October'22 to March'23)

**Annexure: VI**

**Greenbelt Details:**

Area (ha)	No. of Trees & Palm Planted	No. of Shrubs Planted
147.33	341758	1405154

**Plant species planted at Adani Power Limited, Mundra**

Sr. No.	Scientific Name	Common Name
<b>Tress</b>		
1.	<i>Achras sapota</i>	Sapota / Chiku
2.	<i>Areca catechu</i>	Nut Palm tree
3.	<i>Azadirachta indica</i>	Neem
4.	<i>Bismarckia nobilis</i>	Bismarckia Palm
5.	<i>Bauhinia blakeana</i>	Kachnar
6.	<i>Callistemon viminalis</i>	Pink Bottle brush
7.	<i>Callistemon lanceolatus</i>	Red Bottle brush
8.	<i>Casuarina equisetifolia</i>	Saru/Casuarina
9.	<i>Cocos nucifera</i>	Nariyal/Cocconut
10.	<i>Delonix regia</i>	Gulmohar
11.	<i>Ficus benghalensis</i>	Baniyan tree
12.	<i>Ficus religiosa</i>	Peepal Tree
13.	<i>Punica granatum</i>	Pomegranate
14.	<i>Emblica officinalis</i>	Aamla
15.	<i>Ficus infectoria</i>	Pilkhan /White Fig tree
16.	<i>Mangifera indica</i>	Aam/ Mango
17.	<i>Polyalthia longifolia</i>	Ashok/ False Ashok
18.	<i>Psidium guajava</i>	Guava
19.	<i>Salvadora oleoides</i>	Peelu
20.	<i>Citrus limon</i>	Lemon
21.	<i>Syzygium cumini</i>	Jamun
22.	<i>Washingtonia filifera</i>	Washingtonia Palm
23.	<i>Wodyetia bifurcata</i>	Palm
<b>Shrubs</b>		
24.	<i>Allamanda</i>	Yellow Bell
25.	<i>Bougainvillea spectabilis</i>	Bougainvillea/ Booganbel
26.	<i>Catharanthus alba</i>	Vinca
27.	<i>Clerodendrum inerme</i>	Wild Jasmine
28.	<i>Cycas circinalis</i>	Cycas
29.	<i>Euphorbia cotinifolia</i>	Tropical Smoke Bush
30.	<i>Euphorbia milii</i>	Christ Thorn
31.	<i>Ficus panda</i>	-
32.	<i>Hymenocallis caroliniana</i>	Spider Lily
33.	<i>Ixora hybrid</i>	Ixora
34.	<i>Jasminum molle</i>	Jui
35.	<i>Jatropha curcas</i>	Ratanjyot,
36.	<i>Nerium indicum</i>	Kaner
37.	<i>Nerium odoratum</i>	Kaner
38.	<i>Plumeria alba</i>	Champa
39.	<i>Tecoma</i>	Yellow Trumpetbush
40.	<i>Ziziphus mauritiana</i>	Ber/Bor/Indian plum
41.	<i>Furcraea macdougallii</i>	Furcraea
42.	<i>Nicadevia</i>	Nicadevia



## Adani Power (Mundra) Limited, Mundra

### Ash Generation & Disposal (October 2022 to March 2023)

Annexure - VII

Month	Total Ash Generation	For Cement Manufacturing (Fly Ash + Bottom Ash + Pond Ash)	For Export / Domestic Treaders	Filling of low-lying area	Ash Dyke	Dyke Ash lifted for reutilization Embankment / Back Filling	Bottom Ash lifted for Embankment / Back Filling	Total Ash Utilization	% Utilization
Oct'22	12937	6741	5780	0	0	0	2097	14618	112.99
Nov'22	11169	897	9242	0	0	322	1675	12136	108.66
Dec'22	10501	1100	7982	0	0	1950	1577	12609	120.07
Jan'23	25146	4012	16075	0	0	1575	4008	25671	102.09
Feb'23	22123	6661	11401	0	0	575	3616	22254	100.59
Mar'23	22221	9102	12430	0	0	0	3559	25091	112.91
<b>Total</b>	<b>104097</b>	<b>28514</b>	<b>62910</b>	<b>0</b>	<b>0</b>	<b>4422</b>	<b>16532</b>	<b>112379</b>	<b>107.96</b>



Ref: APMuL/ENV/FLYASH/1701/2023  
Date: 17.01.2023

To,  
**Additional Principal Chief Conservator of Forest (APCCF),  
Ministry of Environment Forests and Climate Change,  
Integrated Regional Office (Near Kisan Circle),  
Aranya Bhavan, Fourth Floor,  
Room No.: 407, Sector 10 A,  
Gandhinagar- 382010**

**Sub: Advisory regarding implementation of implementation of Notification No. G.S.R. 2(E) dated: 2<sup>nd</sup> January 2014 for supply and use of coal with ash content - regarding**

**Ref:** File No. L-11011/21/2014-IA.I (T), dated: 13.04.2015

Dear Sir,

With reference to above subject and reference, we are submitting herewith the compliance of said notification.

The half yearly compliance reports of Fly Ash management for environmental safeguards stipulated in the EC and Consent are being regularly submitted to both the regional offices of MoEFCC, Bhopal as well as Gujarat Pollution Control Board (GPCB). We are also submitting the half yearly & annual reports of Fly ash utilization & Ash content of Coal to Central Electricity Authority (CEA) since plant operation.

We are enclosing herewith the monthly as well as **quarterly average ash content** in the coal used by our plant during the period of **October 2022 to December 2022** as Annexure – I.

Total Capacity of TPP: **4620 MW**

Phase – I	:	660 (2x330) MW
Phase – II	:	1980 (2x330) + (2x660) MW
Phase – III	:	1980 (3x660) MW

This is for your kind information and record please.

Thanking You,  
Yours faithfully,

for **Adani Power (Mundra) Limited,**

**(R N Shukla)**  
**Head – Environment**

**Encl:** As above

**Adani Power (Mundra) Limited**  
Village Tunda & Siracha  
Taluka Mundra  
Mundra, Kutch 370 435  
Gujarat, India

Tel +91 2838 266128  
Fax +91 2838 266129  
info@adani.com  
www.adani.com

**ADANI POWER (MUNDRA) LIMITED  
ASH PERCENTAGE IN COAL**

**(From October' 2022 to December' 2022)**

<b>Month</b>	<b>Coal Consumption (MT)</b>	<b>Ash Content in Coal (%)</b>
October 2022	201655	6.42
November 2022	193379	5.78
December 2022	248055	4.23
<b>Quarterly Average (%)</b>	---	<b>5.47</b>

**MT: Metric Tone**



## Power

Ref: APMuL/ENV/FLYASH/085/23

Date: 15.04.2023

To,

**Additional Principal Chief Conservator of Forest**  
Ministry of Environment Forests and Climate Change,  
Integrated Regional Office (Near Kisan Circle),  
Aranya Bhavan, Fourth Floor,  
Room No.: 407, Sector 10 A,  
Gandhinagar- 382010

**Sub:** Advisory regarding implementation of implementation of Notification No. G.S.R.2(E) dated: 2<sup>nd</sup> January 2014 for supply and use of coal with ash content – regarding

**Ref:** File No. L-11011/21/2014-IA. I (T), dated: 13.04.2015

Dear Sir,

With reference to above subject and reference, we are submitting herewith the compliance of said notification.

The half yearly compliance reports of Fly Ash management for environmental safeguards stipulated in the EC and Consent are being regularly submitted to both the regional offices of MoEFCC, Bhopal as well as Gujarat Pollution Control Board (GPCB). We are also submitting the half yearly & annual reports of Fly ash utilization & Ash content of Coal to Central Electricity Authority (CEA) since plant operation.

We are enclosing herewith the monthly as well as **quarterly average ash content** in the coal during the period of **January'2023 to March'2023** as Annexure – I.

Total Capacity of TPP: **4620 MW**  
Phase – I : 660 (2x330) MW  
Phase – II : 1980 (2x330) + (2x660) MW  
Phase – III : 1980 (3x660) MW

This is for your kind information and record please.

Thanking You,

Yours faithfully,

**For Adani Power (Mundra) Limited**

**(R N Shukla)**

**Authorized Signatory**

**Encl:** As above

Adani Power (Mundra) Ltd  
Adani Corporate House  
Shantigram, S G Highway  
Ahmedabad 382 421  
Gujarat, India  
CIN: U40300GJ2015PLC082295

Tel +91 79 2555 4444  
Fax +91 79 2555 7177  
info@adani.com  
www.adanipower.com

**Annexure - I**

**Adani Power (Mundra) Limited**

**ASH PERCENTAGE IN COAL**

**(From January'2023 to March'2023)**

<b>Month</b>	<b>Coal Consumption (MT)</b>	<b>Ash Content in Coal (%)</b>
January'2023	447199	5.62
February'2023	370718	5.97
March'2023	352482	6.30
<b>Quarterly Average (%)</b>	<b>---</b>	<b>5.96</b>

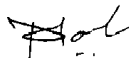
**MT: Metric Tone**

**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0315</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 1</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0315</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 °C	IS 3025(Part 11):2022	--	7.56
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	15730
3.	Total Dissolved Solids	IS 3025(Part 16) 1984	mg/L	10030
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32) 1988	mg/L	4306
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	17.5
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	159.8
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	379.5
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca. B)	mg/L	302
6.	Magnesium as Mg	(APHA 23rd Ed.,2017, 3500 Mg. B)	mg/L	181.7
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na, B	mg/L	1467
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K,B	mg/L	52.6
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24)1986	mg/L	472
10.	Nitrate as NO <sub>3</sub>	(APHA 23rd Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	18.2
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P,D)	mg/L	2.24
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.48
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.78
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42)1992	mg/L	BDL(MDL:0.05)



**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0315</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 1</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0315</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing		NAME OF GROUP: Residues and Contaminants in Water		
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>GENERAL CHEMICAL PARAMETERS</b>				
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
<b>Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,</b>				

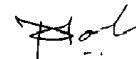
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)



**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0315</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 1</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0315</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

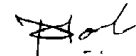
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



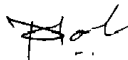
**Nitin B. Tandel**  
(Technical Manager)

### TEST REPORT

ULR No.	--	Report No.	URC /22/12/APL-0316
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	22/12/2022
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 2</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0316</b>		

#### TEST RESULTS:

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 °C	IS 3025(Part 11):2022	--	7.36
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	16830
3.	Total Dissolved Solids	IS 3025(Part 16) 1984	mg/L	10770
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32) 1988	mg/L	4425.9
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	26.3
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	207.1
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	383.8
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca.B)	mg/L	328.7
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg.B)	mg/L	116.3
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na,B	mg/L	1940
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K,B	mg/L	108.6
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24)1986	mg/L	784
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	22.6
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P,D)	mg/L	2.6
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F,D)	mg/L	2.32
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.99
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42)1992	mg/L	BDL(MDL:0.05)



**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0316</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 2</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0316</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>		<b>NAME OF GROUP: Residues and Contaminants in Water</b>		
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>GENERAL CHEMICAL PARAMETERS</b>				
23.	Manganese as Mn	APHA 23rd Ed., 2017, 3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
<b>Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,</b>				

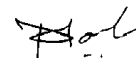
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesch C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

**TEST REPORT**

ULR No.	--	URC /22/12/APL-0316	URC /22/12/APL-0316
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	22/12/2022	22/12/2022
Sample Details	<b>Bore well Water Sample - 2</b>	Customer's Ref.	--
Sample Qty.	<b>2 Lit</b>	Location	--
Sampling Date	<b>15/12/2022</b>	Appearance	<b>Colourless</b>
Test Started Date	<b>17/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Test Completion Date	<b>21/12/2022</b>
UERL Lab ID. No.	<b>22/12/APL-0316</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
<b>Sr. No.</b>	<b>Parameters</b>	<b>Test Method Permissible</b>	<b>Unit of Measurement</b>	<b>Results</b>
<b>DISCIPLINE: Chemical Testing</b>		<b>NAME OF GROUP: Residues and Contaminants in Water</b>		
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

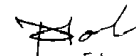
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



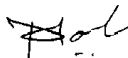
**Nitin B. Tandel**  
(Technical Manager)

### TEST REPORT

ULR No.	--	Report No.	URC /22/12/APL-0317
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	22/12/2022
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample – 3</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0317</b>		

#### TEST RESULTS:

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 ° C	IS 3025(Part 11):2022	--	7.32
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	15030
3.	Total Dissolved Solids	IS 3025(Part 16) 1984	mg/L	9962
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32) 1988	mg/L	4201
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	28.3
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	183.8
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	355
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca.B)	mg/L	272
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg.B)	mg/L	160.7
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na,B	mg/L	1352
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K,B	mg/L	74.5
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24)1986	mg/L	687.5
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO3-B)	mg/L	22
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P,D)	mg/L	1.8
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F,D)	mg/L	2.3
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.59
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42)1992	mg/L	BDL(MDL:0.05)



**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0317</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 3</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0317</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing		NAME OF GROUP: Residues and Contaminants in Water		
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>GENERAL CHEMICAL PARAMETERS</b>				
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
<b>Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,</b>				

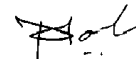
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0317</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 3</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0317</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

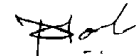
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



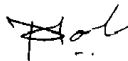
**Nitin B. Tandel**  
(Technical Manager)

### TEST REPORT

ULR No.	--	Report No.	URC /22/12/APL-0318
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	22/12/2022
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 4</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0318</b>		

#### TEST RESULTS:

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 ° C	IS 3025(Part 11):2022	--	7.52
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	16160
3.	Total Dissolved Solids	IS 3025(Part 16) 1984	mg/L	10380
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32) 1988	mg/L	4411.4
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	29.1
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51)2001	mg/L	159.8
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	354.1
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca.B)	mg/L	311.7
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg.B)	mg/L	125.2
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na,B	mg/L	1640
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K,B	mg/L	74.2
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24)1986	mg/L	687.5
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO3-B)	mg/L	23.1
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P,D)	mg/L	1.9
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F,D)	mg/L	2.2
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.97
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47) 1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52) 2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23 <sup>rd</sup> Ed.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42)1992	mg/L	BDL(MDL:0.05)





**TEST REPORT**

ULR No.	--	Report No.	<b>URC /22/12/APL-0318</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 4</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0318</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing		NAME OF GROUP: Residues and Contaminants in Water		
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>GENERAL CHEMICAL PARAMETERS</b>				
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
<b>Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,</b>				

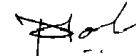
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

### TEST REPORT

ULR No.	--	Report No.	<b>URC /22/12/APL-0318</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>22/12/2022</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 4</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>15/12/2022</b>	Sample Received Date	<b>17/12/2022</b>
Test Started Date	<b>17/12/2022</b>	Test Completion Date	<b>21/12/2022</b>
Sampled By	<b>UniStar Env. &amp; Research Labs</b>	Sampling Method	<b>UREL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>22/12/APL-0318</b>		

#### TEST RESULTS:

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

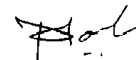
\*\*\*\*\* End of Report \*\*\*\*\*

Checked By:



**Nilesh C. Patel**  
(Sr. Chemist)

Authorized By:



**Nitin B. Tandel**  
(Technical Manager)

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ISO 9001 : 2015  
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ISO 45001 : 2018  
Certified Company

**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0691</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 1</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0691</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 °C	IS 3025(Part 11):2022	--	7.48
2.	Conductivity	IS 3025(Part 14):1984	(µS/cm)	16370
3.	Total Dissolved Solids	IS 3025(Part 16):2023	mg/L	10478
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32):1988	mg/L	4384.0
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	22.6
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	145
4.	Total Alkalinity	IS 3025(Part 23):1986,	mg/L	391.4
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca. B)	mg/L	322.00
6.	Magnesium as Mg	(APHA 23rd Ed.,2017, 3500 Mg. B)	mg/L	196
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na, B	mg/L	1510
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K, B	mg/L	59.6
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24):2022	mg/L	520.4
10.	Nitrate as NO <sub>3</sub>	(APHA 23rd Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	20
11.	Phosphate as PO <sub>4</sub>	(APHA 23rd Ed.,2017,4500-P, D)	mg/L	2.4
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F, D)	mg/L	2.51
13.	Salinity	APHA 23rd Ed.,2017, 2520-B, 2-60	ppt	7.92
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47):1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52):2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41):1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53):2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49):1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42):1992	mg/L	BDL(MDL:0.05)
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54):2003,	mg/L	BDL(MDL:0.02)

**Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,**

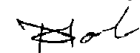
\*\*\*\*\* End of Report \*\*\*\*\*

Checked By:



**Nilesh C. Patel**  
(Sr. Chemist)

Authorized By:



**Nitin B. Tandel**  
(Technical Manager)

QCI-NABET Accredited EIA  
Consultant Organization

GPCB Recognized Environmental  
Auditor (Schedule-11)

ISO 9001 : 2015  
Certified Company

ISO 45001 : 2018  
Certified Company

**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0691</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 1</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0691</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>		<b>NAME OF GROUP: Residues and Contaminants in Water</b>		
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				



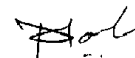
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

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Consultant Organization

GPCB Recognized Environmental  
Auditor (Schedule-11)

ISO 9001 : 2015  
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ISO 45001 : 2018  
Certified Company

**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0692</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 2</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0692</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 ° C	IS 3025(Part 11):2022	--	7.41
2.	Conductivity	IS 3025(Part 14):1984	(µS/cm)	17560
3.	Total Dissolved Solids	IS 3025(Part 16):2023	mg/L	11240
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32):1988	mg/L	4572.0
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	29.8
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	205
4.	Total Alkalinity	IS 3025(Part 23):1986,	mg/L	371.3
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca. B)	mg/L	307.20
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg. B)	mg/L	110
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na, B	mg/L	1872
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K, B	mg/L	89.1
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24):2022	mg/L	654.0
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	20
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P, D)	mg/L	2.1
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F, D)	mg/L	2.27
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	8.06
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47):1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52):2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41):1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53):2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49):1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42):1992	mg/L	BDL(MDL:0.05)
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54):2003,	mg/L	BDL(MDL:0.02)

**Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,**

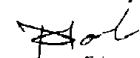
\*\*\*\*\* End of Report \*\*\*\*\*

Checked By:



**Nilesh C. Patel**  
(Sr. Chemist)

Authorized By:



**Nitin B. Tandell**  
(Technical Manager)

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**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0692</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 2</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0692</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				



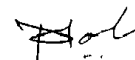
\*\*\*\*\* End of Report \*\*\*\*\*

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

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ULR No.	--	Report No.	<b>URC /23/03/APML-0693</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample – 3</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0693</b>		

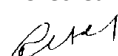
#### TEST RESULTS:

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 °C	IS 3025(Part 11):2022	--	7.52
2.	Conductivity	IS 3025(Part 14):1984	(µS/cm)	16060
3.	Total Dissolved Solids	IS 3025(Part 16):2023	mg/L	10280
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32):1988	mg/L	4290.0
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	17.8
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	169
4.	Total Alkalinity	IS 3025(Part 23):1986,	mg/L	341.6
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca. B)	mg/L	252.50
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg. B)	mg/L	156
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na, B	mg/L	1721
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K, B	mg/L	63.4
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24):2022	mg/L	605.3
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	21
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P, D)	mg/L	1.6
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F, D)	mg/L	1.94
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.80
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47):1994	mg/L	BDL(MDL:0.01)
17.	Chromium as Cr	IS 3025 (PART 52):2003	mg/L	BDL(MDL:0.05)
18.	Cadmium as Cd	IS 3025(Part 41):1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53):2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49):1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
22.	Copper as Cu	IS 3025(Part 42):1992	mg/L	BDL(MDL:0.05)
23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54):2003,	mg/L	BDL(MDL:0.02)

**Note:** BDL= Below Detection Limit, MDL = Minimum Detection Limit,

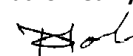
\*\*\*\*\* End of Report \*\*\*\*\*

Checked By:



**Nilesh C. Patel**  
(Sr. Chemist)

Authorized By:



**Nitin B. Tandel**  
(Technical Manager)

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**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0693</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 3</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0693</b>		

**TEST RESULTS:**

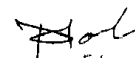
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>		<b>NAME OF GROUP: Residues and Contaminants in Water</b>		
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

**Checked By:**



**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)



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ULR No.	--	Report No.	<b>URC /23/03/APML-0694</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 4</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0694</b>		

**TEST RESULTS:**

DISCIPLINE: Chemical Testing			NAME OF GROUP: Water	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>PHYSIO-CHEMICAL PARAMETERS</b>				
1.	pH @ 25 ° C	IS 3025(Part 11):2022	--	7.58
2.	Conductivity	IS 3025(Part 14):1984	(µS/cm)	24700
3.	Total Dissolved Solids	IS 3025(Part 16):2023	mg/L	16553
<b>GENERAL CHEMICAL PARAMETERS</b>				
1.	Chloride as Cl <sup>-</sup>	IS 3025(PART 32):1988	mg/L	4423.0
2.	Carbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	31.7
3.	Bicarbonate as CaCO <sub>3</sub>	IS 3025(Part 51):2001	mg/L	171
4.	Total Alkalinity	IS 3025(Part 23):1986,	mg/L	336.6
5.	Calcium as Ca	(APHA 23 <sup>rd</sup> Ed.,2017,3500 Ca. B)	mg/L	336.20
6.	Magnesium as Mg	(APHA 23 <sup>rd</sup> Ed.,2017, 3500 Mg. B)	mg/L	137
7.	Sodium as Na	APHA 23 <sup>rd</sup> Ed.,2017,3500 Na, B	mg/L	1704
8.	Potassium as K	APHA 23 <sup>rd</sup> Ed.,2017,3500 K, B	mg/L	71.5
9.	Sulphate as SO <sub>4</sub> -2	IS 3025(Part 24):2022	mg/L	728.4
10.	Nitrate as NO <sub>3</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500 NO <sub>3</sub> -B)	mg/L	26
11.	Phosphate as PO <sub>4</sub>	(APHA 23 <sup>rd</sup> Ed.,2017,4500-P, D)	mg/L	2.1
12.	Fluoride as F	(APHA 23 <sup>rd</sup> Ed.,2017,4500 F, D)	mg/L	2.32
13.	Salinity	APHA 23 <sup>rd</sup> Ed.,2017, 2520-B, 2-60	ppt	7.99
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
14.	Mercury as Hg	(APHA 23 <sup>rd</sup> Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
15.	Arsenic as As	APHA 23 <sup>rd</sup> Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
16.	Lead as Pb	IS 3025 (PART 47):1994	mg/L	BDL(MDL:0.01)
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18.	Cadmium as Cd	IS 3025(Part 41):1992,	mg/L	BDL(MDL:0.003)
19.	Iron (as Fe)	IS 3025(Part 53):2003,	mg/L	BDL(MDL:0.1)
20.	Zinc (as Zn)	IS 3025(Part 49):1994,	mg/L	BDL(MDL:0.05)
21.	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.5)
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23.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
24.	Nickel as Ni	IS 3025(Part 54):2003,	mg/L	BDL(MDL:0.02)

**Note: BDL= Below Detection Limit, MDL = Minimum Detection Limit,**

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

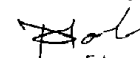
Checked By:



**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.

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**TEST REPORT**

ULR No.	--	Report No.	<b>URC /23/03/APML-0694</b>
Name & Address of Customer	<b>M/s. Adani Power (Mundra) Ltd.</b> Village: Tunda & Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	<b>28/03/2023</b>
		Customer's Ref.	--
Sample Details	<b>Bore well Water Sample - 4</b>	Location	--
Sample Qty.	<b>2 Lit</b>	Appearance	<b>Colourless</b>
Sampling Date	<b>21/03/2023</b>	Sample Received Date	<b>23/03/2023</b>
Test Started Date	<b>23/03/2023</b>	Test Completion Date	<b>27/03/2023</b>
Sampled By	<b>UERL-Lab</b>	Sampling Method	<b>UERL/CHM/SOP/116</b>
UERL Lab ID. No.	<b>23/03/APML-0694</b>		

**TEST RESULTS:**

<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Water</b>	
Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
<b>DISCIPLINE: Chemical Testing</b>			<b>NAME OF GROUP: Residues and Contaminants in Water</b>	
1.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
<b>Note: N.D. = Not Detectable,</b>				

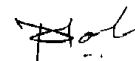


**Checked By:**




**Nilesh C. Patel**  
(Sr. Chemist)

**Authorized By:**



**Nitin B. Tandel**  
(Technical Manager)

	<b>Adani Power (Mundra) Limited, Mundra</b>	<b>Annexure - IX</b>
	<b>Expenditure for Environmental Protection &amp; CER (Period: October 2022 - March 2023)</b>	

<b>Expenditure for Environmental Protection &amp; CER</b>		
<b>(Fig. in Rs. Lacs)</b>		
<b>Sr. No.</b>	<b>Particular</b>	<b>Expenditure from Oct'22 to Mar'23</b>
1.	Green belt development	82.24
2.	Legal, Consent Fee, GPCB lab bills, NABL fee & Social Audit	9.36
3.	Hazardous waste disposal/Bio Medical disposal cost	0.94
4.	Treatment and Disposal cost (Wastewater & Sewage Treatment)	37.99
5.	Maintenance cost of ESP & FGD (Material Cost)	128.39
6.	Online Environment Monitoring cost a. CEMS and EQMS data transferring to GPCB and CPCB.	0.26
	b. Annual Maintaining cost for CAAQMS (03 Nos.) & EQMS system	12.73
7.	Third party Environment Monitoring & Inhouse monitoring including laboratory consumable items, chemical and spares of monitoring equipment.	7.84
	Calibration and maintenance of Environment monitoring equipment	2.36
8.	Insurance, training, and external environmental management	0.46
<b>Total</b>		<b>282.57</b>



Annexure-X

**adani**  
Foundation

# Annual Report 2022-23

**CSR** Kutch

*Adani Foundation*  
*Adani House, Port Road, Mundra – Kutch 370 421*  
*[[info@adanifoundation.com](mailto:info@adanifoundation.com)] [[www.adanifoundation.com](http://www.adanifoundation.com)]*



## Our Journey by Mr. Rakshit Shah Executive Director APSEZ

The year 2022-23 has passed off with motivation through recognition by ASSOCHAM for health care awards which shows courage to work for the commitment given to the community. It is necessary that sustained growth is achieved at rural level along with the industrial development. This can be made possible by involving more and more people in the rural development programme.

Since beginning, The Adani Foundation Mundra is committed to the cause of the deprived and underprivileged. It has been working relentlessly across 6 Talukas, covering 92 villages, to uplift the lives of more than 60,000 families with a multi-faceted approach.

This year conceded with more streamline and scalable project of Education i.e. Utthan – to enhance primary education of 70 schools of Mundra including 8 High Schools, milestone achievement in Fisherman amenities project by Providing skill and livelihood to 34 fisherfolk youth, 225 Homebiogas with partnership approach with objective to reduce chemical fertilizer usage in seven villages of Mundra , considerable impact created by Mangroves Biodiversity projects and new era defined in agriculture projects i.e. Super Napier, dates offshoots and Dragon Fruit Cultivation

Gram Bharti has proved a benchmark platform for Self help groups at PAN India which is true support with promoting skill & sustainability. Massavie Tree plantation drive “Vriksh Se Vikas” initiated with aim of plantation 1 Lac Trees in Mundra Taluka in upcoming year.

Jyoti ben Tank – one of the best women farmer of Mundra awarded by “Amazing Indian Award by Vice President of India”. District Animal Welfare Department recognized Adani Foundation for best contribution during Lumpy outbreak.

The people of Kutch have generously supported the activities carried out by the Adani Group or else this wouldn't have been possible. Their determination, understanding and commitment have strengthened the development even more.

Our Achievement would not be possible without the ultimate support by Mr. Gowda (COO, AF), Mr. V S Gadhvi, Executive Director – AF, Ms. Shilin R Adani (Managing Trustee) **and generous faith and passionate support by Dr. (Mrs.) Priti G Adani, Chairperson– Adani Foundation**

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CSR Kutch	
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# CSR KUTCH

## Demographic Details

Block	Villages	No. of HHs	Population
Mundra	61 Village and 9 Fishermen Vasahat	35192	153179
Anjar	3 Villages	4350	18500
Nakhtrana	8 Villages	4093	16373
Bite – Abdasa	12 Villages	2415	9660

1. Adani Ports and SEZ Limited
2. Adani Power Mundra Limited
3. Adani Wilmar Limited
4. Adani Wilmar – Caster Limited
5. Kutchh Copper Limited
6. Mundra Solar Panel Making Unit
7. Green to PVC Mundra Limited
8. Adani Kandla Bulk Terminal Port Pvt Limited
9. Adani Solar Limited – Bitta, Abdasa
10. Adani Green Energy Limited – Nakhatrana
11. Adani Cementation Limited – Lakhpat
12. Adani Transmission Limited – Mandvi

# ENVIRONMENT SUSTAINABILITY PROJECTS





# ENVIRONMENT SUSTAINABILITY

Environmental sustainability is the responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing for present and future. These components are closely interrelated and mutually re-enforcing Under Corporate Environmental responsibility.

To make connections between human actions Environment & biological diversity found within a habitat and/or ecosystem, Adani Foundation executing various Project i.e. massive tree plantation drive, Mangroves, biogas provision, forest development and drip irrigation

**Biodiversity conservation:** to preserve biodiversity and Natural Resources.

**Regenerative capacity:** Protect the depletion of natural resources and keep the harvest rate of renewable resources within the capacity of regeneration.

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



# REDUCING CARBON FOOTPRINT

## 1. Miyawaki – Nana Kapaya

Miyawaki- Dense Plantation is developed in year 2021-22 at Nana Kapaya Village in 2.0 acre land. Miyawaki plot is very close to sewage water tank so watering to plantation by the same. From current year GP has taken ownership for monitoring and watering.

Plantation of 5880 saplings of different 42 species is completed which will result in dense forest due to good rain this year.

## 2. Smritivan Memorial park– Bhuj

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.

Adani Foundation has supported for 47000 saplings in Smriti van @ 100 Lacs INR.



# REDUCING CARBON FOOTPRINT

With a vision to Enhance the diversity of mangrove and its associated species in suitable coastal region of Kachchh, which in turn would enhance the faunal diversity and fishery resources of the area by providing suitable habitats and breeding ground. The ultimate aim of the project is to improve overall coastal biodiversity of the region which in turn assist in improving the livelihood of the coastal populace

Total five mangrove species, such as Ceriops, Aegiceras and Rhizophora were selected which in turn enhanced the dependent faunal diversity of the area. Thereby, there will be an increase considerable biodiversity of the area. **The initial pilot trails were undertaken in an area of approximately 16 hector during the period between 2019 and 2023 with the active participation of local communities.** Current year 4 Hector plantation is in progress which will be resulted in 20 Hector Mangroves Biodiversity Park within one year

S. NO	Mangrove Associate	Life form
1	Suaeda Spp.	Herb
2	Porteresia coarctata	Herb
3	Opuntia elatior	Shrub
4	Sesuvium portulacastrum	Herb
5	Ipomoea biloba	Climber
6	Salvadora persica L.	Shrub
7	Urochondra setulosa	Herb



# REDUCING CARBON FOOTPRINT

Home biogas is the Israel based company was founded in 2012 manufactures dynamic biogas unit not only for farm waste but for kitchen waste too. Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers periphery Villages.

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

Till date 225 farmers are utilizing it with satisfaction and considerable outcome by saving Average Rs. 23,400 for gas and fertilizer as well – with Economic benefit of Rs. 52.65 Lacs.

100 Farmers are linked up with Gobardhan Yojana in which DRDA is providing Biogas with Rs. 5000 Contribution. Adani Foundation has worked as a facilitator between DRDA and Beneficiaries farmers in filling and submission of forms. Total 325 farmers are supported with Biogas as sustainable environment protection



**4,176** TONS OF ANIMAL MANURE TREATED

**359,687** HOURS OF CLEAN COOKING;  
**9.3** TONS OF BIOGAS CREATED  
**325** TONS OF FIREWOOD REPLACED;

**47,375** HOURS SAVED ON REDUCTION OF  
FIREWOOD & COLLECTION  
**1225** TONS CO2 EMISSION REDUCTION



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

# REDUCING CARBON FOOTPRINT

## 5. Water Conservation Project - CSR

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

- Large number of water harvesting structure ( 18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams
- Ground recharge activities (pond deepening work for 61 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
- New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village. Approx Deepening Capacity is 12000 Cum.
- Roof Top Rain Water Harvesting 145 Nos. **(40 Nos current year)** which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.
- Recharge Bore well 208 Nos which is best ever option to direct recharge the soil
- Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date
- 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.
- **Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.**
- **Pond Pipe line work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area.**



# REDUCING CARBON FOOTPRINT

## • 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 borewell recharging facility
- Storage capacities of check dams and ponds increased by 106.44 MCFT. Total area benefited 2857 hectares.
- 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.



# Water conservation and Management

## Process Flow for Rooftop Rain Water Harvesting System



Social Survey & TDS mapping



Community Contribution



RRWHS



Impact

- Portable water at door step
- Cost saving for portable water
- Improved water quality with
- Creates water conservation awareness in rural community
- Improves standard of living of rural community

Total RRWHS :- 145

RRWHS Constructed in 2022-23 :- 40

Population Impacted :- 500+

Savings per household :- 10000+

TDS difference between Ground water and RRWHS water



# REDUCING CARBON FOOTPRINT

## 6. Tree Plantation

Till the date 70,540 Tree have been planted at various Public places , Schools, GP and crematorium with their responsibility to nurture and maintain regularly.

For this passionate work our team Member Mr. Karshan Gadhvi was Felicitated with Van Mitra Award by Forest department and GOG.

Adani Foundation has planted 1100+ fruit bearing trees at Bhujpur and 2100+ neem, pipal and native spices at Dhrub in coordination with District Forest Department and community with partnership approach





# EDUCATION

EDUCATION



# PROJECT UTTHAN



<b>4</b> QUALITY EDUCATION 	<b>5</b> GENDER EQUALITY 	<b>6</b> CLEAN WATER AND SANITATION 	<b>8</b> DECENT WORK AND ECONOMIC GROWTH 
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# PROJECT UTTHAN

The Adani Foundation set out an innovative intervention in year 2018–19 through project Utthan to improve students' learning capabilities, provide facilities to schools to improve environment and achieve better learning outcomes at the grassroots level with the help of Utthan sahayak. This extensive intervention involves adopting government primary schools, tutoring Priya Vidyarthi's (progressive learners), introducing English as a Third Language, with various academic activities as well co-curriculum activities to end the dropout rates, and working together for staff capacity building. In order to improve children' basic literacy and numeracy skills, it has also engaged the help of educators and parents, especially mothers.

## Key Aspect of Project Utthan

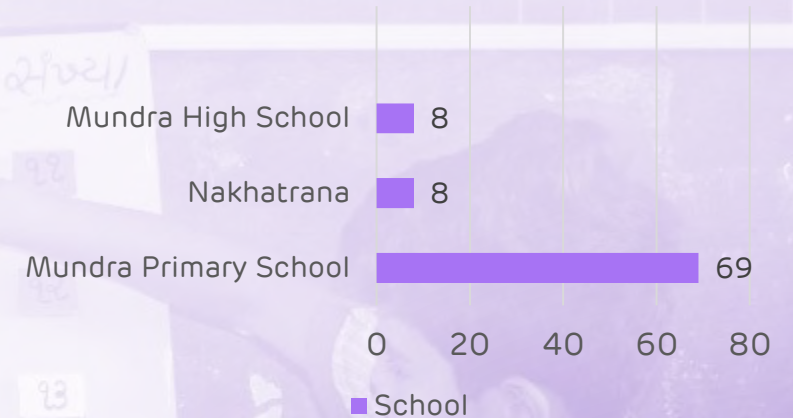
- ✓ Adopting government primary schools.
- ✓ Main streaming Progressive learners
- ✓ Enhancing Learning Outcomes
- ✓ Arresting dropout rates
- ✓ Introducing English as a Third Language
- ✓ Enabling Joyful Learning Spaces
- ✓ Collaborating for teachers' capacity building

Gunotsav is a quality enhancement initiative of the Government of Gujarat for bringing about improvement in learning levels of students at Elementary level

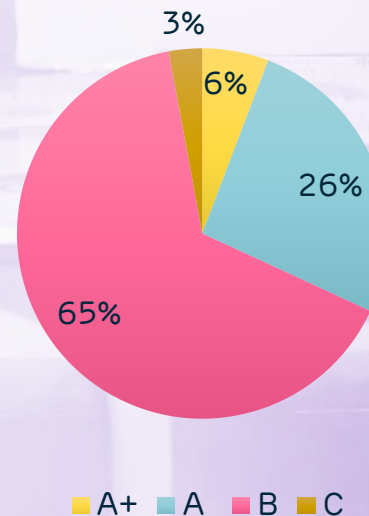
Assessment is based on four core areas :

- ✓ Teaching learning outcomes
- ✓ School management
- ✓ Co-Scholastic activities
- ✓ Usage of resources.

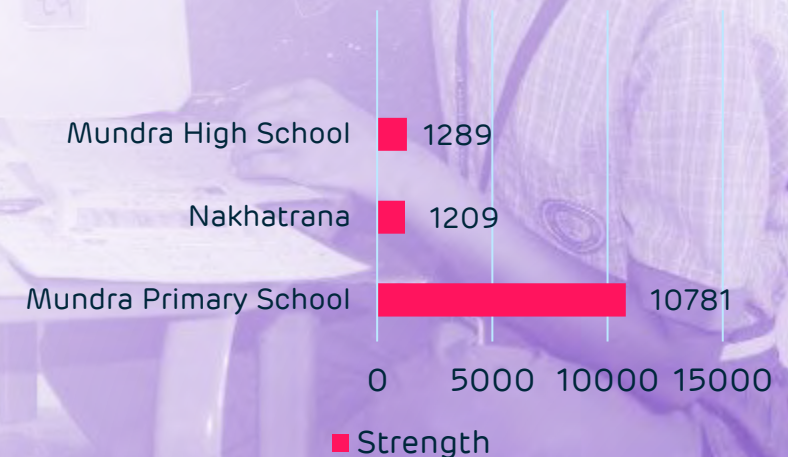
## Utthan Schools in Kutch



## Gunotsav 2021-22 (Kutch) : An Affirmation on Utthan Schools



## No's of Students in Kutch



# PROJECT UTTHAN



Conduct baseline assessment of 7034 Students, 3364 Students were progressive learner, 1403 Students mainstreamed.

Location	Total Strength	Baseline Assessment	Progressive learner	Mainstream Students
Mundra	10799	6047	3029	1247
Nakhatrana	1267	987	335	156

Facilitating English from Classes 1-4 : 7500 + are taking the advantage of this intervention.

## Cultivating Reading Culture

Introduced DEAR (Drop Everything and Read) period on every first and third Saturdays for an hour; Library activities on every Second & fourth Saturdays.



Year 2020-21	22890 books
Year 2021-22	60780 books
Year 2022-23	110205 books

# PROJECT UTTHAN



## **IT on Wheels : 2 Dedicative Van, 55 Laptops Empowering 2620 Students of 5-8 Std. In Gujarat**

IT on wheel program is run to teach them basic emphasizes elementary school 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. Customize basic syllabus impede their development.

## **Day Celebration every Month : Summer Camp & Diwali Mela in Vacation**

Every month Utthan sahayak celebrates day in which encourage students to

participate in co-curriculum Activity which create opportunity to learn and experience new things. Also planned 15 days Summer camp & 10 days Diwali mela during vacation. 2800+ students participated with more than 4000 handmade traditional products, 3500+ footfalls during exhibition cum sale. Diwali mela attracted 7363 students. That included 12 Activities, 28529 Total Expenses & 37529 earn students. Sarpanch, SMC members, Mothers, and Parents all take part enthusiastically.

## **Competitive exam Preparation**

Location	JNV	NMMS	PSE
Mundra	227	324	347
Nakhatrana	23	48	48

## **500+ Mothers meet with 11000+ Mothers**

Every month, on the Fourth Saturday, Utthan Sahayaks conduct Mothers meets. A child grows a most during the first few years of school, when both the mother and the teacher are crucial in developing their character and personality. Many of the kids are first-generation learners with uneducated parents; in these circumstances, Mother's Meet encourages mothers and teachers in working together to support the education of the child. Also, mothers get a sense of empowerment and value and regularly updates on school activities. Recreational activities during the meeting add an element of surprise and rejuvenation among the Mothers.



# PROJECT UTTHAN

## International School Library Month (ISLM)

ISLM (International School Library Month) was celebrated by 69 Utthan schools. And school from Russia joined with us in zoom to engage under the virtual connection around the world.

Students from Samaghogha School No.1 performed Garba, while students from Vandh school gave information about library activities. Bookmarks' & Digital bookmarks were distributed with partner schools. This is continuing, 3<sup>rd</sup> time Utthan schools participated in ISLM.

## Signed MoU with 18 more Government Primary Schools at Mundra

## Signed MoU with 8 Government High Schools : 8 Village 8 High Schools, 2 Adani Education Evening Center

To overcome challenges of High schools and improve the quality of education, Utthan appointed 2 Utthan sahayak at High schools. 1 for Science/Math's & 1 for English as most of the students facing problems in this subjects. Utthan organized a Parents Teachers Meeting at 8 schools in 8 villages, there were over 450 parents gathered.

After school, children get the opportunity to study at three levels at the Adani Education Evening Center. (AEEC) Remedialcoaching.



Project Title	Participation of Utthan School	Partner Schools	Partner Countries
Bookmark	51	63	08
Digital Bookmark	37	78	10
Virtual Connection Around the World	10	10	09
Total	98	151	27

# PROJECT UTTHAN

## Utthan's outreach strategies to Increase children's learning

- ✓ Project Utthan has been studied and selected as 'University Practice Connect' by Azim Premji University, Bengaluru.
- ✓ Project is in alignment with NIPUN Bharat (National Initiative for Proficiency in Reading with Understanding and Numeracy Bharat Program) & FLN (Foundational Literacy & Numeracy)
- ✓ Navneet e-Sense software updated in all schools.
- ✓ 100 hours capacity building programs for Utthan sahayak and school Teachers. specially focusing on Foundational Literacy and Numeracy. Utthan sahayak attend CBP (Capacity building program) once in every month.
- ✓ 100% participation in 100 days reading campaign.
- ✓ Google Map : All Utthan schools added in Google map. Utthan sahayak upload photos continuously. that's uploaded Photos got 200k+ views.
- ✓ Utthan sahayak create content for Reading, Writing & Numeracy.
- ✓ Utthan sahayak create 150 Worksheets on Yoga In the run-up to India's 75th Independence day celebrated across India's Azadi Ka Amrit Mahotsav. The tour covers 75 heritage, tourist and archaeological sites and landmark architectural sites across Gujarat.
- ✓ Utthan Sahayak, Hetalba Vaghela encouraged students from Mokha Primary School to write the story. Saptahik Phulwadi, Ahemdabad published the story written by student.
- ✓ TLM, Sports, Music & Science kit distributed to create joyful environment.
- ✓ Inter school competition organized to encourage physical activity & develop talent.
- ✓ Utthan sahayak encouraged & trained students in various competition organized by GoG.



# EDUCATION PROJECT

## Adani Vidya Mandir, Bhadreshwar



**EDUCATION: FREE AND COMPULSORY** - 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. **507 underprivileged students of Fisherman & Maldhari communities from 8 villages benefitted costfree education at the school**

Teachers Day Celebration with facilitation of all teachers and awarded 5 best teachers in academics. District Education Officer Mr. Prajapati graced the occasion and motivated the staff.



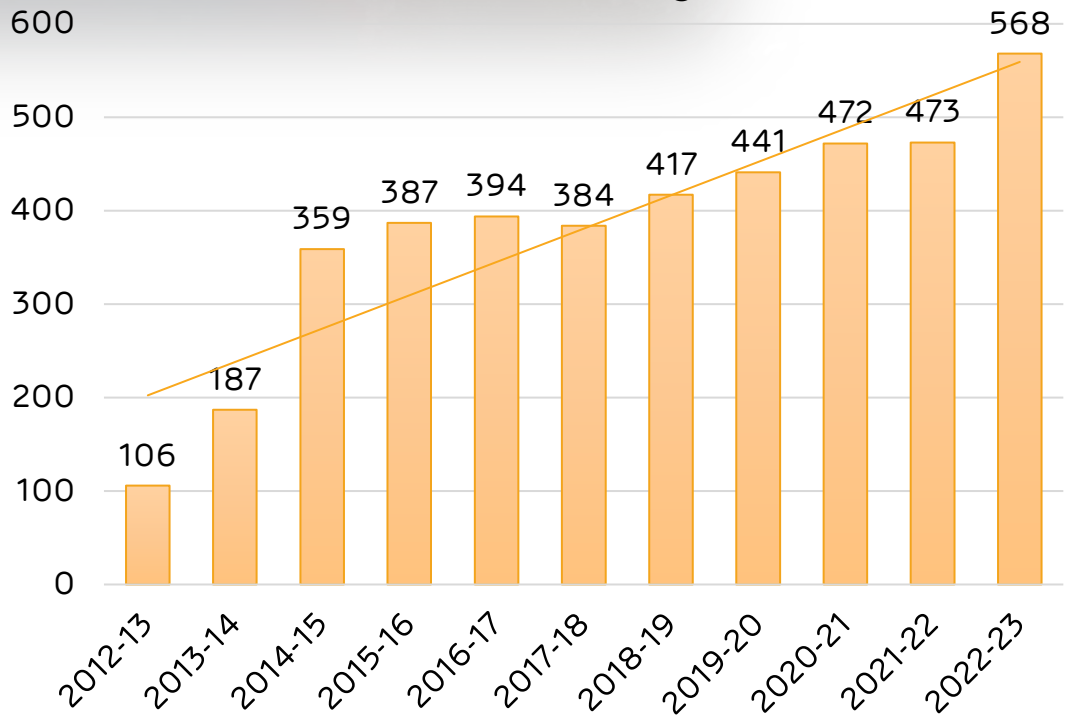
# ADANI VIDYA MANDIR, BHADRESHWAR



milestone achievement of Adani Vidya Mandir Bhadreshwar Gujrat Board Standard 10<sup>th</sup> Examination Result is 100%.

- The grand celebration of the year 2022-23 at AVMB was Shri Gautam Adani sir's Birthday.
- Promoting the harmony across all communities, Special Assemblies are conducted on a regular basis where all the Festivals irrespective of the religion & following are fondly celebrated.
- Periodical assessments and evaluations are conducted for the students and their progress are informed to the parents frequently.

Total Strength



Adani Vidya Mandir Bhadreshwar 2021-22 (10 <sup>th</sup> Board)		
NO	GRADE	STUDENTS
1	Above 80 %	3
2	60-80%	18
3	40-60%	10
	TOTAL	31
	Result	100%

# PROJECT UDAAN

**Vision :** To create a pool of inspired young mind

**Mission :** To motivate young students to dream big



Udaan is a special project inspired by the life changing story of Mr. Gautam Adani. As a child, he had visited the Kandla port in Gujarat, and after looking at the expanse of the port, he dreamt of having his own port one day. The rest is history. Under this project exposure tours are organized where school students are given a chance to visit the Adani Group facilities such as Adani Port, Adani Power and Adani Wilmar refinery at Mundra to get an insight into the large-scale business operations and thus get inspired to dream big in life. The exercise stimulates the young minds to dream big and help them become entrepreneurs, innovators and achievers of tomorrow, and thus play an active role in the process of nation building

Adani Foundation, Udaan Project invited the members of self-finance School Association, Gujarat for an exposure visit. 90 participants were facilitated with extraordinary experience of Port, Power, Wilmar and Solar plants visit.

Under Project Udaan total revenue generation is Rs.218.77 lacs.

**6204**

Total No. of Visit

**400577**

Total No. of participants

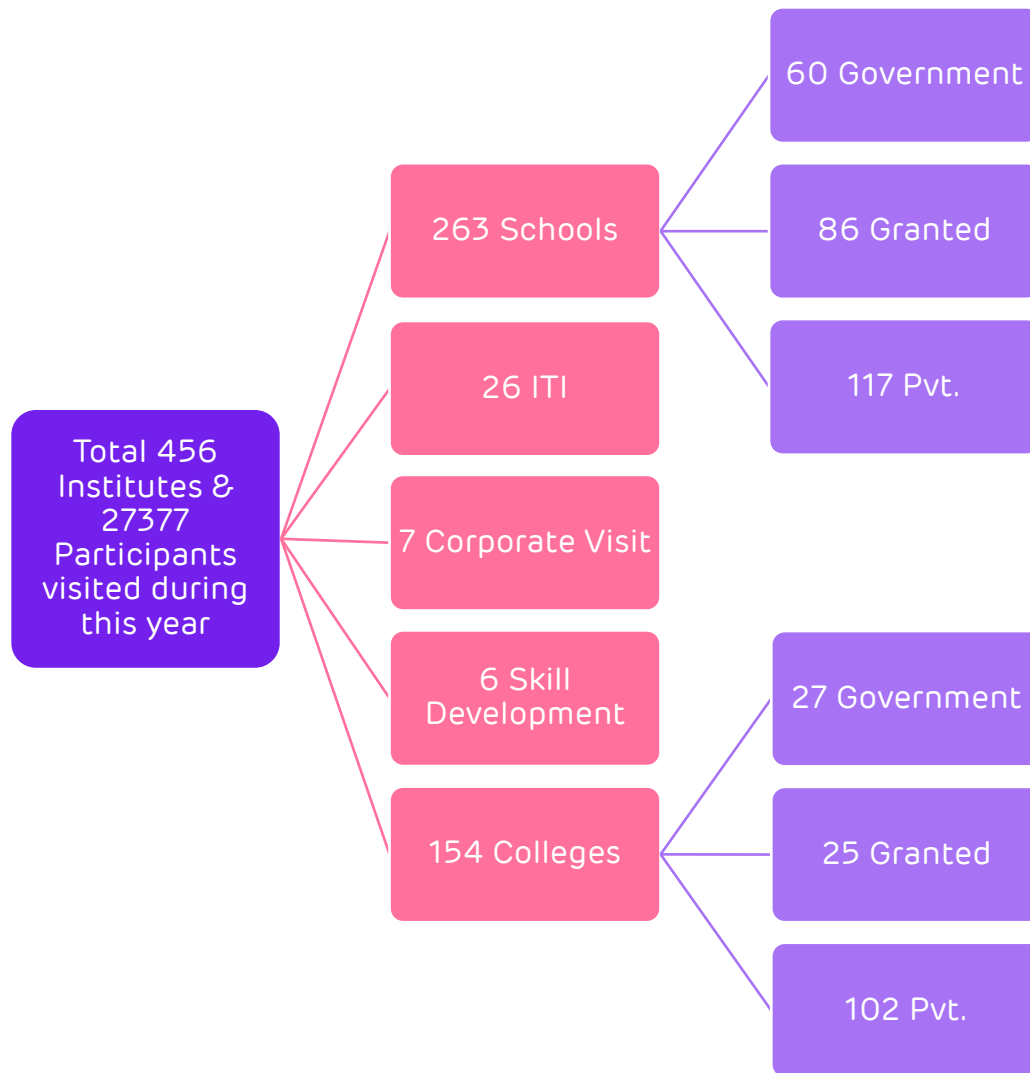
**10,000+**  
Positive Feedbacks

**100+**  
Mementos received

**55+**  
Certificates received

# PROJECT UDAAN

## Dashboard Sustainable project revenue generated



### Impact

- INSPIRE TO ASPIRE**
  - Igniting thoughts for the bright future.
- UNFORGETTABLE EXPERIENCE**
  - Visitors get to observe and experience the operations on sites.
- ENCOURAGE TOWARDS GOAL**
  - APSEZ existence proves that dreams come true if we convert them in GOALS
- INDUCING KNOWLEDGE**
  - Widening of knowledge horizon.
- THOUGHT PROVOKING**
  - Stimulating young minds to think out of the box.
- INFUSE CREATIVITY**
  - Students gets exposure which enable them to provoke ideas in them during visits.

SUSTAINABLE  
LIVELIHOOD  
DEVELOPMENT



# SUSTAINABLE LIVELIHOOD DEVELOPMENT

## The Pashudhan & Preventive Health care management

Program is a revolutionary initiative by Adani Foundation to provide support and aid to farmers in managing their cattle's health and nutrition needs. The program aims to bring about a positive change in the lives of farmers of Mundra ,who heavily rely on their livestock for income and sustenance.

One of the key components of the Pashudhan Program is providing fodder support to farmers, especially during periods of drought or crop failure. Adani Foundation provides good Quality of dry and green fodder which covered 14116 Cattle of 24 Villages / 3008 farmers. This Program help them to feed their cattle with good quality of fodder that meets all nutritional requirements which increase the productivity of livestock and improve their overall health. In turn, this has resulted in increased income for farmers and improved food security for families.

In addition to this, we also focuses on farmers training for effective cattle health management techniques and Vaccination Drive as prevention measures.



# SUSTAINABLE LIVELIHOOD DEVELOPMENT

## Grass Land development

AF converted 205 acres of denuded village common pastureland (gauchar) into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring.

Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value. More than 2250 Cattle will sustain with Improving quality and Quantity Of Milk.

Average 2450 cattle get benefitted by green fodder for 72 days –which increase 0.5 litre milk quantity of 50% cattle.

(1225 cattle x 0.5-liter milk quantity Increase x 40 INR per liter=Rs.1592000).

Apart that Open grazing Benefit save farmer cost to purchase Fodder .(2450 cattle x 7kg /Day X 72 Days = Rs. 37,04,400 (Rs. 3 per kg)

**This Intervention could save Rs.52,96,400.00**

It would be highlighted as best Demonstration and replicate in the other villages as sustainable fodder development project.

## Individual Fodder Cultivation

Farmers were Aware ,Convince and trained to cultivate super Napier Grass- as on farm projects to reduce their Fodder Dependency and expense. its update Varity of grass and Can be harvested three time in year with Good growth and Nutritive Value. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in **190-acre area and produce 3800 Fodder Tonnes Yield annually, lead to save Approx. Rs.52 Lacs of farmers.**

# SUSTAINABLE LIVELIHOOD DEVELOPMENT

## **Cattle health camp**

Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages. A cattle health camp typically involves a team of Government veterinary Doctor who provide check-ups and treatments for common ailments and remaining Medicines and Vaccine was provided by AF

Program is very effective to maintaining the optimal health of livestock and help to protect the cattle from deadly diseases such as Foot-and-Mouth Disease (FMD) and Clostridial infections. The vaccines used in these programs are specifically designed to provide long-lasting immunity against specific diseases, ensuring that the animals remain healthy even in harsh environmental conditions.

**Total 17299 cattle of 19 Villages had benefitted With different kind of medicines and vaccines.**

Apart that 973 camels kharai camels were vaccinated with fitodas and Antisaras in the Phulai-Chhari Dhandh area of Nakhtrana taluka.



## **Lumpy Disease Vaccination Drive.**

An effective and Immediate step was taken to Mitigate lumpy Skin disease outbreak in the Kutch In co-ordination of District Animal Husbandry department through Vaccination and awareness drive at grass Root level. Total 40,000+ cattle were covered through therapeutic and ayurvedic treatment and Nutritive Cattle feed Support.

# SUSTAINABLE LIVELIHOOD DEVELOPMENT

**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.

This disease is also zoonotic (a disease that can be transmitted from animals to people) Hence to protect Cattles against Bovine Brucellosis AF Started Awareness and vaccination program with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages.

**Under this project following activities were carried out,**

- 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 Gram Panchayat's
- Primary Survey and Sample Collections i.e. , Milk Ring Test, Blood Collection and testing
- Brucella Vaccination and Ear Tagging etc. Brucellosis Control Project 2020 Cumulative Progress of various important

No	Name of Activity	2020-21	2021-22	2022-23	Total
1	Awareness Meetings	19	23	18	60
2	Milk Ring Test	48	11	34	93
3	Blood Sample Collection	29	23	18	70
4	Vaccination	2132	2951	2970	8053
5	Family Covered (Direct)	287	379	484	1150
6	Total Benefited (in Direct) Families	1435	1895	2420	5750





## Promotion of Natural Farming

Natural farming is a method of agriculture that prioritizes soil health and sustainability. Instead of relying on synthetic fertilizers and pesticides, one key aspect of natural farming is the use of cow-based preparation like Jivamrut, Gau Krupa Amrutam and wormy Compost Fertilizers.

Adani Foundation Promote Farmers to adopt Cow based farming with end to End Program from Awareness to Market Linkage. 1392 farmers benefitted by training from which 60% farmers chemical usage is reduced to half extent in 500 Acres approximately.

### Impact

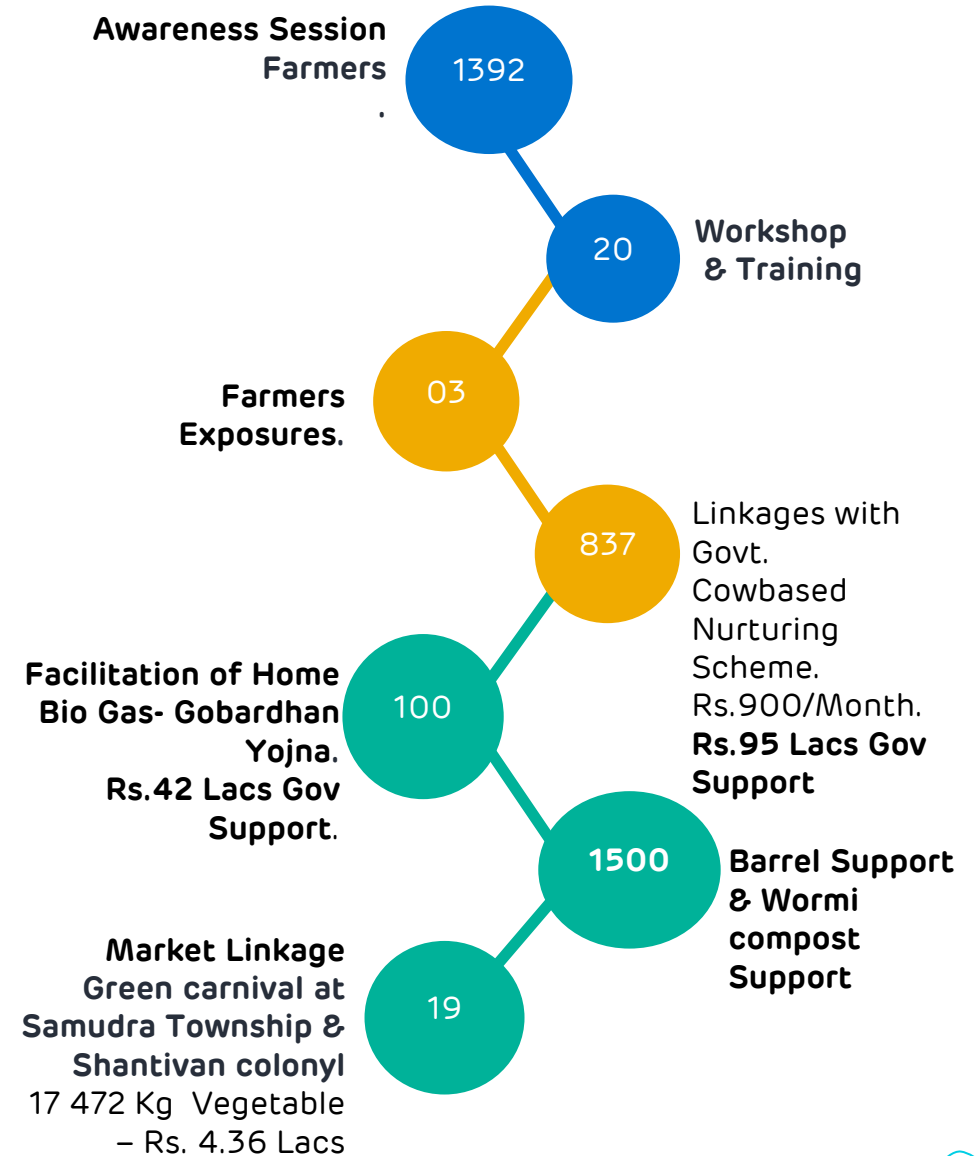
- I. Production Cost- 20% Reduced
- II. Chemical & pesticide exposure- 30 to 40% Reduced
- III. Premium product price-5% increase
- IV. Crop Yield & Taste - Better taste and quality-



# SUSTAINABLE LIVELIHOOD DEVELOPMENT



## Implementation Process of Projects



# SUSTAINABLE LIVELIHOOD DEVELOPMENT



## Prakrutik Sahkari Mandli

Formation of Shree Raj Shakti Prakrutik Kheti sahkari Mandali Limited Mangara and register Under Gujarat Co-operative Society act-1961 with 60 Members which is the First Organic Company of Registered across Kutch.

AF Started an Initiatives **"Green carnival"** an initiatives to Provide Marketing Platform to farmers to sell Natural Farming Vegetable & Agri Produce at Shantivan and Samdudra town Ship ,Mundra on Weekly base.

We provides resources, and technical assistance to help farmers to market their products successfully.

## Farmer's Producer Organization

Kutch Kutch Kalpaturu Producer Entity (KKPC) was established in the year 2020 to address the interests of farmers, particularly to provide an entrance for outputs and inputs. The company was founded with 237 farmers

KKPC served for Date Packaging box, Milk Supply to Colonies, NB 21 Off suits Supply, Vegetable Seed ,Mineral Mixtureand Cattle feed supply and plan to extend more service.

KKPC Current Year turnover is. Rs.28.89 lacs by started Different Kind of Initiatives



# SUSTAINABLE LIVELIHOOD – FISHERFOLK COMMUNITY



Access of Pre-primary education to 3 Vashat – 125 Students



Transportation Facilities to Govt. & AVMB School- 33 Students



Free AVMB –School Education - 147 Students



Book Support -43 High School Students



Scholarship Support -43 Students of SMJ School Luni



Coaching for 10<sup>th</sup> Exam OF 8<sup>th</sup> .9<sup>th</sup> Failed Students -28 Students

**Fisherfolk education has had a significant impact on communities to shaping individuals' lives By providing Access of quality education for Pre- primary to Higher Education. More than 500+ Fisherfolk children are getting Education**

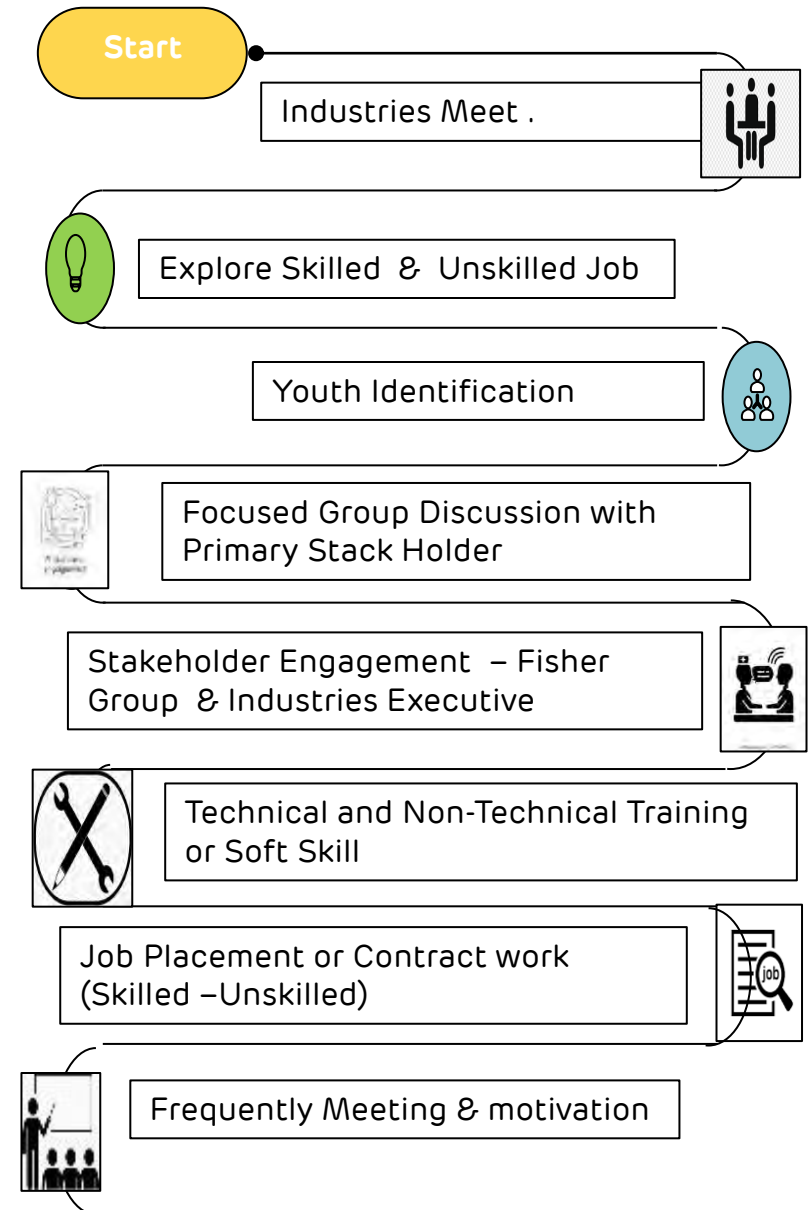
## Impact

1. Access Of Quality Education
2. Promoting Girl Child Education.
3. Increase Economic Productivity
4. Creating Employment Opportunity
5. Social Development & Networking

# SUSTAINABLE LIVELIHOOD DEVELOPMENT

- ❖ 194 fishermen and women are engaged through Contract adani Group Company on regular base.
- ❖ 23 Youth have been Placed in Different company after Completion of Technical training.

Total 217 Fisherfolk are Employed and earning on Monthly Base.  
Average Monthly Income Rs.14500/ Individual



# SUSTAINABLE LIVELIHOOD DEVELOPMENT

## Fisherfolk Livelihood

Mangrove plantation and Nursery development work has created a two facet impact by providing Livelihood to Fisherfolk during two months Fishing during Off season and developing 162 hector dense mangrove afforestation. **5200 Men days** work provide to **285 Fisherfolk** of Luni ,Sekhdiya and Bhadreshwar Villages in coordination with Horticulture Det.

Formed **Sagar Saheli SHG of** Navinal Fisherfolk Women and Linked With DRDA after completion of Stitching Training ,received first order of Rs.80,000 to prepare Cotton Bags. Total 12 Women are engaged and planning to expand with more Women and Order. Liaising with Fisheries department to Facilitate Fishermen welfare Scheme and Form Filling Process. Pagdiya Fisherfolk Kit, Boat Licence renewal, Boat Token Process.



# WOMEN EMPOWERMENT PROJECT

Women are essential to the entire development process, whether in a single household, a village, a state, or a nation. Adani Foundation provides a platform for Community women to overcome the social barriers by becoming change - makers in their communities and societies while maintaining their traditions. Mundra has witnessed a significant shift in the development of women beneficiaries in various fields of occupation including such agriculture, self-employment, horticulture, and so on. The Adani Foundation has a strong emphasis on strengthening rural women and betterment through sustainable livelihood support, resulting to socioeconomic shifts in the rural population.



# WOMEN EMPOWERMENT PROJECT

## Strategy & Process of Empowering Women by SHG Group

Identification of target Group

Mobilization and formation

Capacity building & Training

Saving & Credit Activity

Income generating Activities

Connect with Government & other organization

Monitoring & Evaluation

Adani Foundation has been working towards empowering women through various programs and initiatives. Here is a brief overview of our work in women empowerment :

- ✓ **Self Help Groups (SHGs)** : We have established 82 self-help groups in various rural and urban areas to provide financial and social support to women. We provided training and capacity building workshops to members of these SHGs to help them develop income-generating activities and improve their livelihoods. Through this initiative, we have empowered over 850 women to become self-reliant with Savings of Rs. 30.42 Lacs
- ✓ **Training & Skill Development** : We conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing. These training programs helped women develop their skills and start their own businesses. We have trained over 320 women in various skills, and many of them have started their own businesses.
- ✓ **Women's Health** : We organized several health camps and awareness programs for women, with a special focus on menstrual Hygiene. These programs aimed to educate women about their health and empower them to make informed decisions. We provided health services to over 1150 women through these camps.
- ✓ **Assistance in Job & Government scheme** : We empower 256 women by help them to seek Job, they all earn average 9288/- Monthly. Also Gave awareness about government scheme which directly benefit to woman & helped them in the process to apply.
- ✓ **Advocacy and Awareness** : We conduct awareness campaigns and advocacy programs to promote gender equality and women's rights. We aim to challenge the social norms and cultural practices that prevent women from achieving their full potential.



# WOMEN EMPOWERMENT PROJECT

1. 56+ women by Gram Bharati Platform

2. 102 + Menstrual Hygiene workshops

3. 12+ Advocacy and Domestic violence sessions

4. 82 SHG - Saving & Credit Activity

5. 220 + Job Placement



# WOMEN EMPOWERMENT PROJECT

SHG Name	Our Intervention	No. of Woman	Get Order from	Order of	Total Order (lac)	Grambharati (lac)	Till today Turnover
Jyot Saheli Swa Sahay Juth	Collaboration with RSETI & trained woman by Rural Self Employment Training institute	10	Mundra Navratri Celebration	Moti work, Bead work neckless as well as Panjo	0.42	0.75	1.17
Saheli Swa Sahay Juth	Help them for tender process	10	Jilla Mahila ane Bal Adhikari Kutch,Bhuj	Sanitary Pad	1.20	0.00	2.50
Tejashvi Saheli Swa Sahay juth	Help them to increase variety in stitching related work, Wall Hangings, folder bag, Uniform	15	AVMB – Bhadreshwar	Uniform, Folder bag,Jatt bag	9.12	1.10	20.25
Food Sister Saheli group	Help them to start the Canteen at Rangoli Gate	10	APSEZ + Rangoli Driver Shed	Food	3.00	0.00	3.50
Shradhha Saheli	Tender from ATMA + Various ordered of Food + Snacks provided to various Balvadi	10	ATMA, Adani Public school & Balavadi	Lunch + snacks	8.63	0.20	15.00
Meghadhanush Saheli	organized an exhibition of Eco-friendly Ganpati	11	Utthan Project	Mud frames	1.39	0.60	12.00
Radhe Saheli Swa Sahay Juth	Exhibition cum sale & Inspire them to participate in Grambharti	16	Gram bharati order	various type of Dhadaki	0.40	0.20	2.00
Sonal Saheli Groups	Training them for Making Phynial & Washing Powder	10	Port & Wilmar	Sale washing powder	3.60	0.00	12.00
Karimbhai Mansuri	Namda Craft				1.80	0.00	9.80
Over All Corporate	Marketing & Gift packing Training	35	corporate order	Various order from all SHG	9.76		9.76
Total	-	127	-	-	39.32	2.85	87.98

# WOMEN EMPOWERMENT PROJECT

Training, Awareness programs, Exhibition and Certificate courses can play a critical role in the development of women by providing them with the skills, knowledge, and resources they need to succeed in their personal and professional lives. Adani foundation is providing that opportunity to rural women by

exposure. This initiative more than 500 woman trained in subject like how to run business, Personal hygiene, Woman rights, social media marketing etc. 30 Women got the Artisan card though the RSETI ( Rural self Employment Training Institutes) Adani foundation celebrated International women's by

motivating 150 Woman from different 82 SHG's. Current year theme was **Digital ALL : Innovation & technology for gender equality.**



# Community Health

*Access to quality healthcare is a fundamental right of every individual*

Health plays a crucial role in transforming people's lives. We all realized importance of health after facing challenging situation during Pandemic. Access to quality health care gives a fair chance to lead healthy, productive lives. Healthy people can utilize opportunities available to them.

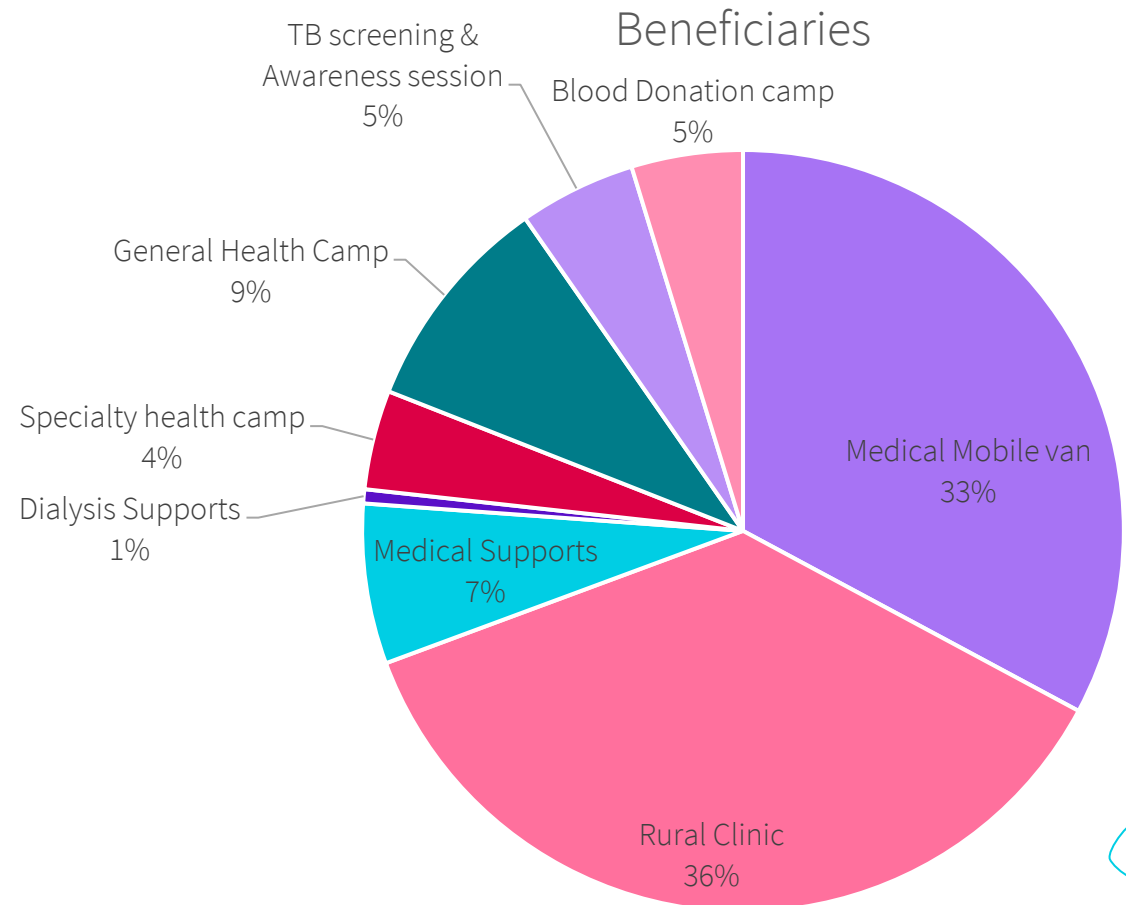


# Community Health

Sr. No.	Project	Beneficiaries	
1	Medical Mobile van	11879	32 village
2	Rural Clinic	13209	9 village
3	Medical Supports	2460	63 village
4	Dialysis Supports	216	63 village
5	Specialty health camp	1527	
6	General Health Camp	3379	
7	TB screening & Awareness session	1795	
8	Blood Donation camp	1710	
	<b>Total</b>	<b>36175</b>	

**“Healthy mind remain in healthy body which create health community to make healthy Nation.”**

Adani Foundation is relentlessly working to Provide access of quality health facilities at Doorstep level to create health Society for healthy nation development through various kind of health Projects



# Community Health

## Rural Clinic & Mobile Health Care unit

Adani Foundation focuses on ensuring good health for better contribution to growth and progress. During this pandemic situation health is the basic need for development of community. Their objective is to live healthier lives by promoting healthcare seeking behavior.

Mobile Health Care Units and Rural Clinic Services are deployed with the objective of providing basic healthcare facilities to remote rural areas as well as poor peoples. The service is being executed by Adani foundation is to reduce travel time, hardships and expenses.

The mobile health care unit cover 25 villages and 07 fishermen settlements. Around 90 types of general life saving medicines are available in these units. This service become boon for women, elderly and children as the service is availed at their doorstep.

Rural Dispensaries are established where there is a gap in the healthcare services. The Adani Foundation operates Rural Dispensaries in 6 villages of Mundra block, 02 villages of Anjar block and 1 clinics in Mandvi Block. Mobile dispensary and rural clinics provide health services with token charge of 20/- rupees per patient daily by a doctor and a volunteer.

During this year total 11879 beneficiaries were benefitted by Mobile van and total 13209 beneficiaries were benefitted by Rural clinics where female ratio is 65%.



# Community Health

## Medical Support Detail

Adani Foundation provides primary health care and financial assistance to needy poor people for ailments such as kidney related problems, paralysis, cancerous and tumor surgeries, neurological and heart problems, blood pressure, diabetes etc.

Partial Medical Support had been given to 2000+ beneficiaries of Mundra, Mandvi and Anjar Block at Adani hospital, Mundra. where as in the Critical cases after stable them we refer them to GKGH, BHUJ for further treatment.

## Dialysis Support

The drinking water of Mundra contains high TDS (Total Dissolved Solids). Hence, the proportion of patients with urinary stones and kidney failure is more. Patients suffering from kidney-related diseases require regular dialysis which is costly and adds to the financial burden of the family.

Hence, the Foundation has undertaken a programme to providing dialysis treatment to help the extremely needy patients to live a healthy life. During this

year, 4 patients were supported for regular dialysis (twice a week) with partial support.

## NCD Awareness and Prevention

MHCU and Rural Clinic Doctors are working parallelly for creating awareness and prevention measures for Non Communicable diseases, Awareness sessions scheduled in 8 High Schools and 2 community places. More than 110+ patients were supported and counselled for Hypertension and Diabetes. Due to early intervention their life span increased and quality of life became better

## Machhimar Shudhh Jal Yojana

To reduce water born disease and women drudgery to get water, Potable water is provided to the fishermen communities at different vasahat through water tanker since 9 years. Coordination done with Gujrat Water Infrastructure Limited For Juna Bandar, Kutadi Bandar, Veera Bandar and Ghavar Bandar. Adani foundation is supporting to 3 fisherfolk settlements.



# COMMUNITY INFRASTRUCTURE DEVELOPMENT

The Adani Foundation's Community Infrastructure Development (CID) program is the keystone initiative focus on improving infrastructure facilities of rural and urban area with proper designing and implementation to built robust infrastructure, This project impacted Thousand of life toward health care, education, agriculture, water and sanitation and other basic facilities for sustainable rural development





# COMMUNITY INFRASTRUCTURE DEVELOPMENT



40  
Construction  
Of RRWHS

19 Bore  
Recharge

2 Pond  
Deepening  
under SSJY

Pond  
Beatification -  
Bund  
Strengthenin  
g at Bhujpur

2 Percolation  
Bore  
Recharge

3 Re-  
strengthening  
of Approach  
Road

Cricket  
Ground at  
Hatdi

Construction  
of house for  
needy  
fisherman

3  
Construction  
of Water Tank  
at Luni  
Bandar

Construction  
Common  
gathering  
open shed

Renovation  
Approach  
Road

4 Common  
gathering  
Open Shed

Construction & Development, Repairing & Maintenance and Support Work covered during the year

Community  
Training  
center  
Shekadiya

Vegetable  
Market at  
Mundra

Development  
of Gate Valve  
at Checkdam

School  
Compound  
wall at Rampar

Fisherman  
approach  
Road  
restoration

Bund Strengt-  
hening at  
Bhujpur

2 Pond  
Deepening -  
Azadi ka  
Amrut  
Mahotsav

Renovation  
Training  
center Mundra

Renovation  
Blood storage  
Lab CHC  
Mundra

2 Disable  
Widow Toilet  
Block

2 CC Road of  
700 mtr.

R.O. Plant  
Mokha 1000ltr  
/HR

JCB & Hitachi  
Support for  
Pre-Monsoon  
Activity

Check dam Re-  
strengthening  
Bharudiya

Pond Pipeline  
work 800 Mtr

Flood Water  
Control Sluice  
Gate at  
Zarpara

Construction & Development, Repairing & Maintenance and Support Work covered during the year

# CRC MUNDRA

## Community Resource Center

Community resource Center is the bridge between Government Schemes and real Beneficiaries. It is situated at Adani Field Office, Baroi with the motive to be **Single window point solution (Online Application & Documentation) to Facilitate Government Schemes leveraged to needy and Eligible people.**



Government Scheme Facilitation				
Sr. No	Gove Scheme	Gov. Support Rs/Month.	Total Beneficeries	Total Amount/ year
1	Widow Pension	1250	641	18496350
2	Bal seva Ayog	2000	49	2254000
3	Divyang pension	1000	19	323000
4	Divang Bus pass	300	439	
5	Niradhar Pension	750	126	2808750
6	Palak Mata Pita	3000	5	516000
<b>Total</b>			<b>840</b>	<b>2,43,98,100</b>

# CRC MUNDRA

## Widow Pension Yojna

Objective of this Yojana is to provide Financial support Rs.1250/Month to widow to made Them Financial independent. Parallely, we are conducting Motivation Session with them to raise their Value and Positivity to create healthy family Environment.

Till The date Total 641 Widow have been Linked with Government Widow pension Scheme.

## Monthly Pension and other allied Scheme

Under This Program disabled Person are supported with Monthly Pension @ Rs.1000 As well allied facilities like Bus pass, Railway pass to made them Self sustain and Confident.

Till the date total 458 Divayang are linked with Different Government Scheme.

## Bal Sakha Yojna

Aim Of the Yojna is to Provide Financial support Rs.2000/Month for Education Purpose to below 18 year Students who lost their Parents due to Life threatening Disease Including Covid.

Total 49 Students are getting benefit of the scheme.

## Palak Mata Pita Yojna:-

Motive of this scheme is to promote parents who is taking care and Nurture the child who is Below 18 year and lost their parents.@ Rs.3000/Month.

Total 5 children are being supported under the scheme.

## Niradhar Pension Scheme

Under this Scheme Financial Assistance 750/Month is provide to Senior citizen who don't have Surviving Children (Son) or Below 21 year son.

Till The date 126 senior Citizen availing schematic benefit.



# CRC MUNDRA

## Key Achievements of Community Resource Center One time

Some Glimpse of Cow Nutrition Support scheme Biogas Under Gobardhan scheme



Sr. No	Gove Scheme one Time	Gov. Support	Total Beneficiaries	Total Amount/Year
1	Covid Support One Time	50000	12	6,00,000
2	Vahali Dikri @ 18 Year	110000	113	1,24,30,000
3	Divayang Sadhan Sahay one time	5000	176	8,80,000
4	Manrega (NB21)	22000	32	7,04,000
5	Pagadiya Sadhan Sahay Yojana	9000	9	81,000
6	Gau Dattak Yojana	10800	857	92,55,600
7	Gobardhan Yojana	42000	100	42,00,000
8	Fishermen Shram Yogi Yojna		163	
			<b>1487</b>	<b>2,81,50,600</b>



# ADANI SKILL DEVELOPMENT CENTRE

**Total Centre  
Admissions  
FY 22 - 23**

## Mundra

Courses	Female	Male	Total	Revenue Generated
Pedicurist and Manicurist	68	0	68	68000
Beauty Therapist	18	0	18	36000
Self Employed Tailor	31	0	31	38850
Assistant Electrician	0	50	50	188800
Bar Bender and Steel Fixer	0	29	29	0
Meson General	0	29	29	0
Domestic Data Entry Operator	47	11	58	239000
Junior Crane Operator	0	23	23	642000
Interview Skills	14	18	32	0
Mudwork	71	0	71	61600
Solar PV Manufacturing Technician	0	25	25	109500
Basic Functional English	562	670	1232	707300
Digital Literacy	391	461	852	454290
<b>Total</b>	<b>1202</b>	<b>1316</b>	<b>2518</b>	<b>2545340</b>

## Bhuj

Courses	Female	Male	Total	Revenue Generated
Interview Skills	21	9	30	0
General Duty Assistant	45	8	53	3,09,734
Disaster Management	0	2	2	4000
Basic Functional English	1077	352	1429	8,57,400
Beauty Therapist	2	0	2	4000
Assistant Beauty Therapist	1	0	1	1500
Self Employed Tailor	8	0	8	8000
Digital Literacy	231	270	501	3,00,400
Domestic Data Entry Operator	0	1	1	4,720
Non Domain Employability Skills	21	11	32	0
Diet & Nutrition	02	00	02	9440
GST with Tally	16	01	17	98000
Understanding Operating System	21	7	28	0
Entrepreneurship	23	7	30	20,800
Financial Literacy	51	1	52	3600
<b>Total</b>	<b>1519</b>	<b>669</b>	<b>2188</b>	<b>16,21,594</b>

# ADANI SKILL DEVELOPMENT CENTRE BHUJ

## **Soft Launching of Self-Employed Tailor – Outreach Batch at Meghpar**

Soft Launched Self-Employed Tailor Batch at Meghpar (Out-reach). Total 25 candidates are enrolled.

## **Soft Launch of Entrepreneurship Development Program**

Soft Launch of Entrepreneurship Development Program Training at Centre under CED with 30 candidates.

## **Soft Launch of General Duty Assistant Batch**

Soft launched General Duty Assistant Batch with 30 candidates under DDU-GKY scheme as per instruction by GLPC.

## **Soft Launch of FL Training under Special Project**

Launching Special Project Jointly with KMVS NGO for FSW ( Female Sex Worker) Financial Literacy training Inaugurated on 22-07-2022  
Total 46 women participant



# ADANI SKILL DEVELOPMENT CENTRE MUNDRA

## **Mud Work Training- Outreach Batch at Samundra township**

Total 45 candidates are enrolled.

## **Soft Launch of Data Entry Operator Batch**

Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie-up

## **Soft Launch of Solar Panel Manufacturing Technician Training of Solar Panel Manufacturing Technician Training at Bhuj, ITI with 25 candidates.**

## **Soft Launch of DL Training under DEO Project**

Soft Launch of DL Training at AVMB School with 61 Students

Tie Ups with (Thermax Foundation, Empazer, Navin Group and DEO Kutch @ Rs.24.25 lacs.





# ADANI SKILL DEVELOPMENT CENTRE MUNDRA

## DEO Project

MOU with Kachchh District Education Office. In this MOU ASDC has provided training of Digital Literacy and Basic Functional English in Kachchh District Schools. As per MOU Kachchh District Education Office has provided 4000 candidates to us for training (Adani Skill Development Centre). Funding from Thermax, CFS and DEO made it possible

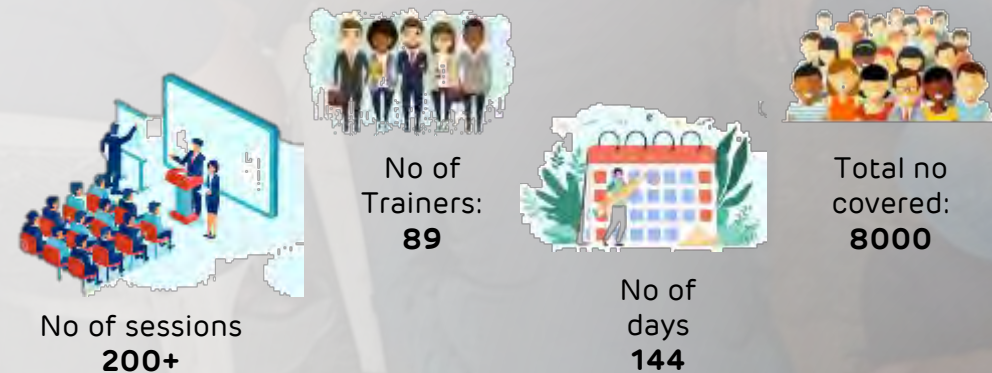
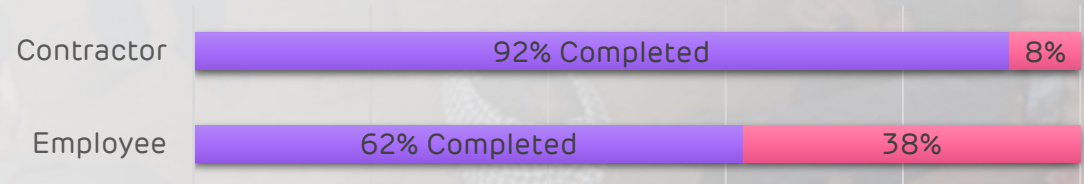
Courses	Total Students Trained
Basic Functional English	2659
Digital Literacy	1341
<b>Total</b>	<b>4000</b>



# 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.



# Dignity of Work Force Programme - EVP

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 completed screening with 8000+ work force.**

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



# Dignity of Work Force Programme - EVP



Central TB Division | #TBMuk...  
@TbDivision

TB-Free Workplace models were showcased in Multisectoral Corporate Engagement towards TB elimination in India conference. @Adaniports through @AdaniFoundation covered a population of over 8000 people comprising employees, family members & contractual workers at Mundra port.



adani | **Transmit**

Transmission of TB diminishes rapidly once **effective treatment is initiated.**

A person with TB can rejoin work as soon as they become medically and physically fit to do so.

USAID | TBPREP |

adani | **Transmit**

Our institutional policy for TB creates a culture of support and inclusion for colleagues with TB.

We work to ensure that our colleague experience **no stigma & discrimination**

USAID | TBPREP |

adani | **Transmit**

Through **nikahay** POSHAN YOJNA

All TB patients will get **₹500 per month** for nutritional support during the entire treatment period.

USAID | TBPREP |

adani | **Transmit**

**Timely diagnosis and treatment** can help avert significant number of TB deaths.

USAID | TBPREP |

adani | **Transmit**

A person with active **TB can infect 10-15** other people through close contact if not diagnosed and treated on time!

USAID | TBPREP |

adani | **Transmit**

If you find yourself having the below symptoms, check for TB.

With timely diagnosis and right treatment, **TB is curable!**

USAID | TBPREP |

adani | **Transmit**

Prevention, management and mitigation of stigma and discrimination to TB are essential elements of a patient centric care.

USAID | TBPREP |

adani | **Transmit**

It is curable, treatment may take **6-9 months** or more.

Full compliance to treatment is essential for preventing emergence of drug-resistance.

Government health facilities provide **FREE** treatment for TB.

USAID | TBPREP |

# Health Camp for workforce and Green Carinal Celebration



18 Green carnivals

17472 Kg Fruits and Vegetable

436000 INR

It is true that we cannot achieve our goal of development unless and until we support to bring up the lives of this community. Basic needs of this work force need to be considered. In labour Vasahats they were not getting even the facility of pure drinking water, proper living condition, sanitation which Adani Foundation has addressed one by one within last years five years span.

With the objective to build up trust and transparency in labour community, union Labours and Smooth business operations, Adani Foundation had organized 45+ labour camps for 2000+ workforce beneficiaries in coordination with Adani Wilmar Limited

Started the great initiative from world Soil Day - Biggest Employee volunteering program of Adani Ports and SEZ Limited with more than 56 employees as supporter of event organizer and 225 employees with family as a supporter of Farmers n SHGs.

Children used to enjoyed Games and Dance ! Lucky Draw surprise gift was organic ghee..

HR department, IT department and Admin department has supported a lot and will support every fortnight for this sale every sunday

# ADANI KANDLA BULK TERMINAL PVT LTD - TUNA

## Water at Fisherfolk settlement

Potable water (18 KL per Day)  
Distribution to Vira and Dhavlvaro  
Bandar through Water tanker Regularly  
which improve Hygiene and Health  
standard and reduce Women drudgery  
,Cost and Time to get water by  
**Linkages through AKBTPL and GWIL  
daily bases.**

## Fodder Support

Support of Dry & Green Fodder to Tuna  
and Rampar Village Gaushala Cattles  
during Scarcity which impacted on  
Cattle health and Milk Productivity  
ultimately Farmers Income as well. Total  
643825 Kg green Fodder Supported for  
900 Cattles of Tuna & Rampar.

## Tree -Plantation

Total 200 Tree was planted and ensure  
responsibility for watering and caring.  
This initiative involved Community and  
School students and sensitized to plant  
more trees and nurture. After our  
plantation, Gram Panchayat also  
planted 55 Neem trees in same  
premises.



# ADANI KANDLA BULK TERMINAL PVT LTD - TUNA

## **School Renovation work Rampar**

More than 800 students are studying in Rampar near Tuna port. School did great coordination to approve 3 new rooms from Sarv Shiksha Abhiyan. Other part was required renovation which was taken care by Adani Foundation. Due to this Total 6 Rooms are now in full utilization.

## **CC Road Wandri**

Wandi is 1 km away from Adani Kandla Bulk Terminal Port Limited and 100 % Population of Fisherfolk. 1 Km Drainage line is done by WASMO – CC road request received in year 2021. Adani Foundation guided for CC road work after drainage work.

## **Common Gathering Flooring work, Tuna**

Tuna Village is 2 Kms away from AKBTPL. In Tuna Village, community gathering shed was constructed from MLA Grant. Flooring work was not included in the same, which was taken up by Adani Foundation. Shed is well utilized in SHG meetings, Farmer meetings and Gram Sabha



## ADANI GREEN ENERGY LTD - ABDASA

Adani Solar Plant Bitta is under Adani Green Energy Limited. Adani Foundation is doing regular support of JCB during monsoon or any accident cases as and when required.

Apart from it Celebrated Chairperson's Birthday by distribution of school bags to the children taking admission in class 1 along with necessary books and Education Material. Which includes Bitta School, Nani Dhufi School and Moti Dhufi School.

Deputy Collector of Abdasa taluka place, called for a meeting to all major industries of taluka area. Agenda of the meeting is to develop 7no's "Amrut Sarovar" in Abdasa taluka area under government proposal at every district level.

As per the proposed identified locations by Deputy collector, one of the location he has asked to develop by Adani Power Limited. He has proposed, "Amrut Sarovar" is developed nearby our plant area with amount Rs 20 lacs as per pond size All such proposed "Amrut Sarovar" are new only, not to develop available old pond in nearby area.





## Impact Story



Ratanbhai Keshavbhai Gadhave is a farmer of Moti Khakhar. On 17th May 2022, he purchased NB Super Grass Stalk to cultivate it in 1 acre of his land. After maintaining, nurturing and hard work the grass thrived lush green with a tremendous height that's when he performed his first mowing of it.

Ratanbhai had to feed fodder to his 35 cattle regularly. While interacting, we came to know that he used to require 16kg of dry grass during summer and winter at an estimated cost of ₹1,60,000 but after planting NB Super Grass, he has saved 80-90,000rs which is approximately 50-55%. Apart from this, Ratan bhai also mentioned that during this period, he usually had a demand for 2 to 3 farm trucks of fodder which he used to order from the market but after cultivation of NB Super, not a single farm truck loaded with fodder is demanded from him.

Moreover, due to the cultivation of NB Super Grass fuel and fare expenses on farm trucks have nearly come to end. Also, Ratan bhai has already mowed the grass twice and 3rd mowing is going on having the height of grass 12-14 ft.

Lastly, Ratan bhai stated that his cattle relishes and is habituated with NB Super Grass more than any distinct fodder.

## Impact Story



*Amrutaben desired to ask God for one thing, a new pushcart! -*

Jiluben is an elderly woman with physical limitations and a terrible economic state. She's been widowed for thirty years. Jiluben's son is 50 years old, unmarried, and almost face continuously ill. While her daughter Amrutaben is divorced (she got married 20 years ago). Jiluben, who is 70 years old only has her daughter Amrutaben is working. Amrutaben used to use her old pushcart, but it was heavy and too old for her to carry around everywhere, plus she didn't have enough money to buy a new one. Amrutaben only desired to ask God for one thing, a new pushcart! because everything else she could take care of on her own despite such bad situation.

An employee of the Adani foundation has spoken with Sarpanch Hawaben about the work being done by the Foundation on support of people with disabilities. As soon as she informed & requested that to make visit at Jiluben house. Their pushcart needs were discussed by representative from the visited, verified all the necessary paperwork, and spoke with Jiluben and her family about government programs for widows and people with disabilities. And a week later the entire process was completed, and the new pushcart was provided to them. She is now able to work promptly and help their family in overcoming this difficulty.

## Impact Story



Hiruben Karsan Tharu lives with her parents in Nani Bhujpur village. She fell very ill when she was three years old. After treatment, she recovered, but her both legs were affected by the paralysis in both legs. At such a young age, she started coping up with her disability. Adani Foundation provided platform to women of Nani Bhujpur village by providing them with Sewing Machine and enrolling her in sewing machine training. Moreover, she was provided with Wheelchair and Calipers to help Hiruben move comfortably and attend class regularly.

Presently, she earns Rs. 5,000 to Rs. 6,000 a month from stitching work which is much appreciated and admired by her neighbors and relative.

## Impact Story



### **Empowered Women, empowered nation!**

India is a land of culture and traditions. These traditions are kept alive in rural locations. One such tradition is gifting daughter during her marriage for her happy married life. Sonalben too received a cow from her maternal family during her wedding. This was given with a purpose of livelihood generation at the time of crises. For sonalben, this gift was priceless, she decided to utilize income received from one cow to buy more cows. She continued to sell milk, buttermilk, Ghee, and other cow-based products and retain income to buy more cows. Gradually she increased her livestock to 66 cows which provides 165 liters of milk per month. Within 7 years of her marriage her livestock increased from 1 cow to 66 cows.

Looking at her zeal and passion towards animal husbandry, Adani Foundation provided her with Biogas kit so that she can save cooking fuel cost and fertilizer cost as waste slurry from biogas acts as a natural fertilizer.

Recently, On Kisan Divas she was felicitated by Adani Foundation for doing exceptional work in Animal Husbandry. She has now become a guide for all those women who wish to make living out of limited means.

## Impact Story



**"Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness." – Thomas Jefferson**

It is said that one can do everything if he or she has direction and clarity towards the goal. Geetaben, a loving wife, responsible mother of 3 daughters and a son and an amazing farmer has always supported her husband in his farming occupation. Her life took a transformational turn when her husband passed away in 2018 due to severe heart attack leaving all responsibilities on her shoulder. Of course, she was working on farm keeping shoulder to shoulder with her husband before he passed away but managing farming single handedly was a tough business for her. Moreover, raising 4 daughters and a son for a widow is a somber task too. It took couple of months for her to hold herself up for the sake of her children and to make her husband's dream true. Her husband Late. Bharat Bhai Jethva hold recognition to be a first farmer in Mundra district who has initiated to cultivate Kamalam (Dragon fruit) in his farm. He had a dream to cultivate best of organic Kamalam and sell his organic fruit to a larger market. He was on cloud nine when his first harvested kamalam blossomed beautifully. But unfortunately, his heart attack pushed him to changed realm. It was her determination to continue his husband's dream and take kamalam cultivation to the next level.

*As Geetaben started inclining towards chemical-free farming, she started getting higher value for her crops resulting more income. With foundation's support and guidance, she understood which crops/vegetable to sow for high returns.*

## Impact Story

Jethva family holds 4 acres of land and Geetaben took charge of cultivating seasonal fruits and vegetables in that farm. Being a female farmer, the use of chemical-based farming impacted her health a bit but still she used to cope up with daily chores until she had an encounter with Adani Foundation in her village Mangra. Team members Mavji Baraiya, SLD Head and Kalyan Gadhavi, Community Mobiliser from Adani Foundation organized Natural Farming training at Mangra village of Mundra district. All farmers of Mangra village participated in that training. she also attended the training in which she got insights of all techniques of natural farming and proposed support from Adani Foundation. She approached foundation team and expressed her willingness to learn more on natural farming techniques for crops, vegetables, and fruits. Before that Jethva family used to cultivate only Kamalam organically but after the intervention and continuous trainings by foundation, she decided to turn her complete farming through natural techniques by gradually taking baby steps toward this new endeavor.

Looking at her zeal and dedication for 0 chemical farming, Foundation provided her with Biogas Kit, Drip Irrigation system, Development of Vermicompost and Jivaamrut. Presently she has 6 to 7 livestock. With the installation of biogas, the slurry produced by biogas digesters makes excellent fertilizer when applied to farms. Moreover, Geetaben learnt how to make Jivaamrut from Adani Foundation's natural farming trainings, which she then applied to her farm where she noticed significant improvements, including a reduction in nutrient deficiencies, an increase in crop size without the use of chemical fertilizers and the presence of lush green, healthy crops. In addition, the Adani foundation brought knowledge of vermicompost to her farm, which she says has already made a big difference in the soil's fertility. Also, setup of drip irrigation system was done in order to save water, nutrients loss, and to provide the water direct to the soil root zone of the plant.

Prosperity knocked her door, and she provided best education to her children. Her daughters completed Engineering and Son is presently studying in Anand Agriculture University. On asking him about his future, Hariom (Son of Geetaben) shares *"My father is recognized as first farmer of Kamalam in Kutch and my mother is epitome of strength and a proud farmer. My mother has achieved lot dignity and respect in our society since she received foundation's guidance for practicing natural farming and I will follow her footsteps in same direction by establishing natural farming agriculture business to provide best quality crops to the society."* Geetaben continues to strive excellence in learning farming training regularly and become a promoter of same to encourage other farmers to adopt Natural Farming for better cultivation and higher returns.

## Impact Story



At Ratadia Ganesh wala village in Mundra taluka, Rabari Megha Vanka lives with 60 percent of his legs divyang.

Meghabhai was working in a garment shop in Mundra two years ago. Bhabhi Ben used to help in running the house by making several pedas. Meghabhai lost his job during Corona time. Then Meghabhai started selling pedas in nearby villages. With the help of Adani Foundation, he was given small help for home based industry and also helped him in the process for obtaining medical certificate and bus pass. Now, Meghabhai with the help of his wife Pabi Ben started home industry 'Pena Home Udyog' and made it as the main means of livelihood. They sell 300 kilos of pedas every month. On an average they earns 18000/- per month.

When the bus pass will come he can save more money by traveling by bus for orders from Gandhidham, Bhuj, Mandvi and nearby areas.

## Impact Story



### **Only a teacher can turn the disability into a talent ! - Mundra**

Challenges are what make life interesting. Overcoming them is what makes life meaningful". Halepotra sadiya studying in class 4 of Dhrub primary school is the SEN - special education needed .she is not able to see clearly through her eyes that is having the problem of vision by birth , she underwent 4 operations but have a great IQ level which never stopped her from learning new things. sadiya's parents never stopped her coming to school. she had a problem in basic maths ,gujarati reading and writing but within an year she worked continuously during her free time and now is able to read write and perform basic calculation. Her favourite hobby is learning new things , colouring and listening new rhymes from YouTube. she can now stand up in morning assembly and give her introduction in English . "only a teacher can turn the disability into a talent through hard work and self confidence". Her dream is to become a teacher.



## Impact Story



*Health care service is to save the lives !*

Mohammad Sadik Turk, 16, of Dhrub arrived in critical condition because of pain in the area of his kidneys. The condition was treated as an intestinal problem by doctors. The specialists tried their best to treat him & offering variety of medications. Support him for his routine dialysis for six to eight months while paying attention to his condition. He no longer needs dialysis after complete therapy, but he still needs to regularly administer injections three times every month.

Many young children pass away each year from insufficient medical care and inability to pay for necessary treatments. As long as there is only one source of income for the family and everyone depends on him, it is hard to provide costs for those who are living below the poverty line. Although India has more than 50,000 patients who receive long term dialysis, it has only a thousand kidney specialists in the entire country. Furthermore, treatment can be expensive. In situation like this Foundation pays for the child's injections in light of his financial situation and wishes him a quick recovery and a long and healthy life. The main goal of the Adani Foundation's community health care service is to save the lives of children like Sadik.

## EVENTS



**World water day** was celebrated on 22<sup>nd</sup> March in coordination by Adani Foundation at Bhuj.

Program was designed on District level awareness on participatory ground water management on the theme of accelerating the change to solve the water and sanitation crises with exhibition of water saving tool, equipment and IEC material.

On this Occasion Mr Dilip Rana ( collector Kutch) was the chief guest and guiding force. He emphasized on RRWHS with assurance to provide 50% Support from government to developed single village as model drinking water sustain village with having 100% RRWHS facilities.

Shri Dobariya Sir administrative officer of Atal Bhujal Yojana and Mr.Nimish Padke Director - Fokia also shared about sustainable management of fresh water sources for future generation. Mr.Mahendra Gadhvi ( Pramukh, Jilla panchayat) also shared his views. More than 200 farmers + Women and Sarpanch of Mundra.



**Project Pragati** :- Success of completion of Project Pragati 1<sup>st</sup> batch was celebrated on 29th April at Adani House, Mundra in esteemed presence of Mr Vikram Tandon, Chief Human Resource Officer, Adani Group, Shri Vasant Gadhavi ,Executive Director, Adani Foundation and Mr Rakshit Shah, Executive Director, APSEZ. Other dignitaries who graced the occasion were Mr AnilKumar Kalaga, , Mr. Charles Douglas, CEO, Mundra and Tuna Ports, Jatin Trivedi, COO, Adani Skill Development Centre and all HR and Department heads of APSEZ, Power, Solar and Wilmar.

The event celebrated by distributing skill training certificate to 52 fisherfolk students, who were trained under Mason and Assistant Electrician job roles under Adani Saksham. All training along with their community leaders shared heartwarming testimonials and expressed emotion of gratitude towards Adani Foundation for providing them skill training opportunities.

## EVENTS



Adani Foundation ,Mundra celebrated **World Earth Day on 22nd April 2022** by distributing 'Home Bio-Gas Kits' to 100 farmers Program intense is to gather 'ધરતી પુત્રો' who share similar mindset and have determined to use Home Bio-Gas to witness social, economical and environmental impact.

Program was graced by Rakshit Shah, Executive Director, APSEZ along with below mentioned esteemed Guests.

1. Manojbhai Solanki, Trustee, Shree Ram krushna Trust, KUKMA
2. Prof. Mrugesh Trivedi , Scientist, Kutch University
3. Kalpesh Maheshwari, Project Officer, Atma, Bhuj
4. Dr. U.N Tank, KVK, Mundra
5. Ms. Riddhi Patel, Officer, kutch
6. Shaileshbhai Vyas, Satvik Sanstha, Kutch
7. Shantilal Patel, Officer, Mundra



Adani Foundation Mundra has celebrated the **International Disability day on 3<sup>rd</sup> Dec** since 2011 with lots of enthusiasm and Zeal in coordination with District Social Welfare office by planning various support to divyang people.

Current year in line of the international Disable day Theme "Transformative solutions for inclusive development: the role of innovation in fueling an accessible and equitable world." Adani Foundation has organized "Divyang Job Fair" in coordination with 11 SEZ Industries at Mundra on 2nd December 2022. More than 50 Divyang had applied for interview out of them 06 were selected For Job.

Apart that Divayand Aid and equipment (Limb, Chair was Supported In the Esteem Presence of Respected Rakshit sir-EDM, APSEZ, Mundra.

## EVENTS



**World Environment Day was celebrated on 5<sup>th</sup> June** in association with Ayi Shree Vishrimata Seva Trust and Gram Panchayat, Moti Bhujpur at Vishri mata Temple and pledged to plant 51000 for which Gram Panchayat will take responsibility to nurture trees throughout this year.

program was organized at Vishrimata mandir with tree planation activity on this occasion Shree P T Prajapati - Sub Divisional Magistrate remain present and address Public to Nurture environment for Future.



Adani foundation Mundra has celebrated **International women day** on 8<sup>th</sup> march at different location of Mundra and Bhuj in coordination with District Animal health department and Sarhad Dairy the day was celebrated at Mundra with Appreciation of best 10 cattle owner women of Mundra who did remarkable work with Sarhad dairy. On this Occasion Dr Thakkar ( DAHO) and Dr Lalani ( cheif Sarhad dairy) appreciated efforts of Adani foundation in animal vaccination and Animal health care in Mundra. More than 210 cattle owner women remained present. District Level celebration was done at Bhuj GKGH with Lunching OF Punya sloka book (Stories of 37 empowered women), A Book Written By Adani foundation employee Mrs. Purvi Goswami on The successful women of Kutch. More than 300 Women had participated.

# EVENTS



National Farmer day on 22 dec with Honoring Women Farmers.



Animal Husbandry Awareness Program



International wet land ay Celebration Through Poster presentation Competition



Teacher Day & Youth Day Celebration



No Tobacco day celebrated by creating awareness to take preventive measures for workforce



International Yoga Day celebration in coordination with sub divisional Magistrate Mundra.

## EVENTS



International coastal Day celebration at Mandavi with Cleanliness Drive



Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seval



The International Mangrove Day for the Conservation of the Mangrove Ecosystem is celebrated

# AWARDS

## ASSOCHAM AWARD FOR HEALTH CARE

Adani Foundation's Community Health project received runner-up position in 'Best CSR excellence award in Healthcare' Associated Chamber of Commerce and Industry of India (ASSOCHAM) in Award ceremony organized at Delhi on 12th October 2022. Community Health project has participated in the grand event to accept the Award on behalf of Adani Foundation, Mundra site.

The award was presented by Chief Guest - Ms Roli Singh, Additional Secretary & Mission Director (NHM), Ministry of Health and Family Welfare, Govt. of India and Dr. Upasana Arora, Co-Chairperson, ASSOCHAM Healthcare Council and Chairperson, Yashoda Super Specialty Hospital.



## Awards and Recognition



Adani Foundation participated in QCFI awards on 4<sup>th</sup> Feb 2023.

Presented Women Empowerment initiatives and received Diamond award for exemplary work done by Adani Foundation for empowering rural women.



our services were appreciated by representative of Ministry of Health Government India, WHO, Union and more than 52 corporate companies present in the National conference on Multisectoral corporate engagement towards TB elimination.



# Awards and Recognition



Received appreciation letter from District Animal Welfare Department for commendable work for Cattles affected by Lumpy Virus



Jyoti ben tank received Award from Vice President in Amazing Indians Awards who is member of Prakrutik Sahkari Mandali supported by Adani Foundation.

# Support to children lost their parents in Morbi bridge collapsed incidence



Adani Foundation supported 25 Lacs each for 20 children who lost their single/both the parents. Adani foundation was honored by IAS G T Pandya Collector and District magistrate of Morbi district for helping children who lost their parents in Morbi bridge accident.

One step forward towards growth with goodness...

Children residing at Morbi, Kutch, Ahmedabad, Rajkot and Dwarka who lost their single or both parents in Morbi Julta Bridge collapse incidence received support of 25 lacs each from Adani Foundation.

Representatives from Adani Foundation, Karsanbhai and Jagrutiben visited above districts to check on the affected children and also met with SBI bank officials, collectors regarding disbursal of amount. 10 Children received amount in their respective bank accounts. For others, work is under process.



# Capacity Building Training



Adani foundation team visited Lakhond and Chandrani plant of sarhad Dairy. These three plant out of which two plant milk processing and packing and another plant cattle feed plant were Mr.Nilesh Jalankar, General Manager provided information about how cooperatives work in the field and about their supply chain management.



Adani Foundation team attended Capacity Building Training Program on 3<sup>rd</sup> and 4<sup>th</sup> of October on Adani Competency building and mapping. The training session was conducted by expert trainer Mr Kamal Dabbawala. Two days sessions were filled with theory sessions, Activity based learning and discussion-based learning.

# Awards and Recognition

શ્રી રામપર ગ્રામ પંચાયત

આવક નં: 08/03/2023

શ્રી અમી કાંડેડ, અસલી કાંડેડવા, ગુજરાત - ૩૮૧૯૦.

વિષય - ગ્રામમાં ગામી પાણી બનાવવાની કામગીરી બાબતે આભાર પત્ર.

ગયા ભાગ સાથે અંગ્રામમાં ૬ ગુંદા તાકુડવાં ગ્રામમાં ગામી અસલી કાંડેડવા કામ ૨૦૨૨-૨૦૨૩માં પાણી બનાવવા યોગ્ય કામગીરી કરવામાં આવી છે. આ દરમિયાન ગ્રામમાં ગામી વરસાદી પાણી ઉપાડવામાં આવી યામ તે ગુંદાની બાજુ અને બોરોલો સેવાઈ કરવામાં આવ્યા અને સાથે સાથે વરસાદી પાણીનો ઉપયોગ થીલા માટે યામ માટે PRWS પાણીનો યોગ્ય બનાવવામાં આવ્યા છે. આવા બધું પાણી પાણી બનાવવાની અને ગુણવત્તા માટે કામ કરવામાં આવે એવું આપેલા માફ આ કામગીરી બદલ આભારી પત્ર તૃપ્ત આભાર માનીએ છીએ.

અમી કાંડેડ

ગામી અસલી કાંડેડવા, ગુજરાત - ૩૮૧૯૦.

શ્રી નાના કપાયા પ્રાથમિક શાળા, નાના કપાયા, મુન્દ્રા-૬૨૬૭

ત-26/07/2022

પત્રી ની

વિષય - ગ્રામમાં ગામી પાણી બનાવવાની કામગીરી બાબતે આભાર પત્ર.

આભાર પત્ર

શ્રી નાના કપાયા પ્રાથમિક શાળા, નાના કપાયા, મુન્દ્રા-૬૨૬૭

SHREE RAMPAR GRAM PANCHAYAT OFFICE

શ્રી રામપર ગ્રામ પંચાયત કચેરી

આવક નં: 08/03/2023

વિષય - ગ્રામમાં ગામી પાણી બનાવવાની કામગીરી બાબતે આભાર પત્ર.

આભાર પત્ર

શ્રી રામપર ગ્રામ પંચાયત કચેરી, મુન્દ્રા-૬૨૬૭

શ્રી રામપર ગ્રામ પંચાયત કચેરી

આવક નં: 08/03/2023

વિષય - ગ્રામમાં ગામી પાણી બનાવવાની કામગીરી બાબતે આભાર પત્ર.

આભાર પત્ર

શ્રી રામપર ગ્રામ પંચાયત કચેરી, મુન્દ્રા-૬૨૬૭



## Beneficiaries List

Sr. No	Program	Direct	Indirect	Remarks
1	Education	3505	14020	UT than Mundra
2	AVMB-Vidhya mandir	568	2840	AVMB -Students
3	Community Health-Mundra	35832	141130	Rural clinic, MHCU,Health camp, AHMUPL
5	AHMUPL	42455	127365	OPD & IPD Patients
6	SLD-Women	1359	6795	SHG Group & Individual Income Generation
7	SLD-Agri & Animal Husbandry	7718	30768	Fooder,Home biogas, Farmers training, Cow based farming -20,Cattle camp Etc.
8	SLD -Fisherfolk	5957	4476	Education, Mangrove, Potable -Water and Livelihood
9	CRC-Gov Schemes	1106	5530	Government Schemes
10	CID	11767	47054	Fishermen Amenities & Other Rural Infra Work
11	Nakhtrana	1209	4836	UT than
12	AKBTPL,Tuna	10071	16373	Rural clinic, MHCU,Health camp, Drinking Water,Fooder Support, Infra Work
13	Bite	2500		Pond deepening Dhrubhi and Bitu
15	ASDC,Bhuj	2188	10940	soft skill and DL .GDA & Online Training
16	ASDC,Mundra	2518	32590	Technical & Non-Tech DL .GDA Training
17	Uddan	27377		Students
<b>Total</b>		<b>156130</b>	<b>444417</b>	

## Financial overview – Adani Foundation Mundrta Executive Summary – Budget Utiliaztion FY 2022-23

Sr No	Particulars	Approved Budget F.Y. 2022-23			Utilization 2022-23	% of utilization
		CAPEX	OPEX	Total		
A	General Management and Administration	1.80	92.35	94.15	98.45	104.56%
B	Education	0.40	141.93	142.33	124.36	87.37%
C	Community Health	-	294.97	294.97	242.16	82.10%
D	Sustainable Livelihood Development	-	466.40	466.40	359.85	77.15%
E	Community Infrastructure Development	-	219.51	219.51	133.88	60.99%
F	EDM Recommended Projects	-	100.00	100.00	98.83	98.83%
	<b>Total AF CSR Budget :</b>	<b>2.20</b>	<b>1,315.16</b>	<b>1,317.36</b>	<b>1,057.53</b>	<b>80.28%</b>
[I]	Adani Vidya Mandir-Bhadreshwar	6.88	255.44	262.32	221.76	84.54%
[II]	Project Udaan-Mundra	-	314.74	314.74	248.20	78.86%
	<b>TOTAL Budget with AVMB &amp; UDAAN F.Y. 2022-23 :</b>	<b>9.08</b>	<b>1,885.34</b>	<b>1,894.42</b>	<b>1,527.49</b>	<b>80.63%</b>







અદાણી ફાઉન્ડેશનના સહકારથી મુંદરામાં બી.આર.જી. ભાવનગર માર્ગમાં તલુકા વિજ્ઞાનભવનમાં કૃતિ વિભાગને અદાણીઓની સહાયતા.

## મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૧૧ શાળાના છાત્રે કરાચ્યાં પ્રતિભાનાં દર્શન

મુજ, તા. ૫ : આજે મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૧૧ શાળાના છાત્રે કરાચ્યાં પ્રતિભાનાં દર્શન. આજે મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૧૧ શાળાના છાત્રે કરાચ્યાં પ્રતિભાનાં દર્શન. આજે મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૧૧ શાળાના છાત્રે કરાચ્યાં પ્રતિભાનાં દર્શન. આજે મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૧૧ શાળાના છાત્રે કરાચ્યાં પ્રતિભાનાં દર્શન.

## દહેજ, અદાણી ફાઉન્ડેશન દ્વારા વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો

વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો. આજે વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો. આજે વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો.



આજે વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો. આજે વાગરા તાલુકાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો.

## રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા

રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા. આજે રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા. આજે રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા.



મુંદરા અને માટી તાલુકાના સ્થાનિક સરકારના સહકારથી આજે રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા.



## અદાણી ફાઉન્ડેશન દ્વારા ઉમરપાડાના આદિવાસી ખેડતો માટે જાગૃતિ શિબિર

અદાણી ફાઉન્ડેશન દ્વારા ઉમરપાડાના આદિવાસી ખેડતો માટે જાગૃતિ શિબિર. આજે ઉમરપાડાના આદિવાસી ખેડતો માટે જાગૃતિ શિબિર. આજે ઉમરપાડાના આદિવાસી ખેડતો માટે જાગૃતિ શિબિર.

## હેલ્થકેર સમિટમાં અદાણી ફાઉન્ડેશનને પ્રતિષ્ઠિત એવોર્ડ એનાયત કરવામાં આવ્યો

હેલ્થકેર સમિટમાં અદાણી ફાઉન્ડેશનને પ્રતિષ્ઠિત એવોર્ડ એનાયત કરવામાં આવ્યો. આજે હેલ્થકેર સમિટમાં અદાણી ફાઉન્ડેશનને પ્રતિષ્ઠિત એવોર્ડ એનાયત કરવામાં આવ્યો.



આજે હેલ્થકેર સમિટમાં અદાણી ફાઉન્ડેશનને પ્રતિષ્ઠિત એવોર્ડ એનાયત કરવામાં આવ્યો.

## અદાણી ફાઉન્ડેશન ને ઉમરપાડા તાલુકા કે ચોંચવાડા ગાંવ મેં મુફત સ્વાસ્થ્ય શિવિર કા આયોજન કિયા



આજે ઉમરપાડા તાલુકા કે ચોંચવાડા ગાંવ મેં મુફત સ્વાસ્થ્ય શિવિર કા આયોજન કિયા. આજે ઉમરપાડા તાલુકા કે ચોંચવાડા ગાંવ મેં મુફત સ્વાસ્થ્ય શિવિર કા આયોજન કિયા.

## કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી

કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી. આજે કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી. આજે કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી.



આજે કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી. આજે કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી.

## નેત્રંગના કોટવાળિયાએ બનાવેલી વાંસની બનાવટો અદાણી યુવના ગ્રામ ભારતીમાં પ્રદર્શિત થઈ



નેત્રંગના કોટવાળિયાએ બનાવેલી વાંસની બનાવટો અદાણી યુવના ગ્રામ ભારતીમાં પ્રદર્શિત થઈ. આજે નેત્રંગના કોટવાળિયાએ બનાવેલી વાંસની બનાવટો અદાણી યુવના ગ્રામ ભારતીમાં પ્રદર્શિત થઈ.

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## અદાણી ફાઉન્ડેશન દહેજ દ્વારા વાગરા તહસીલ કે ૧૪ સ્કૂલોં મેં પરિયોજના ઉત્થાન કે તહત દીપાવલી મેલે કા આયોજન



અદાણી ફાઉન્ડેશન દહેજ દ્વારા વાગરા તહસીલ કે ૧૪ સ્કૂલોં મેં પરિયોજના ઉત્થાન કે તહત દીપાવલી મેલે કા આયોજન. આજે અદાણી ફાઉન્ડેશન દહેજ દ્વારા વાગરા તહસીલ કે ૧૪ સ્કૂલોં મેં પરિયોજના ઉત્થાન કે તહત દીપાવલી મેલે કા આયોજન.

## મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય

મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય. આજે મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય. આજે મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય.



આજે મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય. આજે મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય.



THANK YOU