adani

Power

Ref: APL/EMD/EC/MoEFCC/243/11/21
Date- 17/11/2021

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 – reg.

Ref: Env. Clearance letter **J-13011/7/2007-IA-II (T)** dated, 13th August'2007,
Letter No. **J-13011/1/2008-IA-II (T)** dated, 21st October'2008 and
Letter No. **J-13012/126/2008-IA-II (T)** dated, 20th May'2010 & Corrigendum dated 01/06/2011.
Transfer of EC from Adani Power Ltd. to Adani Power (Mundra) Ltd. dated 13.04.2018.

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 **April'2021 to September'2021** in hard & soft (**e-mail**).

This is for your kind information & record please.

Thanking You,
Yours faithfully,
for **Adani Power (Mundra) Limited**

(**Santosh Kumar Singh**)
SVP-Environment
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
Gandhinagar-382 010

The Regional Officer,
Gujarat Pollution Control Board,
Kandla Port Trust Building (KPT)
Gandhidham – Kutchh 370 201

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Adani Corporate House
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SIX MONTHLY COMPLIANCE REPORT OF ENVIRONMENTAL CLEARANCE (EC)

For

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

At

MUNDRA TALUKA, KUTCHH DISTRICT GUJARAT

Submitted to:

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

adani
Power

Submitted By:

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

PERIOD: April'2021 – September'2021

Contents

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Adani Power (Mundra) Limited

INTRODUCTION

Adani Power (Mundra) Limited (APMuL) is located at village: Siracha & Tunda, Taluka Mundra, District Kutchh in Gujarat.

APMuL has been granted Environmental Clearances from Ministry of Environment, Forest & Climate Change, 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.

Consequent to this De-Merger of 4620 MW Thermal Power Plant, undertaking now vests with Adani Power (Mundra) Limited from 1st January 2018. Ministry of Environment, Forest & Climate Change (MoEF&CC) has Transferred the Environmental Clearances (EC) to Adani Power (Mundra) Limited on 13.04.2018.

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).

We have implemented the Environment Management System (EMS) ISO 14001:2015

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ADANI POWER (MUNDRA) LIMITED, MUNDRA

Compliance status on Environment Clearance

For 660 MW (2x330) TPP Phase – I

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

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.	CRZ Clearance obtained from MoEF&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. **Presently there is no any CRZ clearance with Adani Power (Mundra) Limited.** 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. APMuL is using this integrated intake and outfall facilities.
(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.	The temperature of discharge water and the Intake water is monitored on daily basis. Differential temperature is well within the Stipulated limits. Please refer **Annexure V**
(vi)	Space provision shall be made for installation of FGD of requisite efficiency of removal of SO_2, 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.
(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%	Being followed. The coal is imported from Indonesia and South

	shall be used as fuel	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 **Annexure- VII.**
(ix)	Rain water harvesting should be adopted. Central Groundwater Authority/Board shall be consulted for finalization of appropriate rain water 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_2, NO_x has 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^3.	Complied, ESP with efficiency of 99.9% installed in both the units to meet permissible norm for particulate emissions less than 50 mg/Nm^3. (As we have received renewed "Consent to Operate" (CTO). Please refer **Annexure – I**
(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 April' 21 to September 21 is enclosed as **Annexure- VII.**
(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 **Annexure VIII.**
(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 **Annexure- I.** 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 being developed in 141.09 Ha (Out of total 452 Ha Land for all three phases). Green belt/plantation is enclosed as **Annexure VI**

(xvi)	First aid and sanitation arrangements shall be made for the drivers and contract labor during construction phase.	Complied. First aid and sanitation was 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. Please refer **Annexure I.**
(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. In 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 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 - http://envfor.nic.in	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 surveillance for implementation of stipulated environmental safeguards and full fledge Environment Lab for Air & Water has been established. **Environment Management System as per EMS**

		ISO 14001: 2015 implemented.
(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 compliance report was submitted for the period of October' 20 to March'21 had been submitted vide letter no. APL/EMD/EC/MoEFCC/222/05/21 Dated: 17.05.2021.
(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.
(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 April '2021 to September '2021 (FY 2021-22) is enclosed as **Annexure X (A).** Report on Environment Day Celebration is enclosed as **Annexure X (B).** APMuL certified as a SUP free industry by CII is enclosed as **Annexure X (C).**
(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

ADANI POWER (MUNDRA) LIMITED, MUNDRA

Compliance status on Environment Clearance

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

Vide letter No. J-13011/1/2008-IA-II (T) dated 21/10/08)

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 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. **Presently there is no CRZ clearance available with Adani Power (Mundra) Limited.** 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. APMuL 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 **Annexure V.** Regular third-party marine monitoring also being carried out, monitoring report enclosed for the period of April'21 to September '21 Please refer **Annexure – III**
(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 under the clearance for Waterfront Development proposed by APSEZL. APMuL is using this integrated intake and outfall facility.
(v)	The sulphur content in the coal to be used	Being followed

	both for Phase–I and Phase-II shall not exceed 0.3 %.	The coal is imported from Indonesia and South Africa. It is ensured that sulphur content in coal below 0.3%.
(vi)	Appropriate measures shall be adopted to reduce the emissions of SO_2. It shall also be ensured that at no point of time the ground level concentration of SO_2 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_2 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 **Annexure I.**
(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_2, NOx 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 on line continuous emission monitoring system (CEMS) installed for PM, SOx & NOx. Exit velocity is more than 23 m/sec & records are being maintained. 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^3	Complied Highly efficient Electrostatic Precipitator (ESPs) has been provided to each boiler to maintain particulate emission less than 50 mg/Nm^3. Please refer **Annexure I.**
(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	Noted Space for FGD has been provided in the

	SO2, If required at later stage.	plant as per the guidelines of CPCB vide letter No. B-33014/07/2017/IPC-II/TPP/15872 dated 11.12.2017. However, as per MoEF&CC's Notification date 31st March 2021, Mundra TPP is falling under Category "C" Non- retiring TPPs and the timelines for compliance of SO_2 emission is up to December 2024. 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)	Rain water 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 April' 2021 to September' 2021 is enclosed as **Annexure VII.**
(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	Regular noise level monitoring is being carried out inside the plant locations & monitoring values are well within limits.

	high noise area, requisite personal protective equipment like earplugs/ear muffs 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.	Please refer **Annexure- I.** We are providing necessary PPE's like ear muff 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. Please refer monitoring report in **Annexure-VIII.**
(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 141.09 Ha. (Out of total 452 Ha Land for all three phases) Green belt / plantation is enclosed as **Annexure VI.**
(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_2, NOx, 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 MoEF&CC, CPCB & GPCB. Please refer **Annexure- I** Online continuous monitoring systems Installed in consultation with GPCB. AAQM monitoring in and around also being done by third party twice in a week. Please refer **Annexure – IV**
(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	Complied

	locality concerned within seven days form 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 http://envfor.nic.in	
(xxvi)	A separate environment management cell with qualified staff shall be set up for implementation of the stipulated environment safe guards.	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. Please Refer **Annexure – II** for terrestrial ecology report. **Environment Management System as per EMS ISO 14001: 2015 implemented.**
(xxvii)	Half yearly on the status of implementation of stipulated condition and environmental safe guards 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 Oct' 20 to March' 21 had been submitted vide letter no. APL/EMD/EC/MoEFCC/222/05/21 Dated: 17.05.2021.
(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 MoEF&CC, Regional Office Bhopal. Addition information being forwarded time to time MoEF&CC, 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. Expenditure details from April 21 to September 2021 (F.Y. 2021-22) is enclosed as **Annexure-X (A).** Report on Environment Day Celebration is enclosed as **Annexure X (B).** APMuL certified as a SUP free industry by CII is enclosed as **Annexure X (C).**

(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.

ADANI POWER (MUNDRA) LIMITED, MUNDRA

Compliance status on Environment Clearance
For 1980 MW (3x660) TPP Phase – III
Vide letter No. J-13012/126/2008-IA.II (T) dated 20.05.10

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 APMuL 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 **Annexure – III**.
(v)	A comprehensive marine biological quality monitoring programme 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 MoEF&CC. Monitoring report is enclosed as **Annexure – III**.
(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 carry out in-house environmental monitoring. **Environment Management System as per EMS ISO 14001: 2015 implemented.**
(vii)	The project proponent shall not be hamper the vocation of the fishing community in the	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

	area and it shall be ensured that local fishing community shall be allowed to carry out their vocation in the creek.	intake channel and outfall channel, developed by APSEZ Ltd., which is not hampering the vocation of fishing community. Our CSR activities enhance infrastructure & essential nets to fishermen communities for the betterment of their vocation in the area. Please refer **Annexure XI.**
(viii)	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.	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 **Adani Foundation.** The CSR report is enclosed as **Annexure –XI.**
(ix)	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.	APMuL 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. Adani Foundation has also established "**Adani Vidya Mandir"** a school focusing on education of fisherman's children. Refer **Annexure XI.**
(x)	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.	Being complied. Suitably designed screen systems have been provided in the intake system.
(xi)	No ground water shall be extracted for use in operation of the power plant even in lean season.	Being Complied. There is no extraction of Ground water for use in operation of the power plant.
(xii)	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.	Being Complied. No ground water bodies/natural drainage will be disturbed.
(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 at 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	Complied,

	Precipitator(ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm³.	High efficient Electrostatic Precipitator (ESPs) has been provided to each boiler to maintain particulate emission less than 50 mg/Nm³. Please refer **Annexure-I**
(xvii)	Adequate dust extraction system such as cyclones/beg 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 April 2021 to September 2021 Please refer **Annexure- VII.**
(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 dyke from getting breached.	Ash dyke is provided with LDPE Lining. Safety measures are in place to prevent breaching of the dyke.
(xxi)	For disposal of Bottom Ash in abandoned mines (if proposed to be undertaken) if 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	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 see

	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.	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 141.09 Ha (Out of total 452 Ha Land for all three phases). Afforestation has been undertaken by APSEZL and Adani Foundation. Please refer **Annexure – VI**
(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 interest earned out of it should be used for the development and management of green cover of the area.	APMuL has internal department of Horticulture for developing greenbelt/landscaping of our APMuL premises and its surrounding area. APMuL has separate fund for such development.
(xxvi)	No waste water 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	The waste-water is treated and disposed off through Outfall Channel, as recommended by NIO and approved by MoEF&CC.

	plants should not be discharged into sea.	
(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 waste water 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 with in 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 **Annexure XI**.
(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. Half yearly CSR Progress Report for F.Y 2021-22 enclosed as **Annexure – XI.**
(xxxii)	Action plan for R&R (If applicable) with compensation package of the project affected persons be submitted and implemented as per prevalent R&R policy within three months from the date of issue of this letter.	Not applicable.
(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	Complied. A separate budget earmarked for CSR activities. CSR study report already submitted to ministry. CSR activities being carried out by Adani Foundation. Expenditure details from April 21 to September 21 (F.Y.2021-22) is enclosed as **Annexure-X (A).**

	month along with road map for implementation.	Report on Environment Day Celebration is enclosed as **Annexure X (B).** APMuL certified as a SUP free industry by CII is enclosed as **Annexure X (C).**
(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 orchrds, 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 mariginalised 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. Please Refer **Annexure XI.**
(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 **Indian Institute of Social Welfare and Business Management** (IISWBM) of university of Kolkata have done the Social audit. Final Social Audit Report is awaited from IISWBM. Final Social Audit Report has been submitted in Six monthly compliance report-Apr'15 to Sep'15.
B	**General Conditions:**	**Status**
(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.
(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	Proper fire fighting and fire hydrant system has been provided in the coal stack yard.

	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.	**Occupational Health & Safety Management System as** ISO 45001:2018 **implemented.**
(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. **Occupational Health & Safety Management system as** ISO 45001:2018 **implemented.**
(v)	Regular monitoring of ground water level shall be carried out be 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 Bore well 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 **Annexure VIII.**
(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 hearing loss including shifting to non noisy/less noisy areas.	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 values are well within limits. Please refer **Annexure- I.** **Occupational Health & Safety Management System as** ISO 45001:2018 **implemented.**
(viii)	Regular monitoring of ground level concentration of SO_2, NOx, $PM_{2.5}$ & PM_{10} 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	Being complied. Regular monitoring of PM_{10}, $PM_{2.5}$, SO_2, NO_X 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 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.	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 **Annexure - I**
(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 http://envfor.nic.in	Complied. Advertisement published in the local newspaper.
(xi)	A copy of the clearance letter shall be sent by the proponent to concerned 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 implementation of the stipulated environment safe guards.	We have established separate environmental monitoring cell with well qualified staff to carry 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 & Noise as well as terrestrial & marine ecology regularly. **Environment Management System as per EMS ISO 14001: 2015 implemented.**
(xiii)	The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their	Six monthly Environmental Clearance compliance status report is regularly submitted to MoEF&CC, CPCB and SPCB. The same is sent by email also.

	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 ($PM_{2.5}$, & PM_{10}), SO_2, NO_X (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.	Compliance status updated on Company's website. Regular monitoring of PM_{10}, $PM_{2.5}$, SO_2, NO_X and Hg is being carried out by third party and records are maintained. Please refer **Annexure I.** Display board is already installed in main gate.
(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.	Being Complied Half yearly compliance report is regularly submitted to MoEF, CPCB & SPCB. The same is sent by email also. Compliance status updated on Company's website. Last compliance report for the period of Mœ•ñùţ •" K æ—ñùţ submitted vide letter no. APL/EMD/EC/MoEFCC/222/05/21 Dated: 17.05.2021.
(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.	Being complied, Regular environment statement is being submitted to the Gujarat Pollution Control Board (GPCB). Environmental Statement for F.Y 20 – 21 submitted to GPCB vide our letter no. APMuL/Env/GPCB/358/21 dated 08.07.2021. The same is enclosed as **Annexure – IX.**
(xvi)	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated 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.	Six monthly Environmental Clearance compliance status report is regularly submitted to MoEF&CC, CPCB and SPCB. The same is sent 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	Being Complied. Display board already installed in main gate.

	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 up load 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.	
(xviii)	Separate funds allocated for implementation of environmental protection measures along with item wise breakup. 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 should be reported to the Ministry.	Being Complied. Separate funds allocated for environmental protection measures. Expenditures details F.Y. 2021-22 is enclosed as **Annexure-X.**
(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.

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ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY, STACK EMISSION, WATER QUALITY AND NOISE MONITORING

Period: April 2021- June 2021

For

M/s. ADANI POWER (MUNDRA) LIMITED

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

Prepared By

UniStar
Environment & Research Labs Pvt. Ltd.

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QUALITY CONTROL							
Name of Publication	Environmental Quality Monitoring Report for the Quarter April 2021- June 2021						
Project Number	03	**Report No.**	UERL/ENV/JAN/ 04-06 / 2021	**Version**	1	**Released**	July 2021
Project Coordinator	Mr. Bhavin Patel						
Prepared By	Miss. Shweta A. Rana						
Checked By	Mr. Jaivik Tandel						
DISCLAIMER							
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FOR
UniStar Environment and
Research Labs Pvt. Ltd.

Mr. Jaivik Tandel
(Authorized By)

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LIST OF GRAPHS

EXECUTIVE SUMMARY

Adani Power (Mundra) Limited (APMuL) has total generation capacity of 4620MW in phased manner at Mundra Thermal (coal Based) Power Plant near Village Tunda in Mundra, District Kutch, and Gujarat. 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. Adani Power (Mundra) Limited Implemented ISO-14001:2015 Environment Management System (EMS) 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 April 2021-June 2021.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_{10}, $PM_{2.5}$, Sulphur Dioxide and Nitrogen Dioxide	Three Location	Twice a week
2.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, Sulphur Dioxide, Nitrogen Dioxide, Ozone and Mercury	Two Location	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.	Surrounding Villages Ground Water Analysis	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, BOD3, 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.	STP Water Analysis	pH, Residual Chlorine, SS, BOD, COD, Faecal coliform	Three Location	Once in month/ Quarter
8.	Borwell water Near Ash Dyke Area	pH @ 25 ° C, Conductivity (µS), Chloride as Cl^- Salinity (ppt), Total Dissolved Solids, Carbonate as CaCO3, Bicarbonate as CaCO3, Mercury as Hg,Arsenic as As, Lead as Pb, Chromium as Cr, Cadmium as Cd.	Four Location	Once in a Quarter
9.	Surrounding Villages Soil Analysis	Magnesium as Mg %, Molybdenium 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, Sulphurin %, Chloride as Cl%.	Five Location	Once in Six Month
10.	Noise Level Monitoring	Noise level monitoring in dB(A)	10 Location	Once in a Quarter
11.	Cooling tower	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 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 5locations 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_{10}) & Fine Dust Samplers ($PM_{2.5}$) 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 represents the Ambient Air Quality Status.

The significant parameters viz., PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2) and Nitrogen Dioxides (NO_2) 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 May 2021 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.

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

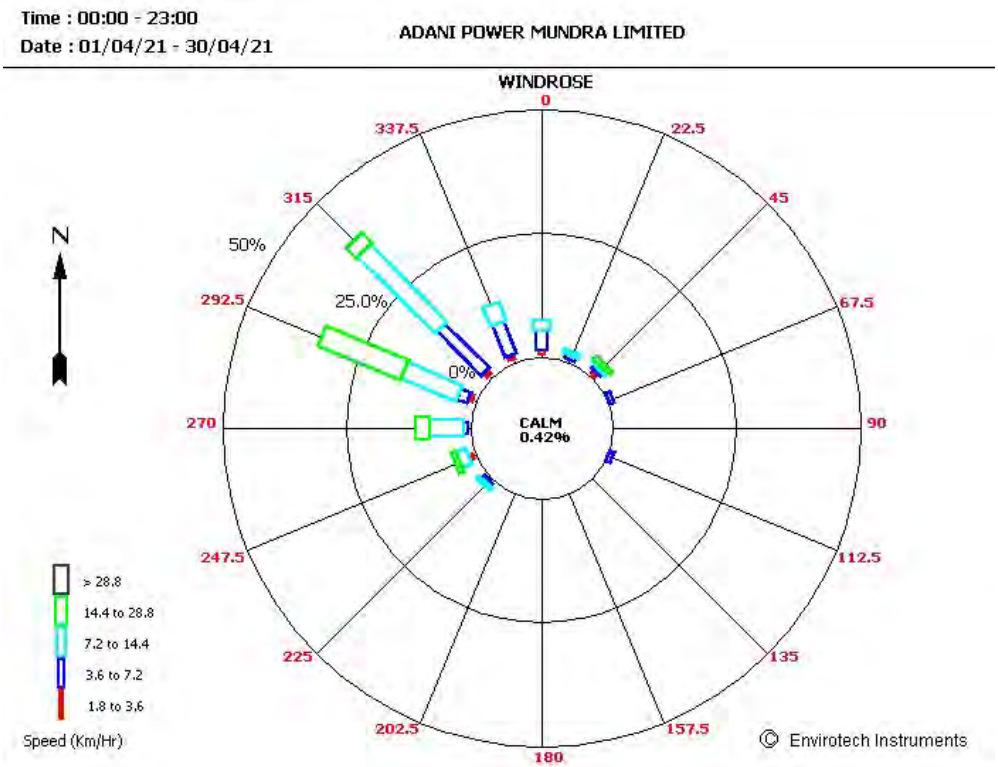
- Relative Humidity
- Ambient Temperature

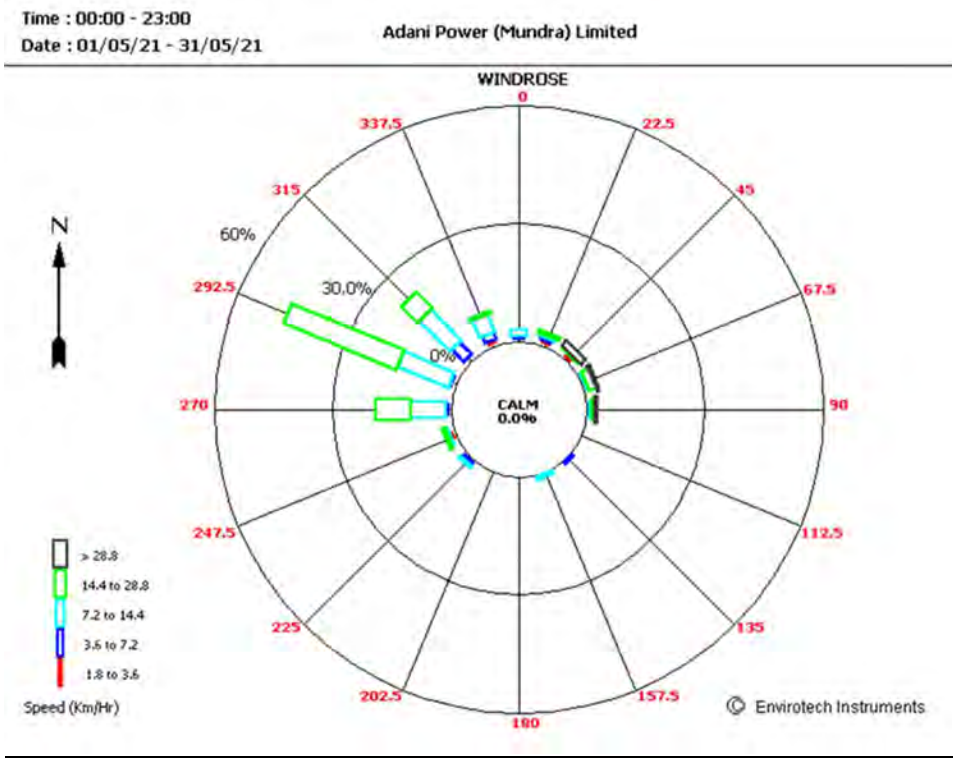
The above-said factors are considered as secondary factors since these factors control the dispersion of the pollutant indirectly by affecting the primary factors.

1.5.1 Wind Rose Diagram

Project	:	**Adani Power (Mundra) Limited (APMuL)**	**Period**	**:**	April 2021 to June 2021
Location	:	**Village – Tunda, Dist. - Kutch**			
April 2021					
Wind Direction			NW		
Average Wind Speed			10.4 km/hr		
May 2021					
Wind Direction			WNW		
Average Wind Speed			14.8km/hr		
June 2021					
Wind Direction			WNW		
Average Wind Speed			15.2 km/hr		

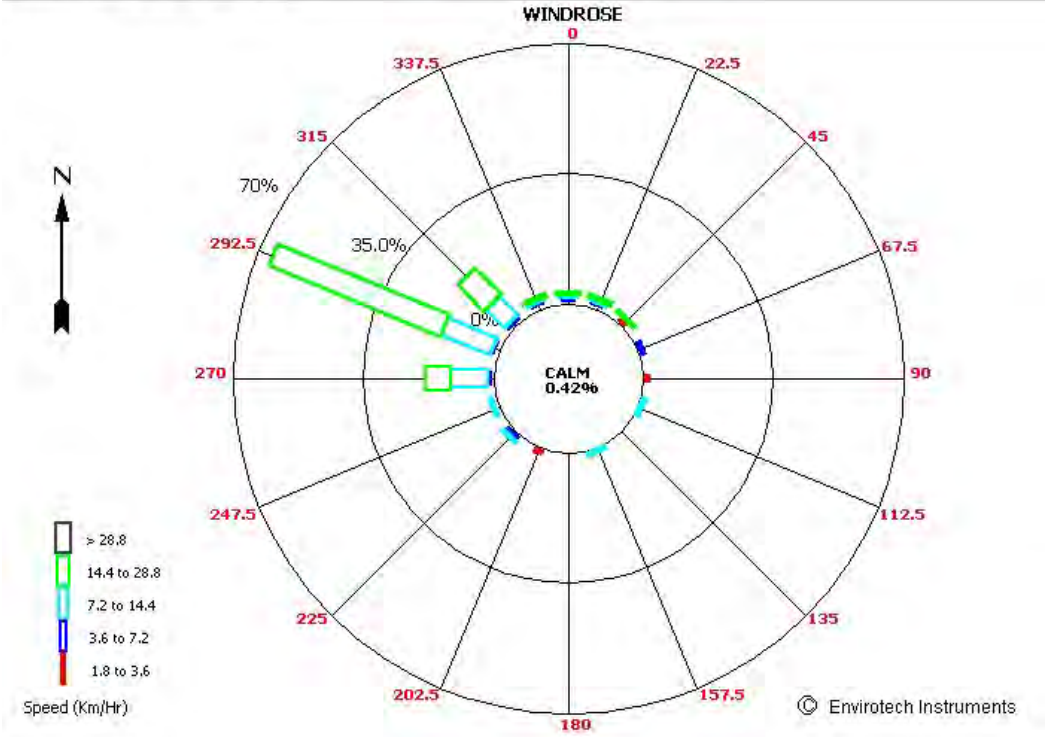
ADANI POWER (MUNDRA) LIMITED – MUNDRA WINDROSE FOR THE SEASON OF April to June 2021





Time : 00:00 - 23:00
Date : 01/06/21 - 30/06/21

ADANI POWER (MUNDRA) LIMITED



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_{10}, $PM_{2.5}$, SO_2, NO_2	Twice a week (24 hourly Samples)	72	IS : 5182 & Reference APHA(AIR)
2	Ambient Air Quality	5	PM_{10}, $PM_{2.5}$, SO_2, NO_2, O_3, 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_2, 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 ENVIRONMENAT AIR QUALITY AND FLUE GAS MONITORING

The principle 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 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
1	A - 1	Nr.20 MLD Plant	1.2 Km
2	A - 2	Nr. Shantiniketan-1	0.8 Km
3	A - 3	Kandagara Village	3.2 km (NW)
4	A - 4	Siracha Village	2.6 km (NE)
5	A - 5	Wandh Village	2.0 km (SW)

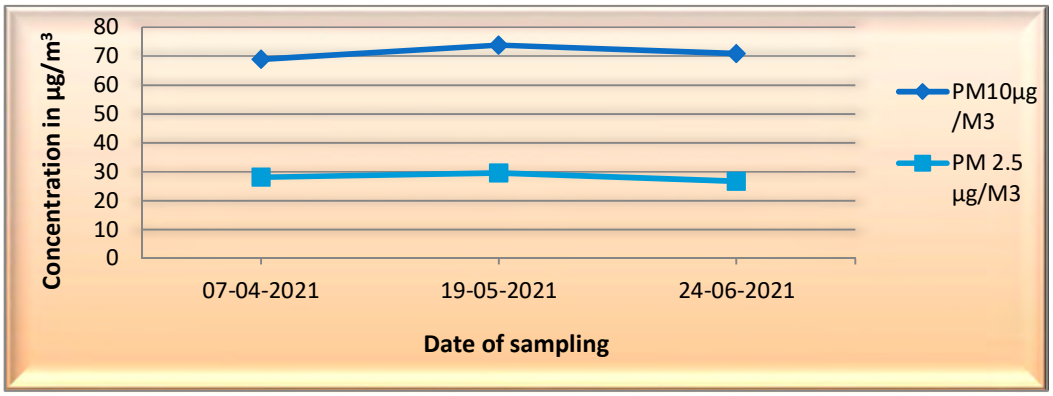
3.1.2 Location: Nr.20 MLD Plant

The Sampling station was located in the core zone in Company premises. The Respirable Dust Sampler (PM_{10}) & ($PM_{2.5}$) Sampler were placed at a height of 3 m above the ground level. Assess present pollution level the observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during monitoring period (April 2021-June 2021) are as follows:

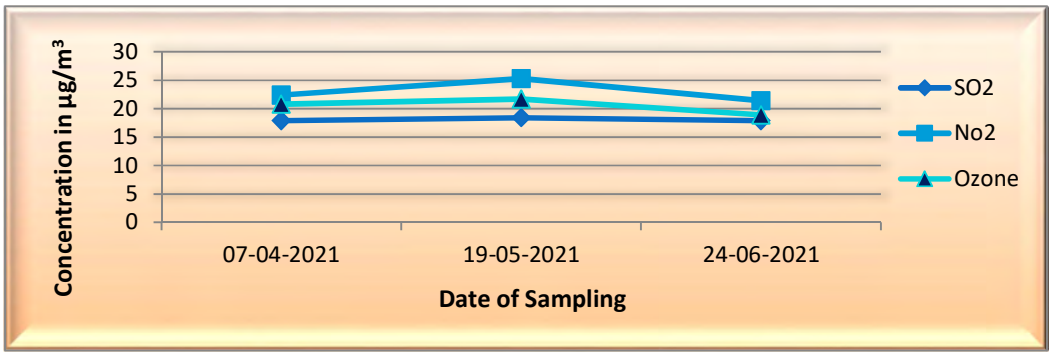
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**73.8**	**29.6**	**18.4**	**25.3**	**21.7**
Minimum Value	**68.9**	**26.7**	**17.9**	**21.4**	**18.9**
Average Value	**71.2**	**28.1**	**18.1**	**23.0**	**20.4**
Standard Deviation	**2.5**	**1.5**	**0.3**	**2.0**	**1.4**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 1 : Particulate Matter Level Nr.20 MLD Plant



Graph 2: SO2, NO2 and O_3 Nr.20 MLD Plant



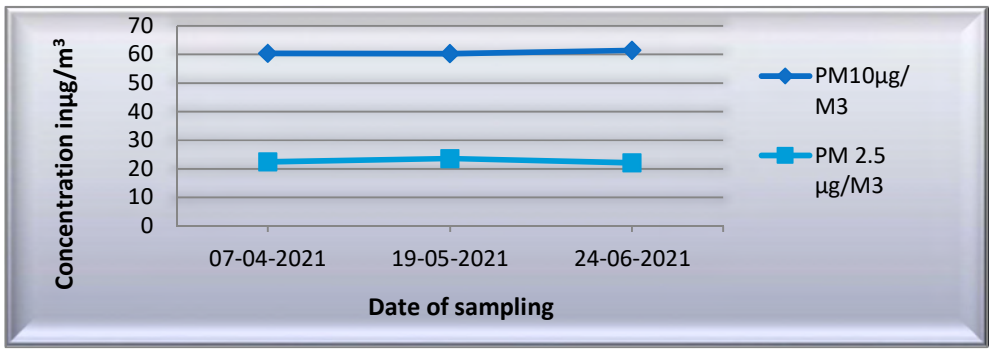
3.1.3 Location: Nr. Shantiniketan-1

The Sampling station was located in the core zone in company premises. The Respirable Dust SamplerPM_{10} & $PM_{2.5}$Sampler were placed at a height of 3 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during monitoring period (April 2021-June 2021) are as follows

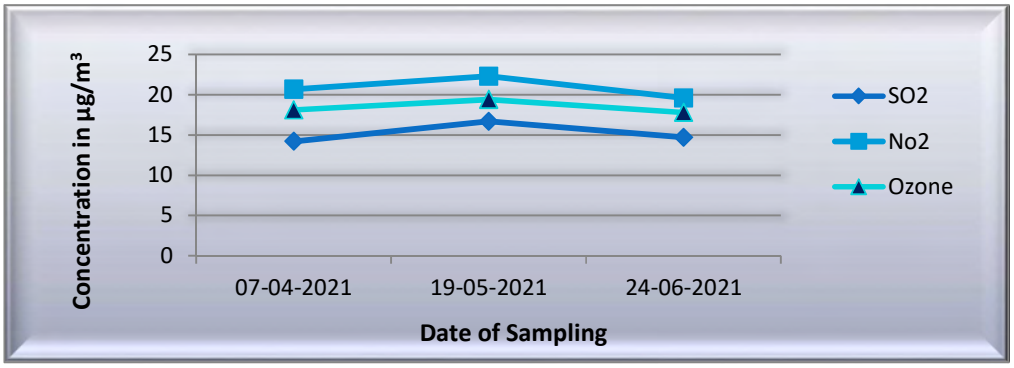
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**61.4**	**23.6**	**16.7**	**22.3**	**19.4**
Minimum Value	**60.2**	**22.1**	**14.2**	**19.6**	**17.8**
Average Value	**60.7**	**22.7**	**15.2**	**20.9**	**18.4**
Standard Deviation	**0.6**	**0.8**	**1.3**	**1.4**	**0.8**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 3: Particulate Matter Level Nr. Shantiniketan-1



Graph 4 : SO2, NO2 and O_3 Nr. Shantiniketan-1



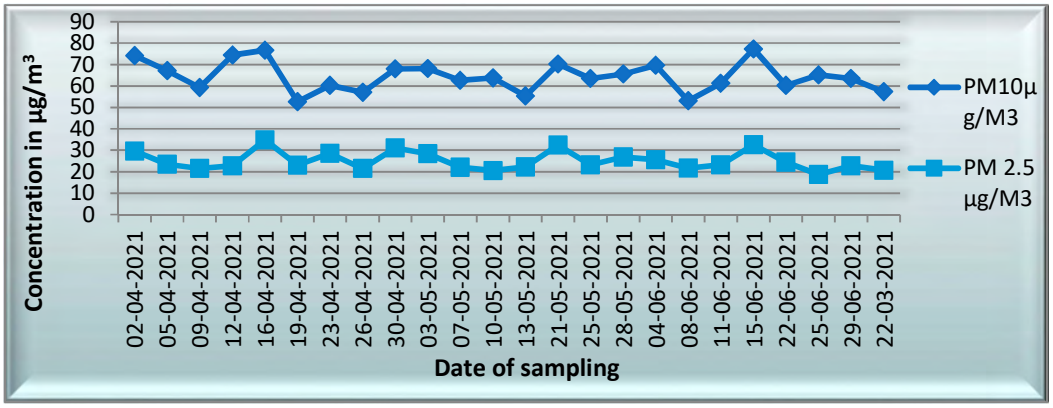
3.1.4 Location: Kandagara Village

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_{10}) & $PM_{2.5}$Sampler were placed at a height of 1.5 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (April 2021-June 2021) are as follows.

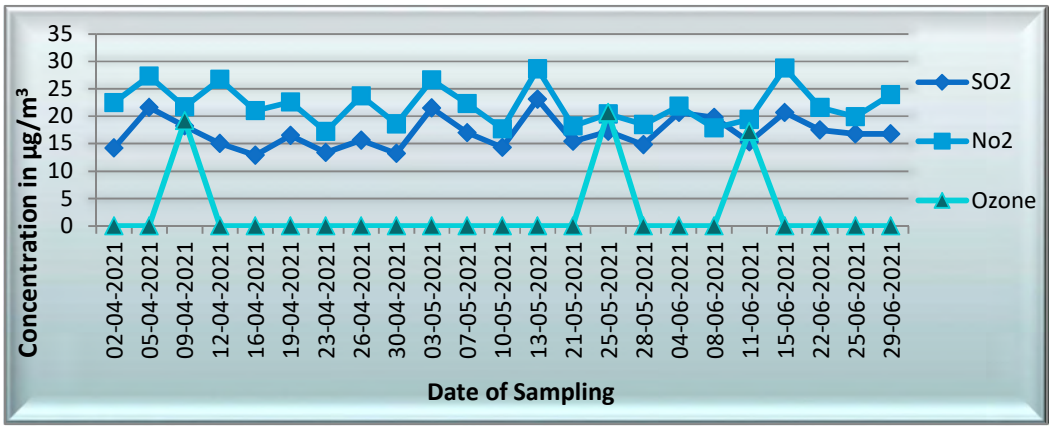
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**77.3**	**34.9**	**23.1**	**28.8**	20.7
Minimum Value	**52.7**	**18.7**	**12.9**	**17.2**	**17.2**
Average Value	**64.8**	**25.3**	**17.0**	**22.0**	**19.0**
Standard Deviation	**7.0**	**4.4**	**3.0**	**3.6**	**1.7**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: µg/m^3

Graph 5: Particulate Matter Level Kandagara Village



Graph 6 : SO2, NO2 and O_3 Level Kandagara Village



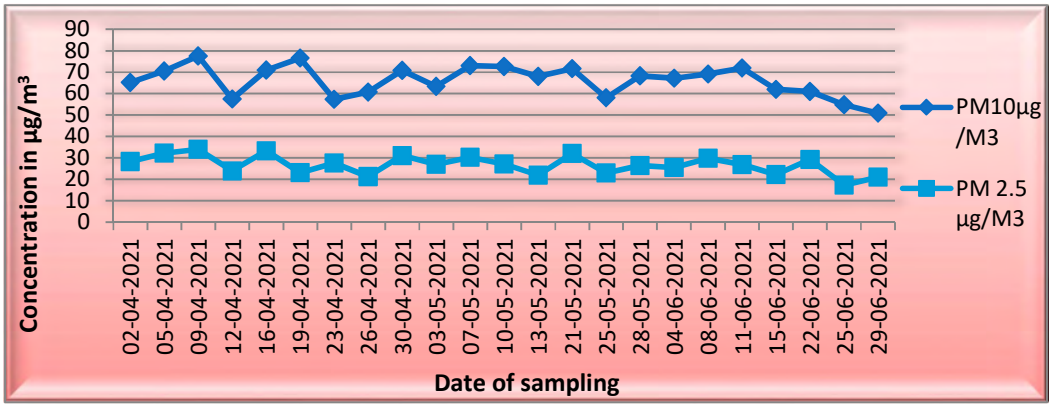
3.1.5 Location: Siracha Village

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 & $PM_{2.5}$ was placed at a height of 3.0 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (April 2021-June 2021) are as follows.

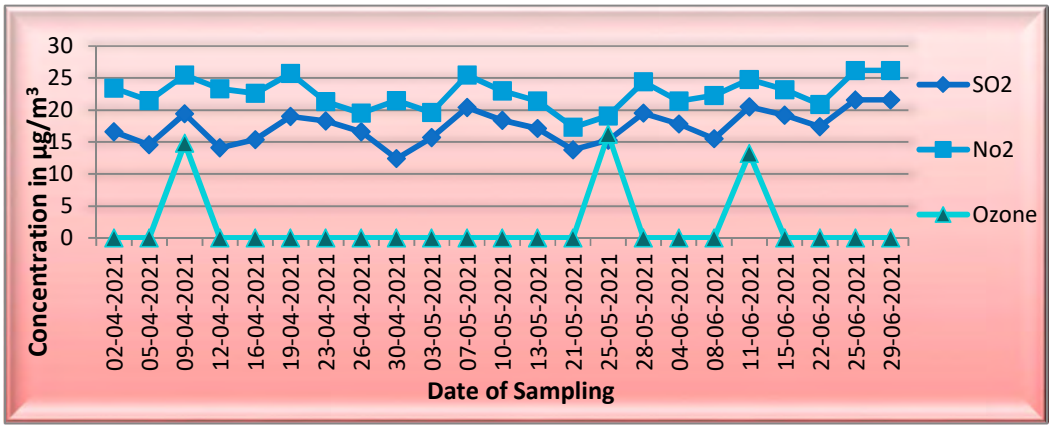
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**77.5**	**34**	**21.6**	**26.2**	**16.2**
Minimum Value	**50.9**	**17.3**	**12.4**	**17.3**	**13.2**
Average Value	**66.0**	**26.7**	**17.4**	**22.6**	**14.7**
Standard Deviation	**7.2**	**4.5**	**2.5**	**2.4**	**1.5**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: µg/m^3

Graph 7 : Particulate Matter Level Siracha Village



Graph 8 : SO_2, NO_2 and O_3 Level Siracha Village



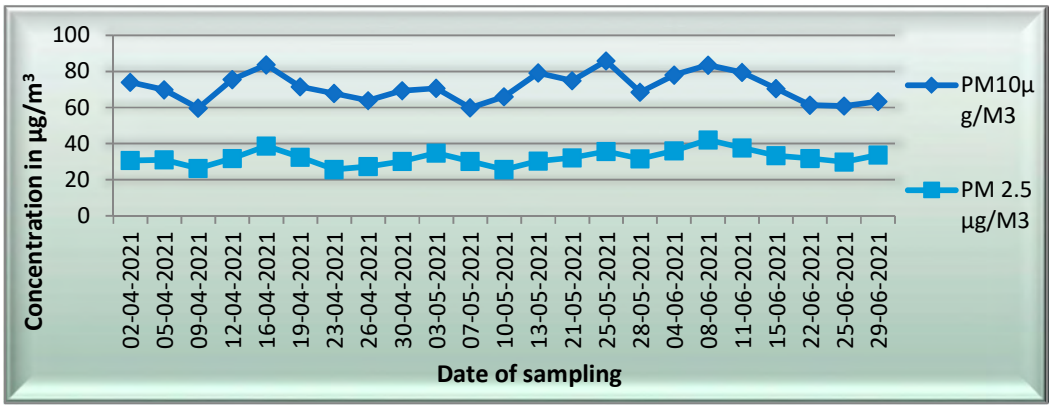
3.1.6 Location: Wandh Village

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_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (April 2021-June 2021) are as follows.

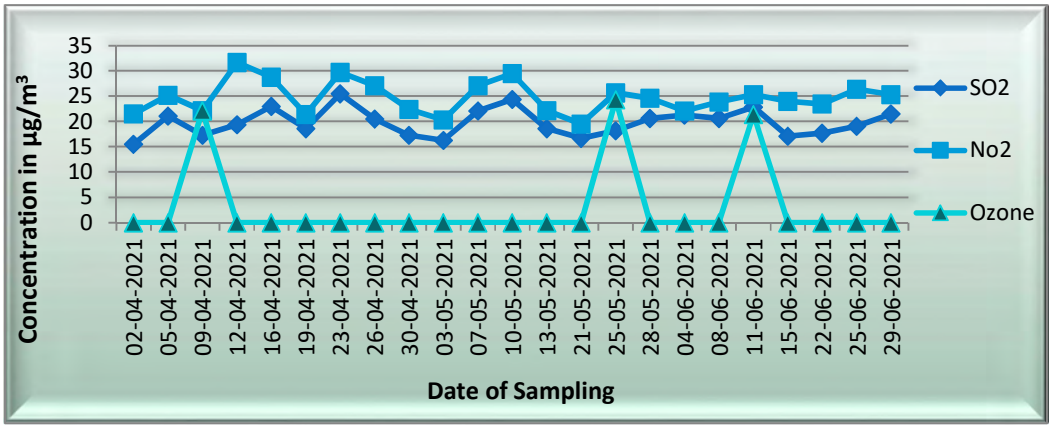
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**85.9**	**42.1**	**25.5**	**31.7**	**24.3**
Minimum Value	**59.7**	**25.6**	**15.5**	**19.5**	**21.4**
Average Value	**71.2**	**32.1**	**19.8**	**24.8**	**22.6**
Standard Deviation	**7.9**	**4.1**	**2.7**	**3.2**	**1.5**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 9 : Particulate Matter Level Wandh Village



Graph 10 : SO_2, NO_2 and O_3 Level Wandh Village



3.1.7 Ambient Air Quality Monitoring (Parameters- Mercury & Ozone)

Location	April-2021			May-2021			June-2021		
	Date	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**	**Date**	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**	**Date**	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**
Village Kandagara	**09.04.21**	19.2	BDL	**25.05.21**	20.7	BDL	**11.06.21**	17.2	BDL
Village Wandh	**09.04.21**	22.1	BDL	**25.05.21**	24.3	BDL	**11.06.21**	21.4	BDL
Village Siracha	**09.04.21**	14.8	BDL	**25.05.21**	16.2	BDL	**11.06.21**	13.2	BDL
Nr. 20 MLD Plant	**07.04.21**	20.8	BDL	**19.05.21**	21.7	BDL	**24.06.21**	18.9	BDL
Nr. Shantiniketan-1	**07.04.21**	18.1	BDL	**19.05.21**	19.4	BDL	**24.06.21**	17.8	BDL
Remark**: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.**									
Analysis Method Reference :									
Hg : AAS by VGA Method -3112 B APHA 22 Edition : BDL Limit Hg **: 2 ppb**									
O_3 : IS - 5182 (part 9) 2009 Ozone BDL limit: 5 µg/m^3									

3.2 Flue Gas Monitoring Data

Stack monitoring has been carried out by UniStar environment & Research Pvt. Ltd.

Date	Location	PM in mg/Nm^3	SO_2 in mg/Nm^3	NO_x in mg/Nm^3
06-04-2021	Boiler (Unit - 1)	35.8	572.8	278.5
29-05-2021	Boiler (Unit - 1)	33.2	542.6	262.4
07-06-2021	Boiler (Unit - 1)	29.4	471.8	238.4
06-04-2021	Boiler (Unit - 2)	31.1	561.6	262.4
10-05-2021	Boiler (Unit - 2)	29.6	567.8	251.7
07-06-2021	Boiler (Unit - 2)	30.1	482.1	247.3
07-04-2021	Boiler (Unit - 3)	39.7	548.7	258.6
26-05-2021	Boiler (Unit - 3)	32.4	503.6	257.4
23-06-2021	Boiler (Unit - 3)	42.3	508.6	288.8
07-04-2021	Boiler (Unit - 4)	41.4	541.6	252.3
29-05-2021	Boiler (Unit - 4)	40.8	521.4	255.7
23-06-2021	Boiler (Unit - 4)	36.9	467.7	262.4
09-04-2021	Boiler (Unit - 5)	37.8	495.2	285.6
12-05-2021	Boiler (Unit - 5)	33.6	457.2	242.9
09-04-2021	Boiler (Unit - 6)	36.6	486.4	270.4
21-05-2021	Boiler (Unit - 6)	35.4	461.1	238.9
25-06-2021	Boiler (Unit -6)	34.3	423.8	233.4
10-04-2021	Boiler (Unit - 7)	34.2	172.1	258.9
10-04-2021	Boiler (Unit - 8)	35.5	169.6	294.6
20-05-2021	Boiler (Unit - 8)	34.7	163.4	288.6
04-06-2021	Boiler (Unit -8)	33.7	163.4	293.9
10-04-2021	Boiler (Unit - 9)	33.4	178.9	282.4
20-05-2021	Boiler (Unit - 9)	31.1	152.8	262.4
04-06-2021	Boiler (Unit - 9)	34.2	174.5	281.2
Permissible Limits		**50**	**<500 MWH-600** **>500 MWH-200**	**450**

3.3 Water Quality Monitoring

3.3.1 Location: Tunda Village Water Sample **DATE: 28/05/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.31	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 $CaCO_3$	mg/L	140.2	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	31.6	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	18.3	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1542	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	385.2	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	511.5	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	188.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	3.9	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	0.28	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.76	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)	16	100 CFU/ml	100 CFU/ml
Note: BDL= Below Detection Limit. N.D. = Not Detected					

3.3.2 Location: Kandagara Village Water Sample **DATE: 28/05/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.35	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 $CaCO_3$	mg/L	155.2	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	36.1	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	25.4	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1494	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	434.5	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	476.3	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	149.1	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	3.9	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	0.26	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.62	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

3.3.3Location: Siracha Village Water Sample **DATE: 28/05/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.28	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	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as $CaCO_3$	mg/L	275.3	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	46.1	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	34.7	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1512	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	329.3	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	435.2	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	159.9	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	2.4	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	0.27	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.47	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)	16	100 CFU/ml	100 CFU/ml

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

3.3.4 Location: Navinal Village Water Sample **DATE: 28/05/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.45	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	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as $CaCO_3$	mg/L	152.3	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	36.3	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	26.8	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1408	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	311.1	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	445.6	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	170.5	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	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	0.59	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

3.3.5Location: Desalpur Village Water Sample **DATE: 28/05/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.49	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 $CaCO_3$	mg/L	196.3	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	36.9	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	1406	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	411.5	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	438.8	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	173.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	3.1	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	0.59	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: Colour = 1(10) = 10 APHA, BDL= Below Detection Limit. N.D. = Not Detected

3.4 Water Quality Monitoring – Plant area

3.4.1 Location: Outfall Channel

Sr. No.	Parameter	Unit	Date of sampling		
			16/04/2021	**20/05/2021**	**14/06/2021**
1	pH @ 25	--	7.98	8.20	8.16
2	Temperature	^{0}C (Intake)	27.5	30.5	30.0
		^{0}C (Outfall)	30.0	34.0	33.5
		^{0}C (Differential)	2.5	3.5	3.5
3	Color	Pt. CO. Scale	10	10	10
4	Total Suspended Solids	mg/L	24	26	31.8
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_4	mg/L	0.29	0.27	0.25
11	Lead as Pb	mg/L	0.028	0.031	0.028
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	0.131	0.124	0.117
15	Chemical Oxygen Demand(COD)	mg/L	37.7	31.8	39.2
16	Biochemical Oxygen Demand (BOD)	mg/L	11	11.2	11.8

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

3.4.2 Location: STP Outlet Water Sample;

Sr. No.	Parameter	Unit	SPCB Limit	Date of sampling		
				16/04/2021	**20/05/2021**	**24/06/2021**
1	pH @ 25 ° C	--	**6.5-8.5**	7.63	7.51	7.42
2	Total Suspended Solids	mg/L	**30**	22	20	16
3	Residual Chlorine	mg/L	**0.5 Min.**	0.63	0.60	0.59
4	Biochemical Oxygen Demand (BOD)	mg/L	**20**	14	12	10
5	Fecal Coliform	CFU/100ml	**<1000**	48	46	42

3.4.3 Location: ETP Outlet Water Sample;

S.N	Parameter	Unit	SPCB Limit	Date of sampling		
				16/04/2021	**20/05/2021**	**14/06/2021**
1	pH @ 25	--	**6.5 – 8.5**	7.53	7.62	7.49
2	Temperature	° C	**40 Max.**	31	32	30
3	Color	Pt. CO. Scale	**100 Max.**	20	20	20
4	Total Suspended Solids	mg/L	**100 Max.**	24	22	18
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.**	48.8	45.2	39.6
7	Biochemical Oxygen Demand (BOD)	mg/L	**30 Max.**	15	14	12
8	Chloride as Cl^-	mg/L	**600 Max.**	448.3	423.3	385.5
9	Total Dissolved Solids	mg/L	**2100 Max.**	1808	1744	1596
10	Sulphate as SO_4	mg/L	**1000 Max.**	116.7	105.5	93.1
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.**	54.4	52.9	50.3
13	Sodium Absorption Ratio(SAR)	mg/L	**26 Max.**	2.9	2.3	2.1
14	Sulphide as S^{-2}	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_4	mg/L	**5.0 Max.**	0.38	0.36	0.31
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) **Date: 14/06/2021**

Sr.No.	Parameter	Unit	Results			
			Borewell-1	**Borewell-2**	**Borewell-3**	**Borewell-4**
1	pH @ 25 ° C	-	7.49	7.29	7.61	7.33
2	Conductivity (µS)	-	16190	17880	15620	16680
3	Chloride as Cl^-	mg/L	4986.3	4525.3	4725.2	4744.3
4	Salinity (ppt)	mg/L	9.0	8.18	8.54	8.57
5	Total Dissolved Solids	mg/L	10824	11962	10424	11146
6	Carbonate as CaCO3	mg/L	BDL(MDL:4.0)	BDL(MDL:4.0)	BDL(MDL:4.0)	BDL(MDL:4.0)
7	Bicarbonate as CaCO3	mg/L	214.2	209.3	206.3	198.3
8	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)
9	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
10	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)
11	Chromium as Cr	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
12	Cadmium as Cd	mg/L	BDL(MDL:0.03)	BDL(MDL:0.03)	BDL(MDL:0.03)	BDL(MDL:0.03)
13	Iron (as Fe)	mg/L	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
14	Zinc (as Zn)	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
15	Total Alkalinity	mg/L	175.4	171.6	169.1	162.5
16	Calcium as Ca	mg/L	365.5	356.3	310.2	384.4
17	Magnesium as Mg	mg/L	249.3	218.3	165.3	213.3
18	Sodium as Na	mg/L	1805	2110	1405	1710
19	Potassium as K	mg/L	110.2	129.3	102.3	105.8
20	Sulphate as SO4-2	mg/L	672.3	836.3	689.3	793.3
21	Nitrate as NO3	mg/L	28.5	31.5	24.8	31.5
22	Phosphate as PO_4	mg/L	2.93	3.35	2.35	3.22
23	Barium as Ba	mg/L	N.D.	N.D.	N.D.	N.D.
24	Fluoride as F	mg/L	2.65	3.05	2.25	3.05
25	Cobalt as Co	mg/L	N.D.	N.D.	N.D.	N.D.
26	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
27	Manganese as Mn	mg/L	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)
28	Nickel as Ni	mg/L	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)

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-1	**Unit-2**	**Unit-3**	**Unit-4**
Date of Sampling →				**07/04/2021**	**07/04/2021**	**07/04/2021**	**07/04/2021**
1	pH @ 25 ° C	--	-	7.82	7.86	7.82	7.87
2	Free available Chlorine	° C	Min. 0.5	0.65	0.71	0.66	0.67
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	0.052	0.056	0.053	0.051
6	Phosphate as P	mg/L	5.0	0.36	0.35	0.39	0.36

S.No.	Parameter	Unit	Limit	Results				
				Unit-5	**Unit-6**	**Unit-7**	**Unit-8**	**Unit-9**
Date of Sampling →				**07/04/2021**	**07/04/2021**	**07/04/2021**	**07/04/2021**	**07/04/2021**
1	pH @ 25 ° C	--	-	7.79	7.81	7.78	7.89	7.98
2	Free available Chlorine	° C	Min. 0.5	0.69	0.65	0.59	0.72	0.63
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)	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)	BDL(MDL:0.05)
5	Total Chromium as Cr	mg/L	0.2	0.055	0.050	0.057	0.060	0.059
6	Phosphate as P	mg/L	5.0	0.37	0.40	0.42	0.29	0.38

3.4.6 Location: Condensate Cooling Tower Water Sample							
S.No.	Parameter	Unit	Limit	Results			
				Unit-1	Unit-2	Unit-3	Unit-4
Date of Sampling →				07/04/2021	07/04/2021	07/04/2021	07/04/2021
1	pH @ 25 ° C	--	6.5 to 8.5	8.14	8.13	7.86	7.96
2	Temperature ^{0}C (Inlet)	^{0}C	--	28.0	28.0	27.0	27.5
	Temperature ^{0}C (Outlet)	^{0}C	--	30.0	30.5	29.5	29.5
	Temperature ^{0}C (Differential)	^{0}C	7	2.0	2.5	2.5	2.0
3	Free available Chlorine	mg/L	Min 0.5	0.65	0.73	0.71	0.69

S.No.	Parameter	Unit	Limit	Results				
				Unit-5	Unit-6	Unit-7	Unit-8	Unit-9
Date of Sampling →				07/04/2021	07/04/2021	07/04/2021	07/04/2021	07/04/2021
1	pH @ 25 ° C	--	6.5 to 8.5	7.91	7.82	8.15	8.01	8.02
2	Temperature ^{0}C (Inlet)	^{0}C	--	27.5	27.0	27.5	27.0	27.5
	Temperature ^{0}C (Outlet)	^{0}C	--	30.0	29.5	29.5	29.5	29.5
	Temperature ^{0}C (Differential)	^{0}C	7	2.5	2.5	2.0	2.5	2.0
3	Free available Chlorine	mg/L	Min 0.5	0.63	0.63	0.68	0.71	0.67

3.4.7 Location: Boiler Blow Down Water Sample					DATE: 24/06/2021	
Parameter	**Unit**	**Limit**	**Results**			
			Unit -1	**Unit -2**	**Unit -3**	**Unit -4**
Total Suspended Solids	mg/L	**100**	BDL(MDL:4.0)	BDL(MDL:4.0)	BDL(MDL:4.0)	BDL(MDL:4.0)
Oil & Grease	mg/L	**10**	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
Total Copper as Cu	mg/L	**1.0**	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
Total Iron (as Fe)	mg/L	**1.0**	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)

3.5 Soil Quality Monitoring: Date: 28/05/2021

Locations of soil sampling ⇨			**Kandagara**	**Tunda**	**Desalpur**	**Siracha**	**Navinal**
Sr. No.	**Parameter**	**Unit**	**Results**				
1	Magnesium as Mg	%	0.0054	0.0042	0.0061	0.0053	0.0099
2	Molybdenum as Mo	%	N.D.	N.D.	N.D.	N.D.	N.D.
3	Phosphorous as P	%	0.308	0.3406	0.2267	0.2891	0.2341
4	Calcium as Ca	%	0.039	0.026	0.019	0.0372	0.0272
5	Zinc as Zn	%	0.006	0.0020	0.0027	0.0028	0.0026
6	Manganese as Mn	%	0.019	0.027	0.0286	0.031	0.0262
7	Potassium as K	%	0.0051	0.0042	0.0036	0.0026	0.0037
8	Nitrogen as N	%	0.0066	0.0082	0.0085	0.0071	0.0092
9	Iron as Fe	%	0.327	0.491	0.4452	0.767	1.1441
10	Copper as Cu	%	0.0011	0.0007	0.0007	0.0005	0.0005
11	Boron as B	%	N.D.	N.D.	N.D.	N.D.	N.D.
12	Sulphur	%	0.0054	0.0084	0.0052	0.0084	0.0085
13	Chlorides as Cl	%	0.0055	0.0163	0.0152	0.0587	0.043
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: 07-08.04.2021

Result

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 - 13:10 pm	64.3	22:35 pm - 00:20 am	**63.0**
2.	Nr. 20 MLD Plant		62.8		**60.8**
3.	Nr. Pump House		63.5		**62.1**
4.	Nr. Coal Handling plant		64.4		**62.8**
5.	Nr. Gate No.4		59.7		**58.3**
6.	Nr. Integrated Ash Silo		66.9		**63.9**
7.	Nr. Main Gate		62.8		**60.8**
8.	Nr. APCH Building		59.3		**58.6**
9.	Nr. Shantiniketan-I		58.9		**57.2**
10.	Nr. OHC Building		61.1		**59.3**

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

Date of Monitoring: 25-26.05.2021

Result

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	10:50 am - 12:20 pm	64.5	22:20 pm -00:20 am	**59.2**
2.	Nr. 20 MLD Plant		63.9		**58.7**
3.	Nr. Pump House		62.2		**57.3**
4.	Nr. Coal Handling plant		65.3		**59.0**
5.	Nr. Gate No.4		58.9		**56.3**
6.	Nr. Integrated Ash Silo		67.9		**61.4**
7.	Nr. Main Gate		62.7		**58.1**
8.	Nr. APCH Building		60.8		**54.8**
9.	Nr. Shantiniketan-I		59.4		**56.9**
10.	Nr. OHC Building		59.6		**59.2**

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

Date of Monitoring: 25-26.06.2021

Result

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	10:45 am - 13:05 pm	62.2	22:00 pm -00:30 am	**57.9**
2.	Nr. 20 MLD Plant		65.5		**59.3**
3.	Nr. Pump House		63.4		**59.5**
4.	Nr. Coal Handling plant		65.7		**60.6**
5.	Nr. Gate No.4		59.7		**58.1**
6.	Nr. Integrated Ash Silo		66.2		**60.8**
7.	Nr. Main Gate		62.0		**59.8**
8.	Nr. APCH Building		58.1		**57.8**
9.	Nr. Shantiniketan-I		61.1		**60.5**
10.	Nr. OHC Building		59.7		**58.8**

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

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ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY, STACK EMISSION, WATER QUALITY AND NOISE MONITORING

Period: July 2021- September 2021

For

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

Prepared By

UniStar
Environment & Research Labs Pvt. Ltd.

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QUALITY CONTROL							
Name of Publication	Environmental Quality Monitoring Report for the Quarter July 2021- September 2021						
Project Number	03	**Report No.**	UERL/ENV/JAN/ 07-09 / 2021	**Version**	1	**Released**	October 2021
Project Coordinator	Mr. Bhavin Patel						
Prepared By	Miss. Shweta A. Rana						
Checked By	Mr. Jaivik Tandel						
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FOR
UniStar Environment and
Research Labs Pvt. Ltd.

Mr. Jaivik Tandel
(Authorized By)

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CONTENTS

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LIST OF GRAPHS

EXECUTIVE SUMMARY

Adani Power (Mundra) Limited (APMuL) has total generation capacity of 4620MW in phased manner at Mundra Thermal (coal Based) Power Plant near Village Tunda in Mundra, District Kutch, and Gujarat. 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. Adani Power (Mundra) Limited Implemented ISO-14001:2015 Environment Management System (EMS) 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 July 2021 to September 2021.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_{10}, $PM_{2.5}$, Sulphur Dioxide and Nitrogen Dioxide	Three Location	Twice a week
2.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, Sulphur Dioxide, Nitrogen Dioxide, Ozone and Mercury	Two Location	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.	Surrounding Villages Ground Water Analysis	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, BOD3, 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.	STP Water Analysis	pH, Residual Chlorine, SS, BOD, COD, Faecal coliform	Three Location	Once in month/ Quarter
8.	Borwell water Near Ash Dyke Area	pH @ 25 ° C, Conductivity (µS), Chloride as Cl^- Salinity (ppt), Total Dissolved Solids, Carbonate as CaCO3, Bicarbonate as CaCO3, Mercury as Hg,Arsenic as As, Lead as Pb, Chromium as Cr, Cadmium as Cd.	Four Location	Once in a Quarter
9.	Surrounding Villages Soil Analysis	Magnesium as Mg %, Molybdenium 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, Sulphurin %, Chloride as Cl%.	Five Location	Once in Six Month
10.	Noise Level Monitoring	Noise level monitoring in dB(A)	10 Location	Once in a Quarter
11.	Cooling tower	pH @ 25 ° C, Free available chlorine, Zinc as Zn, Hexavalent Chromium, Total Chromium, Phosphate	09 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 5locations 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_{10}) & Fine Dust Samplers ($PM_{2.5}$) 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 represents the Ambient Air Quality Status.

The significant parameters viz., PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2) and Nitrogen Dioxides (NO_2) 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 September 2021 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.

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

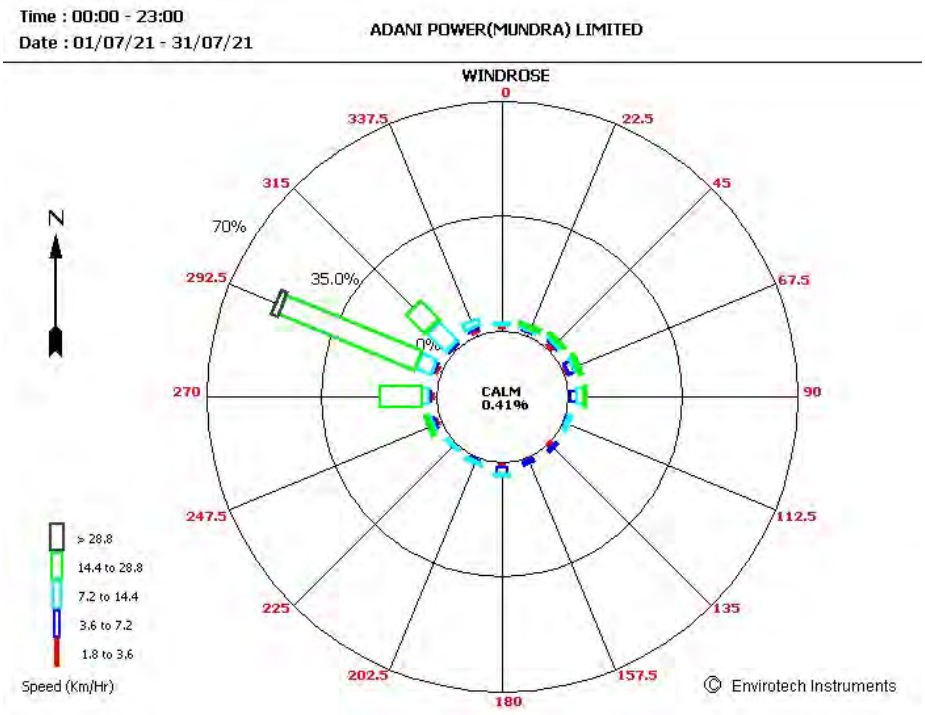
- Relative Humidity
- Ambient Temperature

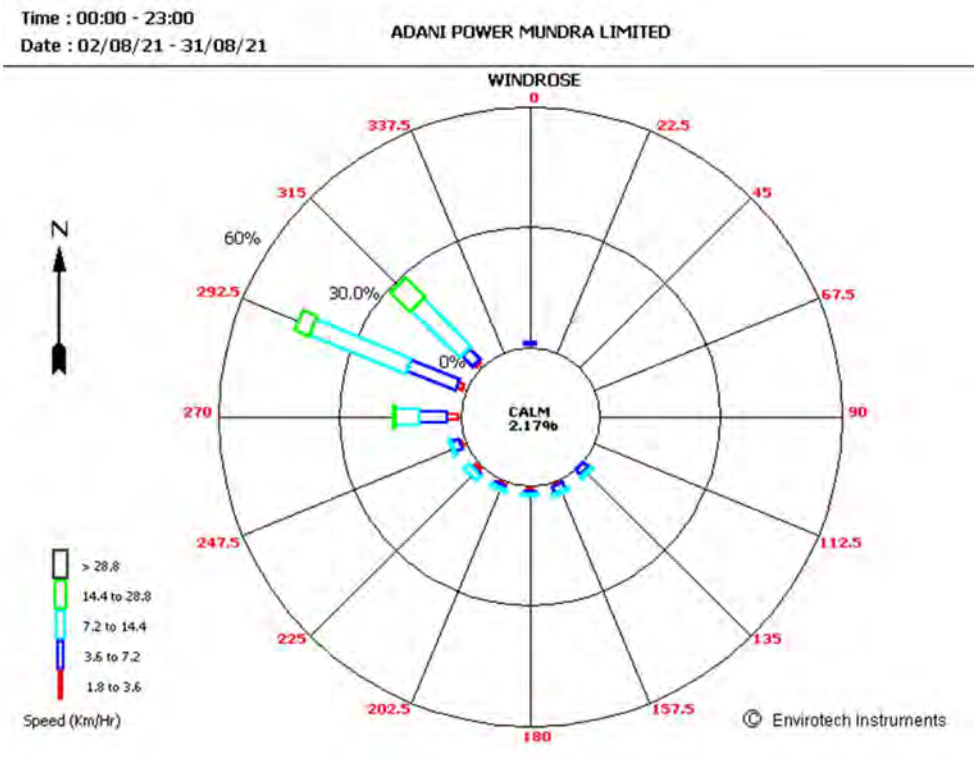
The above-said factors are considered as secondary factors since these factors control the dispersion of the pollutant indirectly by affecting the primary factors.

1.5.1 Wind Rose Diagram

Project	:	**Adani Power (Mundra) Limited (APMuL)**	**Period**	**:**	July 2021 to September 2021
Location	:	**Village – Tunda, Dist. - Kutch**			
July 2021					
Wind Direction			WNW		
Average Wind Speed			16.3 km/hr		
August 2021					
Wind Direction			WNW		
Average Wind Speed			11.4 km/hr		
September 2021					
Wind Direction			SSW		
Average Wind Speed			7.8 km/hr		

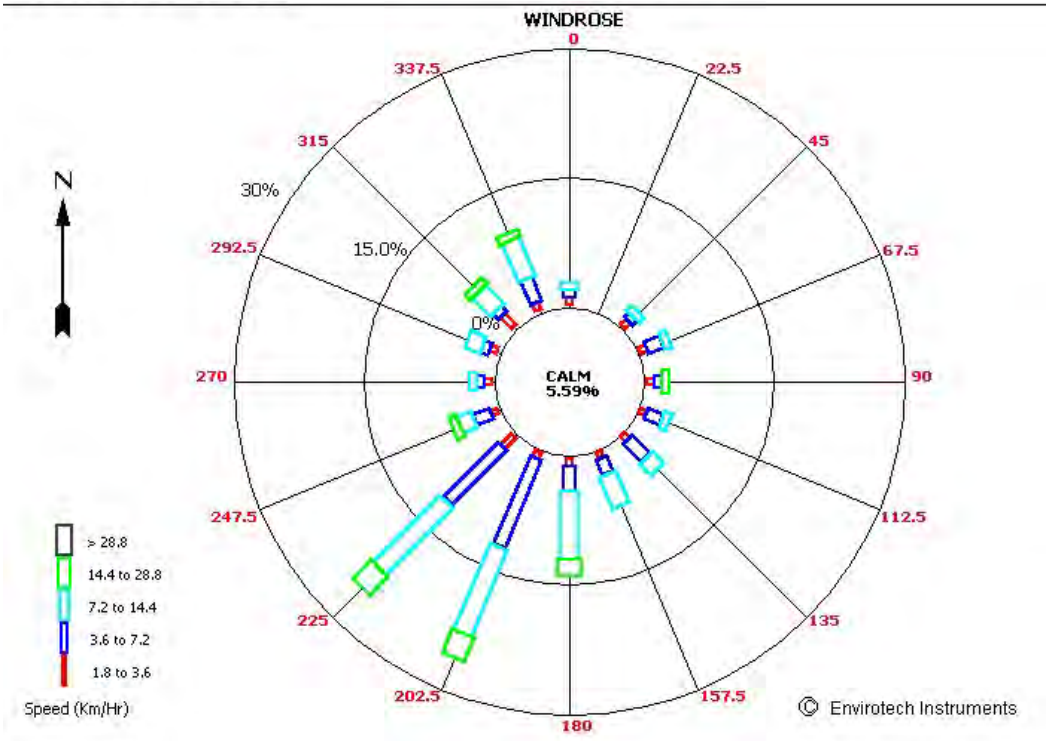
ADANI POWER (MUNDRA) LIMITED – MUNDRA WINDROSE FOR THE SEASON OF July to Sep. 2021





Time : 00:00 - 23:00
Date : 01/09/21 - 30/09/21

ADANI POWER MUNDRA LIMITED



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_{10}, $PM_{2.5}$, SO_2, NO_2	Twice a week (24 hourly Samples)	72	IS : 5182 & Reference APHA(AIR)
2	Ambient Air Quality	5	PM_{10}, $PM_{2.5}$, SO_2, NO_2, O_3, 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_2, 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 ENVIRONMENAT AIR QUALITY AND FLUE GAS MONITORING

The principle 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 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
1	A - 1	Nr.20 MLD Plant	1.2 Km
2	A - 2	Nr. Shantiniketan-1	0.8 Km
3	A - 3	Kandagara Village	3.2 km (NW)
4	A - 4	Siracha Village	2.6 km (NE)
5	A - 5	Wandh Village	2.0 km (SW)

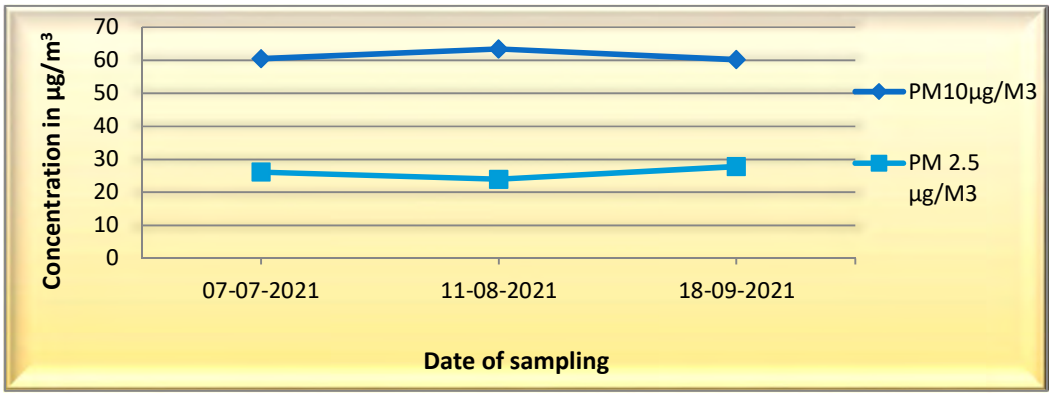
3.1.2 Location: Nr.20 MLD Plant

The Sampling station was located in the core zone in Company premises. The Respirable Dust Sampler (PM_{10}) & ($PM_{2.5}$) Sampler were placed at a height of 3 m above the ground level. Assess present pollution level the observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during monitoring period (July 2021-Sep.2021) are as follows:

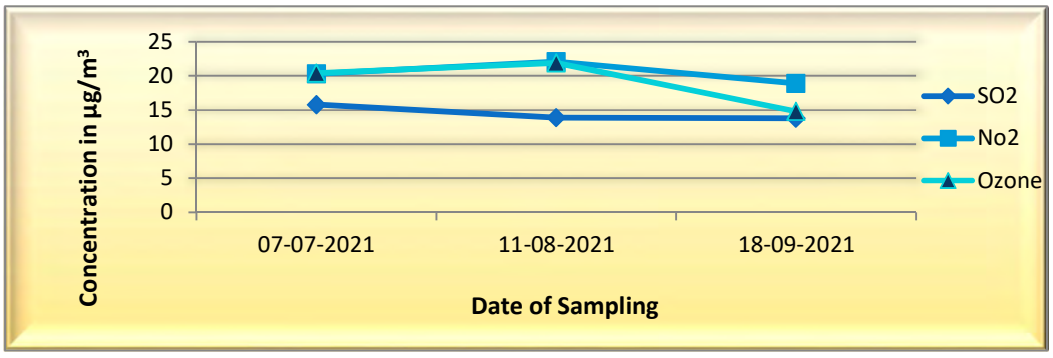
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**63.4**	**27.8**	**15.8**	**22.1**	**21.9**
Minimum Value	**60.2**	**24**	**13.8**	**18.9**	**14.8**
Average Value	**61.4**	**26.0**	**14.5**	**20.4**	**19.0**
Standard Deviation	**1.8**	**1.9**	**1.1**	**1.6**	**3.7**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 1 : Particulate Matter Level Nr.20 MLD Plant



Graph 2: SO2, NO2 and O_3 Nr.20 MLD Plant



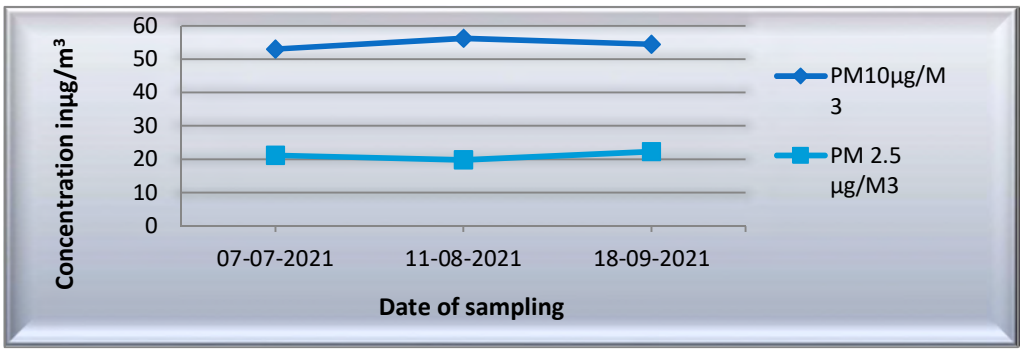
3.1.3 Location: Nr. Shantiniketan-1

The Sampling station was located in the core zone in company premises. The Respirable Dust SamplerPM_{10} & $PM_{2.5}$Sampler were placed at a height of 3 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during monitoring period (July 2021-Sep.2021) are as follows

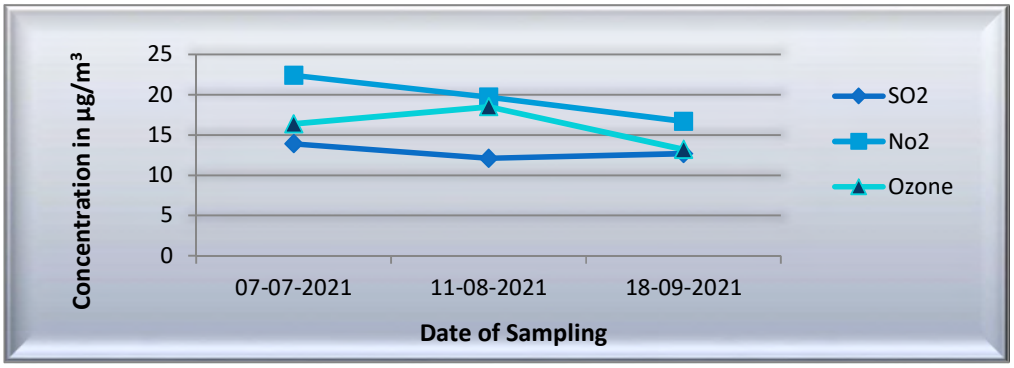
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**56.2**	**22.3**	**13.9**	**22.4**	**18.5**
Minimum Value	**53**	**19.8**	**12.1**	**16.7**	**13.2**
Average Value	**54.5**	**21.1**	**12.9**	**19.6**	**16.0**
Standard Deviation	**1.6**	**1.3**	**0.9**	**2.9**	**2.6**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 3: Particulate Matter Level Nr. Shantiniketan-1



Graph 4 : SO2, NO2 and O_3 Nr. Shantiniketan-1



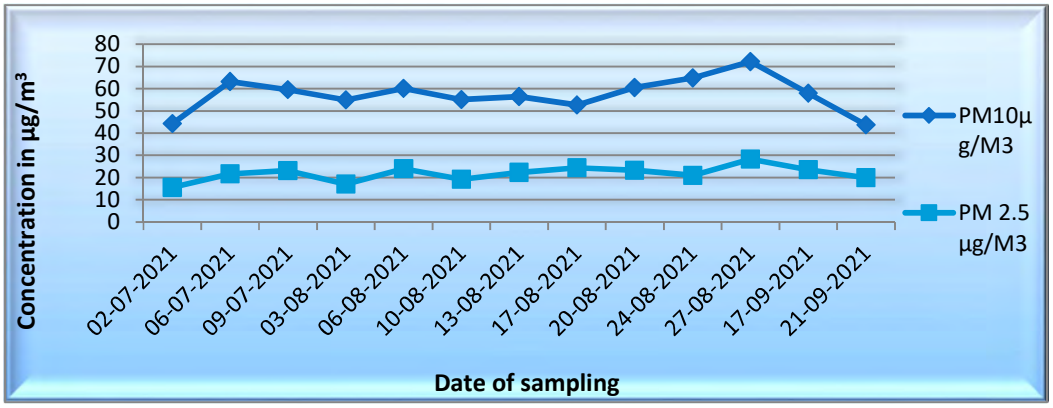
3.1.4 Location: Kandagara Village

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_{10}) & $PM_{2.5}$Sampler were placed at a height of 2.5 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (July 2021-Sep.2021) are as follows.

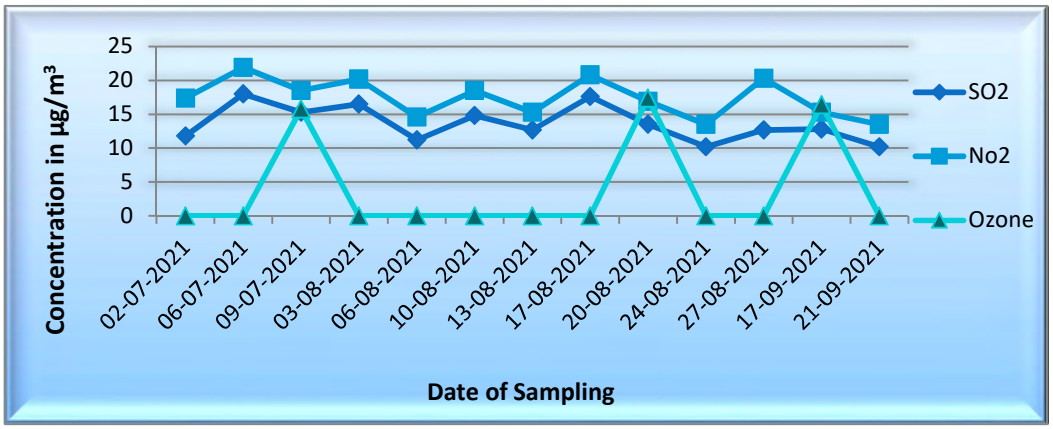
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**72.2**	**28.3**	**18**	**21.9**	**17.4**
Minimum Value	**43.7**	**15.6**	**10.2**	**13.5**	**15.8**
Average Value	**57.3**	**21.8**	**13.6**	**17.4**	**16.5**
Standard Deviation	**7.8**	**3.3**	**2.6**	**2.9**	**0.8**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 5: Particulate Matter Level Kandagara Village



Graph 6 : SO2, NO2 and O_3 Level Kandagara Village



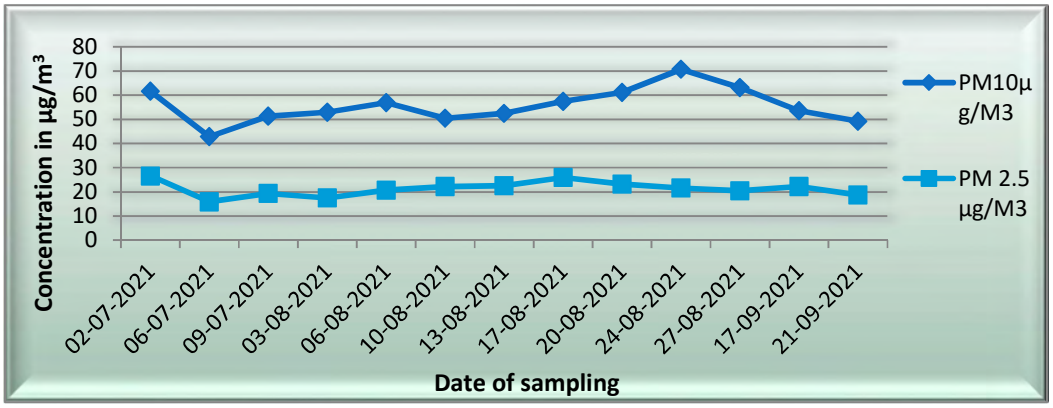
3.1.5 Location: Siracha Village

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 & $PM_{2.5}$ was placed at a height of 3.0 m above the ground level. The observed levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (July 2021-Sep.2021) are as follows.

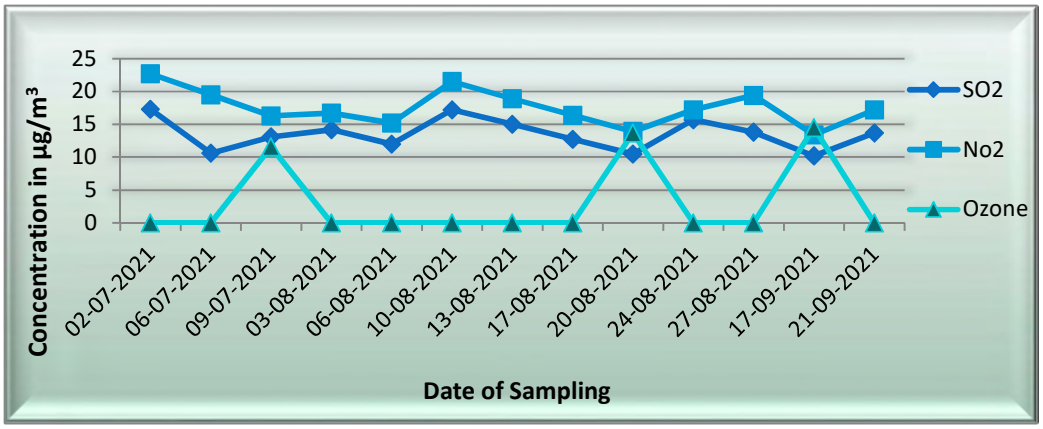
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**70.7**	**26.6**	**17.3**	**22.7**	14.5
Minimum Value	**42.8**	**15.9**	**10.2**	**13.4**	**11.6**
Average Value	**55.7**	**21.3**	**13.5**	**17.6**	**13.2**
Standard Deviation	**7.2**	**3.1**	**2.4**	**2.8**	**1.4**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: µg/m^3

Graph 7 : Particulate Matter Level Siracha Village



Graph 8 : SO_2, NO_2 and O_3 Level Siracha Village



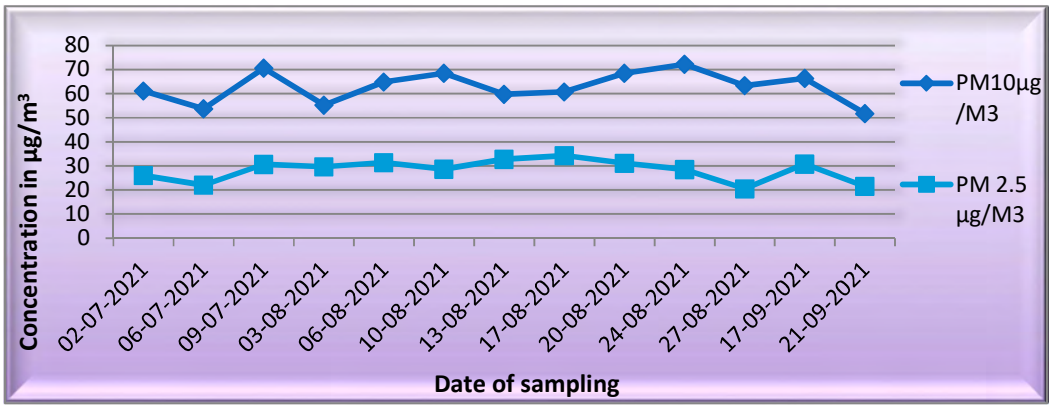
3.1.6 Location: Wandh Village

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_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 collected during the monitoring period (July 2021-Sep.2021) are as follows.

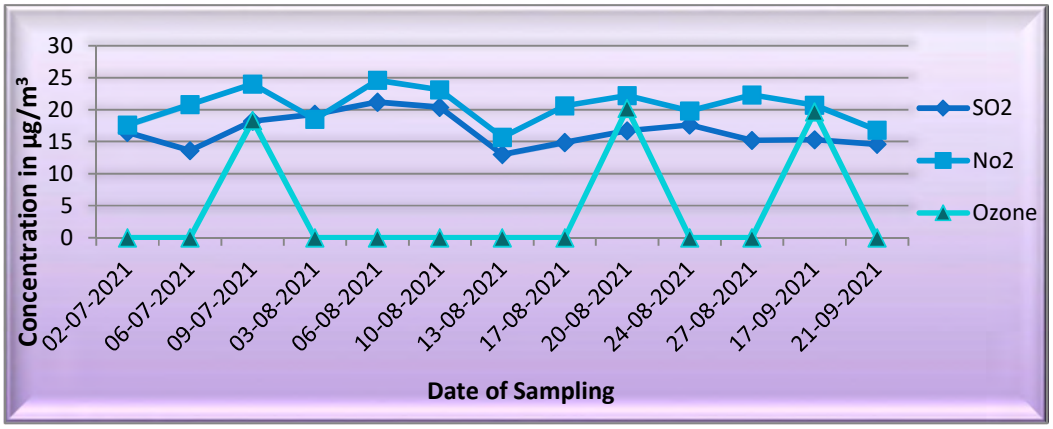
Observations	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3
Maximum Value	**72.2**	**34.3**	**21.2**	**24.6**	20.2
Minimum Value	**51.8**	**20.6**	**13**	**15.7**	**18.3**
Average Value	**62.8**	**28.3**	**16.7**	**20.5**	**19.4**
Standard Deviation	**6.5**	**4.4**	**2.6**	**2.8**	**0.9**
Permissible Limits	**100**	**60**	**80**	**80**	**100**

Units: $\mu g/m^3$

Graph 9 : Particulate Matter Level Wandh Village



Graph 10 : SO_2, NO_2 and O_3 Level Wandh Village



3.1.7 Ambient Air Quality Monitoring (Parameters- Mercury & Ozone)

Location	July-2021			August-2021			September-2021		
	Date	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**	**Date**	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**	**Date**	**Ozone (O3) µg/m3**	**Mercury (Hg) µg/m3**
Village Kandagara	**09.07.21**	15.8	BDL	**20.08.21**	17.4	BDL	**17.09.21**	16.4	BDL
Village Wandh	**09.07.21**	18.3	BDL	**20.08.21**	20.2	BDL	**17.09.21**	19.7	BDL
Village Siracha	**09.07.21**	11.6	BDL	**20.08.21**	13.7	BDL	**17.09.21**	14.5	BDL
Nr. 20 MLD Plant	**07.07.21**	20.4	BDL	**11.08.21**	21.9	BDL	**18.09.21**	14.8	BDL
Nr. Shantiniketan-1	**07.07.21**	16.4	BDL	**11.08.21**	18.5	BDL	**18.09.21**	13.2	BDL
Remark**: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.**									
Analysis Method Reference :									
Hg : AAS by VGA Method -3112 B APHA 22 Edition : BDL Limit Hg **: 2 ppb**									
O_3 : IS - 5182 (part 9) 2009 Ozone BDL limit: 5 µg/m^3									

3.2 Flue Gas Monitoring Data

Stack monitoring has been carried out by UniStar environment & Research Pvt. Ltd.

Date	Location	PM in mg/Nm^3	SO_2 in mg/Nm^3	NO_x in mg/Nm^3
09-07-2021	Boiler (Unit - 1)	30.2	461.7	243.8
09-08-2021	Boiler (Unit - 1)	33.4	475.9	248.4
18-09-2021	Boiler (Unit - 1)	33.3	472.8	233.6
09-07-2021	Boiler (Unit - 2)	29.1	452.6	248.7
09-08-2021	Boiler (Unit - 2)	30.1	458.7	262.4
18-09-2021	Boiler (Unit - 2)	30.8	453.6	244.7
12-07-2021	Boiler (Unit - 3)	38.1	435.2	236.4
18-08-2021	Boiler (Unit - 3)	36.8	489.7	257.1
18-09-2021	Boiler (Unit - 3)	38.1	468.7	251.4
12-07-2021	Boiler (Unit - 4)	31.1	472.1	284.2
18-08-2021	Boiler (Unit - 4)	33.4	502.4	254.8
30-09-2021	Boiler (Unit - 4)	32.4	470.2	242.6
17-07-2021	Boiler (Unit - 5)	34.8	445.4	245.7
12-08-2021	Boiler (Unit - 5)	35.1	465.2	266.9
22-09-2021	Boiler (Unit - 5)	33.2	519.7	233.3
08-07-2021	Boiler (Unit - 6)	35	433.8	238.9
02-07-2021	Boiler (Unit - 8)	33.4	169.7	284.6
09-07-2021	Boiler (Unit - 9)	32.2	161.3	266.9
19-08-2021	Boiler (Unit - 9)	33.7	166.9	274.7
Permissible Limits		**50**	**<500 MWH-600** **>500 MWH-200**	**450**

3.3 Water Quality Monitoring

3.3.1 Location: Tunda Village Water Sample **DATE: 21/09/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.42	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 $CaCO_3$	mg/L	118.5	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	24.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	13.0	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1196	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	326.2	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	429.1	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	142.5	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	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	0.2	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.49	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: Kandagara Village Water Sample **DATE: 21/09/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.42	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 $CaCO_3$	mg/L	133.7	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	34.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	19	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1126	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	346.1	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	393.2	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	139.7	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	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	0.73	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)	08	100 CFU/ml	100 CFU/ml
Note: BDL= Below Detection Limit. N.D. = Not Detected					

3.3.3Location: Siracha Village Water Sample **DATE: 21/09/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.33	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	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as $CaCO_3$	mg/L	209.2	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	32.2	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1096	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	244.4	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	356.3	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	117.2	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	1.6	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	0.20	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.43	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

3.3.4 Location: Navinal Village Water Sample **DATE: 21/09/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.49	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	BDL(MDL:0.1)	1 NTU	5 NTU
6	Total Hardness as $CaCO_3$	mg/L	165.7	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	17.1	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1092	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	236.2	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	359.1	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	114.4	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	mg/L	3.1	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	0.23	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.47	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: BDL= Below Detection Limit. N.D. = Not Detected

3.3.5Location: Desalpur Village Water Sample **DATE: 21/09/2021**

Sr. No.	Parameter	Unit	Results	Desirable Limits	Permissible limit in the absence of alternate source
1	pH @ 25	-	7.53	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 $CaCO_3$	mg/L	139.7	200 mg/lit.	600 mg/lit.
7	Calcium as Ca	mg/L	28.2	75 mg/lit.	200 mg/lit.
8	Magnesium as Mg	mg/L	20.4	30 mg/lit.	100 mg/lit.
9	Total Dissolved Solids	mg/L	1036	500 mg/lit.	2000 mg/lit.
10	Total Alkalinity	mg/L	325.3	200 mg/lit.	600 mg/lit.
11	Chloride as Cl^-	mg/L	359.8	250 mg/lit.	1000 mg/lit.
12	Sulphate as SO_4^{-2}	mg/L	107.7	200 mg/lit.	400 mg/lit.
13	Nitrate as NO_3	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	0.29	0.2 mg/lit.	1.0 mg/lit.
18	Fluoride as F	mg/L	0.58	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

3.4.1 Location: Outfall Channel

Sr. No.	Parameter	Unit	Date of sampling	
			13/07/2021	**04/08/2021**
1	pH @ 25	--	8.21	8.15
2	Temperature	^{0}C (Intake)	28.5	28.0
		^{0}C (Outfall)	31.5	31.0
		^{0}C (Differential)	3.0	3.0
3	Color	Pt. CO. Scale	10	10
4	Total Suspended Solids	mg/L	36	30
5	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Ammonical Nitrogen	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)
7	Sulphide as S-2	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)
8	Total Chromium	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)
9	Hexavalent Chromium as Cr+6	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)
10	Phosphate as PO_4	mg/L	0.27	0.21
11	Lead as Pb	mg/L	0.031	0.026
12	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)
13	Zinc as Zn	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)
14	Iron (as Fe)	mg/L	0.121	0.114
15	Chemical Oxygen Demand(COD)	mg/L	43.3	38.6
16	Biochemical Oxygen Demand (BOD)	mg/L	13	11

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

3.4.2 Location: STP Outlet Water Sample;

Sr. No.	Parameter	Unit	SPCB Limit	Date of sampling		
				13/07/2021	**04/08/2021**	**18/09/2021**
1	pH @ 25 ° C	--	**6.5-8.5**	7.63	7.55	7.49
2	Total Suspended Solids	mg/L	**30**	22	18	16
3	Residual Chlorine	mg/L	**0.5 Min.**	0.67	0.61	0.67
4	Biochemical Oxygen Demand (BOD)	mg/L	**20**	14	12	10
5	Fecal Coliform	CFU/100ml	**<1000**	48	46	44

3.4.3 Location: ETP Outlet Water Sample;

S.N	Parameter	Unit	SPCB Limit	Date of sampling	
				13/07/2021	**04/08/2021**
1	pH @ 25	--	**6.5 – 8.5**	7.58	7.45
2	Temperature	° C	**40 Max.**	29	27
3	Color	Pt. CO. Scale	**100 Max.**	20	20
4	Total Suspended Solids	mg/L	**100 Max.**	20	16
5	Oil & Grease	mg/L	**10 Max.**	BDL(MDL:2.0)	BDL(MDL:2.0)
6	Chemical Oxygen Demand (COD)	mg/L	**100 Max.**	41.3	37.2
7	Biochemical Oxygen Demand (BOD)	mg/L	**30 Max.**	13	11
8	Chloride as Cl^-	mg/L	**600 Max.**	410.5	368.2
9	Total Dissolved Solids	mg/L	**2100 Max.**	1656	1568
10	Sulphate as SO_4	mg/L	**1000 Max.**	101.2	95.5
11	Ammonical Nitrogen	mg/L	**50 Max.**	BDL(MDL:2.0)	BDL(MDL:2.0)
12	% Sodium(Na)	mg/L	**60 Max.**	51.8	50.3
13	Sodium Absorption Ratio(SAR)	mg/L	**26 Max.**	2.1	1.9
14	Sulphide as S^{-2}	mg/L	**02 Max.**	BDL(MDL:0.05)	BDL(MDL:0.05)
15	Total Chromium	mg/L	**02 Max.**	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)
17	Phosphate as PO_4	mg/L	**5.0 Max.**	0.33	0.31
18	Copper as Cu	mg/L	**03 Max.**	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)
20	Zinc as Zn	mg/L	**05 Max.**	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)
22	Iron (as Fe)	mg/L	**1.0 Max.**	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) **Date: 17/09/2021**

Sr.No.	Parameter	Unit	Results			
			Borewell-1	**Borewell-2**	**Borewell-3**	**Borewell-4**
1	pH @ 25 ° C	-	7.63	7.42	7.65	7.49
2	Conductivity (µS)	-	14370	16170	14460	15070
3	Total Dissolved Solids	mg/L	9544	10962	9524	10040
4	Chloride as Cl^-	mg/L	4152	4205.3	4284.3	4333.2
5	Carbonate as CaCO3	mg/L	18.9	25.1	28.2	27.3
6	Bicarbonate as CaCO3	mg/L	205.9	169.9	145.5	161
7	Total Alkalinity	mg/L	366	385.2	365.2	410.7
8	Calcium as Ca	mg/L	322.2	315.5	277.2	359.3
9	Magnesium as Mg	mg/L	225.3	195.6	142.3	176.7
10	Sodium as Na	mg/L	1425	1896	1165	1424
11	Potassium as K	mg/L	78.5	110.3	62.3	82.1
12	Sulphate as SO4-2	mg/L	536.5	744.3	562.3	685.2
13	Nitrate as NO3	mg/L	25.3	27.5	21.1	26.5
14	Phosphate as PO_4	mg/L	2.65	2.95	1.96	2.35
15	Fluoride as F	mg/L	2.4	2.27	2.0	2.7
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	7.5	7.8	7.17	7.69
28	Barium as Ba	mg/L	N.D.	N.D.	N.D.	N.D.

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-1	Unit-2	Unit-3
	Date of Sampling			**22/09/2021**	**22/09/2021**	**22/09/2021**
1	pH @ 25 ° C	--	--	7.82	7.89	7.84
2	Free available Chlorine	° C	Min. 0.5	0.68	0.70	0.67
3	Zinc as Zn	Pt. CO. Scale	1.0	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)
5	Total Chromium as Cr	mg/L	0.2	0.062	0.067	0.063
6	Phosphate as P	mg/L	5.0	0.42	0.41	0.45

3.4.6 Location: Condensate Cooling Tower Water Sample

S.No.	Parameter	Unit	Limit	Results		
				Unit-1	Unit-2	Unit-3
	Date of Sampling			**22/09/2021**	**22/09/2021**	**22/09/2021**
1	pH @ 25 ° C	--	**6.5 to 8.5**	8.13	8.11	7.98
2	Temperature ^{0}C (Inlet)	^{0}C	--	27.0	27.5	28.0
	Temperature ^{0}C (Outlet)	^{0}C	--	29.5	29.5	30.0
	Temperature ^{0}C (Differential)	^{0}C	**7**	2.5	2.0	2.0
3	Free available Chlorine	mg/L	**Min 0.5**	0.67	0.62	0.67

3.4.7 Location: Boiler Blow Down Water Sample DATE: 18/09/2021

Parameter	Unit	Limit	Results		
			Unit -1	Unit -2	Unit -3
Total Suspended Solids	mg/L	**100**	BDL(MDL:4.0)	BDL(MDL:4.0)	BDL(MDL:4.0)
Oil & Grease	mg/L	**10**	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)
Total Copper as Cu	mg/L	**1.0**	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)
Total Iron (as Fe)	mg/L	**1.0**	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)

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: 07-08.07.2021

Result

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	11:40 am - 13:30 pm	61.2	22:15 pm - 00:20 am	56.2
2.	Nr. 20 MLD Plant		60.6		56.4
3.	Nr. Pump House		63.1		62.5
4.	Nr. Coal Handling plant		65.2		63.7
5.	Nr. Gate No.4		59.7		58.9
6.	Nr. Integrated Ash Silo		66.5		62.7
7.	Nr. Main Gate		58.9		57.3
8.	Nr. APCH Building		59.0		56.9
9.	Nr. Shantiniketan-I		59.1		56.1
10.	Nr. OHC Building		60.0		58.9

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

Date of Monitoring: 19.08.2021

Result

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	11:15 am - 13:10 pm	60.4	22:05 pm -00:15 am	55.9
2.	Nr. 20 MLD Plant		63.0		56.8
3.	Nr. Pump House		58.8		54.5
4.	Nr. Coal Handling plant		62.4		56.8
5.	Nr. Gate No.4		57.1		53.6
6.	Nr. Integrated Ash Silo		64.0		62.1
7.	Nr. Main Gate		62.4		56.8
8.	Nr. APCH Building		61.4		57.6
9.	Nr. Shantiniketan-I		59.7		53.3
10.	Nr. OHC Building		60.0		52.3

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

Date of Monitoring: 15-16.09.2021

Result

Sr. No.	Location	Noise Level dB(A)			
		Sampling Time	Day Time dB(A) 06 am - 10 pm Limit 75 dB(A)	Sampling Time	Night Time dB(A) 10 pm - 06 am Limit 70 dB(A)
1.	Nr. LDO Pump House	11:40 am - 13:30 pm	62.7	22:50 pm -00:30 am	61.5
2.	Nr. 20 MLD Plant		61.5		59.9
3.	Nr. Pump House		61.1		58.4
4.	Nr. Coal Handling plant		64.1		61.1
5.	Nr. Gate No.4		56.0		55.7
6.	Nr. Integrated Ash Silo		62.3		60.5
7.	Nr. Main Gate		59.5		56.8
8.	Nr. APCH Building		61.0		58.7
9.	Nr. Shantiniketan-I		61.2		59.2
10.	Nr. OHC Building		60.5		59.7

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 (Apr' 2021 TO Sep'2021)

	Unit 1			Unit 2			Unit 3		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm^3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Apr-21	28.7	504.7	250.0	26.9	476.9	258.5	35.9	445.8	215.4
2-Apr-21	31.2	484.8	247.9	27.8	451.6	281.6	36.4	465.2	221.3
3-Apr-21	34.0	497.9	250.1	28.7	475.8	261.2	35.2	472.8	233.8
4-Apr-21	34.6	512.1	252.5	29.3	491.1	249.0	35.6	469.6	235.2
5-Apr-21	32.5	525.0	254.4	29.0	506.9	236.0	36.5	476.4	233.8
6-Apr-21	32.9	520.8	254.9	28.3	507.9	237.9	38.7	489.4	235.1
7-Apr-21	32.8	523.7	255.5	29.8	511.2	233.7	38.5	506.8	234.3
8-Apr-21	32.8	498.9	253.7	29.6	481.2	260.6	36.0	480.7	229.3
9-Apr-21	33.0	482.4	251.3	28.3	467.2	276.4	36.0	481.9	226.2
10-Apr-21	31.3	480.5	251.0	28.3	459.5	279.5	35.2	475.4	225.2
11-Apr-21	31.4	495.1	252.7	28.3	483.3	263.9	37.4	499.9	232.0
12-Apr-21	31.5	501.6	253.9	28.6	487.6	256.9	35.1	479.7	226.3
13-Apr-21	32.8	493.6	253.0	29.2	480.9	263.5	37.4	427.5	200.9
14-Apr-21	28.2	491.8	252.7	26.9	474.1	267.5	33.8	368.3	168.4
15-Apr-21	28.3	505.5	254.7	27.0	494.1	248.6	33.3	354.6	160.4
16-Apr-21	30.2	516.0	256.7	28.0	508.3	235.4	34.8	383.0	189.9
17-Apr-21	29.8	518.1	257.4	27.8	517.7	232.7	34.6	446.6	248.2
18-Apr-21	26.8	509.3	257.1	26.2	506.7	241.6	35.3	448.8	248.6
19-Apr-21	29.7	515.6	258.1	28.1	520.4	230.8	36.8	450.6	248.7
20-Apr-21	27.4	515.6	258.5	26.4	519.5	230.5	31.6	448.8	248.4
21-Apr-21	27.9	505.9	257.7	26.7	509.7	240.5	32.2	449.6	248.4
22-Apr-21	28.0	509.7	257.9	26.4	507.8	235.3	32.2	451.8	248.9
23-Apr-21	26.9	515.5	258.9	25.5	525.2	227.7	30.7	456.1	248.1
24-Apr-21	33.4	520.0	259.6	28.9	537.8	221.4	38.2	456.9	247.9
25-Apr-21	26.4	510.3	258.9	24.7	522.0	233.7	28.4	455.7	247.1
26-Apr-21	30.1	510.5	258.9	27.0	525.0	233.8	30.0	431.3	231.0
27-Apr-21	32.2	511.0	259.5	28.7	529.8	228.4	36.4	344.3	163.1
28-Apr-21	32.2	505.9	259.1	28.5	519.4	233.5	37.0	392.9	197.2
29-Apr-21	31.1	507.5	259.3	28.5	521.0	231.2	35.9	459.4	245.6
30-Apr-21	29.3	510.4	259.9	26.7	530.5	228.0	32.3	460.1	245.5
1-May-21	31.0	511.4	260.4	28.0	525.3	225.5	36.3	459.9	245.4
2-May-21	29.9	495.0	258.9	27.3	500.5	248.7	35.3	458.8	245.2
3-May-21	25.3	491.4	258.1	24.1	498.4	249.7	28.6	455.9	244.4
4-May-21	29.4	504.2	259.6	27.5	520.1	231.0	34.3	455.3	243.8
5-May-21	27.9	509.6	260.4	27.1	537.1	222.3	32.8	459.6	246.0
6-May-21	29.5	510.2	260.9	27.4	531.3	221.0	33.1	462.1	246.8
7-May-21	27.4	510.5	261.5	25.1	531.9	220.2	31.0	461.3	246.7
8-May-21	32.7	512.5	262.1	29.4	539.6	215.8	38.1	459.7	245.8
9-May-21	26.7	507.2	261.4	25.1	527.4	223.6	31.4	459.6	245.5
10-May-21	24.6	504.5	260.9	25.2	519.2	227.9	28.0	459.8	246.2
11-May-21	27.8	503.6	261.0	26.9	518.4	228.2	32.1	461.5	246.4
12-May-21	26.7	505.3	261.6	26.7	527.0	224.2	32.0	463.4	246.6
13-May-21	26.3	505.6	261.8	24.9	524.5	224.0	33.5	466.9	247.2
14-May-21	26.7	507.0	262.4	25.1	531.3	221.1	34.7	466.3	247.1
15-May-21	28.7	508.0	262.7	25.9	542.7	216.0	36.2	461.7	247.0
16-May-21	21.1	443.7	231.9	19.9	462.2	196.5	29.0	459.6	246.1
17-May-21							24.4	475.4	251.8
18-May-21							18.3	245.6	132.0
19-May-21									
20-May-21									
21-May-21									
22-May-21									
23-May-21									
24-May-21									
25-May-21							24.8	359.4	188.8
26-May-21							29.2	456.8	233.5
27-May-21							31.0	443.8	231.4
28-May-21	18.6	312.7	142.1				30.1	451.7	237.9
29-May-21	30.7	490.8	238.7				38.0	471.7	238.4
30-May-21	28.3	501.7	254.0	25.3	396.1	190.1	35.5	406.5	219.2
31-May-21	24.3	495.3	255.3	20.5	395.9	181.9	31.3	390.2	211.5

Note : Blank coloum -Unit is in shutdown

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 1			Unit 2			Unit 3		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm^3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Jun-21	26.7	480.4	252.0	SD	SD	SD	32.9	410.2	241.6
2-Jun-21	30.3	473.6	247.6	26.7	460.6	229.0	36.0	445.2	267.6
3-Jun-21	29.5	464.9	244.4	26.6	442.6	232.2	36.5	481.3	270.8
4-Jun-21	29.5	484.0	257.9	27.1	428.9	213.9	36.0	424.3	260.3
5-Jun-21	25.8	464.5	244.3	25.5	427.4	223.5	32.5	377.6	254.0
6-Jun-21	25.4	415.8	219.3	25.7	435.6	221.2	32.4	388.9	258.8
7-Jun-21	24.7	425.0	219.5	25.2	435.0	223.3	31.9	380.3	267.1
8-Jun-21	26.4	421.7	215.9	26.5	434.1	225.4	35.7	359.0	269.6
9-Jun-21	26.4	433.4	220.8	26.0	431.2	226.5	34.1	298.4	252.6
10-Jun-21	27.3	428.3	224.1	27.0	437.8	235.6	38.3	291.6	259.2
11-Jun-21	28.5	443.0	228.3	25.4	434.3	238.0	37.2	362.8	255.3
12-Jun-21	26.0	437.5	224.0	25.3	433.1	238.4	36.1	329.7	256.1
13-Jun-21	28.4	431.2	218.5	25.7	438.6	254.1	38.3	312.1	255.8
14-Jun-21	27.9	440.9	223.3	25.8	434.2	242.2	38.6	322.8	249.9
15-Jun-21	27.3	441.8	224.2	25.5	432.5	241.4	38.3	401.2	265.2
16-Jun-21	27.7	443.8	225.6	25.8	437.7	236.6	37.1	258.7	235.5
17-Jun-21	26.4	442.7	222.8	25.3	434.8	230.2	35.4	253.3	222.5
18-Jun-21	25.9	439.5	228.7	25.5	423.6	241.7	35.8	312.2	216.3
19-Jun-21	16.5	295.6	153.4				31.9	348.1	210.6
20-Jun-21							29.2	315.9	281.4
21-Jun-21							31.5	314.7	276.1
22-Jun-21							35.2	439.5	212.1
23-Jun-21	30.1	429.3	216.4	26.8	386.3	228.3	40.6	487.1	261.9
24-Jun-21	27.7	421.4	219.1	25.2	379.1	224.3	37.7	455.3	235.1
25-Jun-21	26.7	433.4	218.7	24.7	388.4	231.9	39.9	414.6	232.9
26-Jun-21	29.9	428.4	217.0	26.3	388.8	228.3	39.8	434.6	255.7
27-Jun-21	29.2	409.0	217.1	25.6	384.2	215.0	38.5	394.8	248.4
28-Jun-21	29.4	410.7	215.5	26.0	392.3	225.3	39.6	396.2	215.1
29-Jun-21	27.9	406.6	211.1	25.6	397.8	237.9	36.8	421.5	211.4
30-Jun-21	26.9	412.9	210.6	25.3	393.1	240.8	35.4	361.9	197.7
1-Jul-21	19.5	301.4	149.1	18.8	264.3	148.7	31.6	425.9	211.0
2-Jul-21							30.9	417.3	199.1
3-Jul-21							30.0	403.9	180.3
4-Jul-21							30.0	402.4	177.8
5-Jul-21	26.4	426.4	210.2	24.6	383.6	195.6	30.4	409.7	188.7
6-Jul-21	32.4	446.6	208.7	28.3	406.2	205.0	31.5	424.5	209.0
7-Jul-21	27.1	405.8	206.5	25.3	407.4	211.1	31.4	422.5	206.2
8-Jul-21	26.4	425.7	216.7	25.7	397.3	204.2	31.4	422.2	205.5
9-Jul-21	26.1	416.7	210.6	25.1	407.9	228.5	31.0	416.7	198.2
10-Jul-21	26.9	409.8	205.2	25.5	407.6	223.9	30.3	409.4	187.9
11-Jul-21	27.3	401.0	203.3				31.0	418.6	201.0
12-Jul-21	27.3	396.7	198.5				29.3	397.8	178.0
13-Jul-21	25.5	403.8	203.7						
14-Jul-21	30.0	399.6	195.6						
15-Jul-21	30.9	405.2	200.6						
16-Jul-21	27.5	403.9	196.9						
17-Jul-21	25.4	412.0	195.4						
18-Jul-21	26.1	418.0	197.1						
19-Jul-21									
20-Jul-21									
21-Jul-21									
22-Jul-21									
23-Jul-21									
24-Jul-21									
25-Jul-21									
26-Jul-21									
27-Jul-21									
28-Jul-21									
29-Jul-21									
30-Jul-21									
31-Jul-21									

Note : Blank coloum -Unit is in shutdown

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 1			Unit 2			Unit 3		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm^3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Aug-21									
2-Aug-21									
3-Aug-21									
4-Aug-21									
5-Aug-21									
6-Aug-21									
7-Aug-21	30.0	361.2	182.9						
8-Aug-21	28.1	416.6	209.7	25.5	360.1	201.0	31.6	370.6	191.5
9-Aug-21	28.9	392.4	224.0	26.2	379.0	207.6	33.5	367.0	190.2
10-Aug-21	25.3	413.1	221.0	25.3	371.2	210.5	32.1	370.6	194.7
11-Aug-21	25.1	427.2	208.7	24.5	365.2	213.6	31.5	373.9	197.9
12-Aug-21	29.2	428.7	202.0	26.2	370.9	211.3	34.8	375.2	198.8
13-Aug-21	27.6	421.9	200.6	26.2	368.4	215.4	33.5	388.0	210.9
14-Aug-21	27.8	414.6	203.3	25.1	382.0	221.0	19.6	136.6	77.9
15-Aug-21	31.5	402.7	214.2	27.5	398.6	232.0			
16-Aug-21	32.4	403.0	214.1	28.5	398.3	232.0	32.9	395.8	251.0
17-Aug-21	32.6	400.0	214.0	28.7	400.4	232.9	33.7	384.1	248.2
18-Aug-21	29.0	408.0	216.6	26.7	398.2	228.8	30.3	395.0	239.0
19-Aug-21	26.7	409.5	215.7	25.3	412.4	234.1	29.9	422.6	226.6
20-Aug-21	30.0	426.3	227.8	26.8	408.3	230.9	32.9	423.4	231.3
21-Aug-21	30.3	428.7	216.2	27.0	411.1	235.1	33.3	420.4	226.1
22-Aug-21	26.3	426.9	220.8	25.5	408.8	231.5	30.3	420.3	225.5
23-Aug-21	28.0	427.2	227.0	25.6	408.2	228.0	32.0	417.3	224.0
24-Aug-21	29.5	419.7	214.5	26.6	399.7	222.6	34.8	411.7	214.1
25-Aug-21	27.5	416.4	207.2	25.9	399.6	223.5	32.5	413.5	212.8
26-Aug-21							34.4	411.3	215.0
27-Aug-21							35.7	413.2	214.4
28-Aug-21							35.3	411.7	214.8
29-Aug-21							35.7	411.4	216.3
30-Aug-21							31.6	413.1	212.9
31-Aug-21									
1-Sep-21									
2-Sep-21									
3-Sep-21									
4-Sep-21									
5-Sep-21									
6-Sep-21									
7-Sep-21									
8-Sep-21									
9-Sep-21									
10-Sep-21									
11-Sep-21									
12-Sep-21									
13-Sep-21									
14-Sep-21									
15-Sep-21									
16-Sep-21				25.3	396.1	218.8			
17-Sep-21	27.6	429.8	243.2	25.4	407.8	224.4	31.8	418.0	220.4
18-Sep-21	30.2	423.2	210.0	27.1	410.4	220.1	34.7	422.5	220.4
19-Sep-21	28.8	421.6	215.1	25.2	409.4	220.2	30.7	419.3	216.9
20-Sep-21	31.0	422.0	208.5	27.5	407.5	224.2	35.3	423.0	217.2
21-Sep-21	27.9	430.3	208.5				30.9	430.4	220.3
22-Sep-21	29.0	432.1	211.1	18.4	198.0	108.1	31.9	424.5	220.9
23-Sep-21	28.6	430.3	210.0	26.0	413.7	218.9	31.6	425.0	216.4
24-Sep-21	30.5	432.4	213.7	27.3	413.9	219.5	36.2	422.9	214.4
25-Sep-21	26.4	433.3	213.2	24.7	412.6	220.2	30.0	424.7	213.6
26-Sep-21	29.3	431.9	210.9	26.2	410.5	220.5	34.7	430.1	216.2
27-Sep-21	27.9	432.2	214.4	25.2	411.8	220.6	32.3	427.7	214.3
28-Sep-21	28.3	427.9	215.4	25.1	415.4	218.1	32.9	429.0	214.0
29-Sep-21	24.8	434.8	211.2	21.8	325.5	174.9	25.8	426.6	216.5
30-Sep-21							28.4	426.4	216.1

Note : Blank coloum -Unit is in shutdown

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Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 4			Unit 5			Unit 6		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Apr-21	35.5	468.3	230.9	32.5	445.3	234.6	33.6	450.3	244.8
2-Apr-21	36.5	510.6	209.5	33.1	459.0	242.6	33.2	445.3	236.6
3-Apr-21	37.9	433.7	201.9	34.0	477.2	253.2	34.2	455.5	251.0
4-Apr-21	38.5	415.7	195.3	32.7	448.4	236.6	33.0	441.2	230.8
5-Apr-21	39.6	429.2	199.5	34.1	475.8	253.2	34.1	455.5	251.4
6-Apr-21	39.6	487.5	229.0	32.9	457.6	240.6	33.1	442.8	233.0
7-Apr-21	38.8	488.6	228.8	34.6	485.2	259.1	34.2	455.3	250.5
8-Apr-21	35.7	483.0	229.1	34.7	487.0	260.1	34.4	456.6	252.3
9-Apr-21	35.8	487.2	228.3	34.6	483.1	259.2	34.0	452.6	246.7
10-Apr-21	35.2	488.6	228.1	33.7	467.3	248.1	33.3	444.5	235.8
11-Apr-21	35.7	491.9	228.4	31.9	436.7	228.2	32.7	437.7	225.8
12-Apr-21	34.6	490.5	228.2	34.6	484.8	259.1	34.3	456.3	252.1
13-Apr-21	36.2	488.9	228.6	34.3	482.4	256.7	34.2	456.0	251.9
14-Apr-21	34.5	491.0	229.2	33.4	470.5	247.4	34.0	453.8	249.2
15-Apr-21	35.3	497.8	229.5	34.3	480.8	255.7	34.2	454.7	250.1
16-Apr-21	34.5	500.9	229.0	32.6	456.2	237.8	33.0	443.8	235.2
17-Apr-21	34.6	505.0	228.5	33.4	465.3	246.0	33.7	451.6	246.3
18-Apr-21	29.3	494.9	228.8	33.1	458.9	242.2	33.6	450.9	245.6
19-Apr-21	33.1	500.3	228.5	32.3	448.8	233.8	33.3	447.0	239.5
20-Apr-21	33.6	507.2	228.3	33.1	457.2	242.2	34.0	454.3	249.7
21-Apr-21	34.0	496.3	228.3	32.4	447.1	234.1	32.4	435.6	223.7
22-Apr-21	32.6	500.6	228.5	31.9	441.5	228.9	32.9	442.3	232.5
23-Apr-21	30.3	522.5	227.8	31.4	429.1	222.7	32.4	438.0	227.8
24-Apr-21	38.4	516.1	227.7	31.8	441.0	228.8	32.1	432.5	219.7
25-Apr-21	32.9	509.2	227.5	31.6	433.0	224.7	31.5	424.0	207.7
26-Apr-21	35.7	515.6	227.6	32.7	455.9	238.7	32.5	435.8	223.5
27-Apr-21	38.7	510.4	227.9	32.4	449.1	234.8	32.1	431.5	218.2
28-Apr-21	37.1	510.8	227.9	32.2	448.2	233.0	32.6	440.4	231.1
29-Apr-21	37.2	510.7	227.8	31.7	435.5	226.4	33.1	445.4	237.8
30-Apr-21	35.5	515.7	228.6	32.0	435.4	229.3	33.1	445.5	237.8
1-May-21	35.6	524.5	228.8	31.7	431.6	225.6	31.8	426.3	210.6
2-May-21	33.6	519.7	228.7	31.0	421.7	218.4	31.2	419.3	201.4
3-May-21	27.2	512.3	227.3	31.0	416.0	217.7	31.8	427.5	212.7
4-May-21	35.4	512.4	226.2	32.8	461.0	240.4	32.8	440.9	231.2
5-May-21	34.9	515.9	226.7	30.9	421.4	218.0	31.7	426.5	210.2
6-May-21	34.8	514.1	226.4	30.6	415.6	214.2	31.0	417.3	198.0
7-May-21	34.4	515.1	226.4	31.2	426.9	221.2	31.0	416.5	198.0
8-May-21	38.0	520.8	226.5	30.8	416.8	216.1	32.4	434.4	222.8
9-May-21	33.3	523.4	226.8	30.4	412.4	212.0	31.7	426.6	210.8
10-May-21	32.3	524.0	226.9	30.6	411.8	213.5	31.2	419.1	201.1
11-May-21	36.4	530.6	226.8	30.5	409.3	212.3	31.0	417.4	198.3
12-May-21	36.8	542.1	227.1	30.7	413.2	214.1	30.7	413.4	193.5
13-May-21	31.2	549.7	227.5	30.8	418.1	216.2	30.7	413.9	194.4
14-May-21	32.1	551.5	227.3				32.5	435.9	223.7
15-May-21	34.8	538.3	227.1				31.8	427.0	211.7
16-May-21	25.7	540.2	227.9				31.9	428.1	212.7
17-May-21	24.8	545.4	241.7				33.2	446.3	238.6
18-May-21							33.0	443.9	235.1
19-May-21							32.1	432.8	219.2
20-May-21	32.0	500.9	247.9				32.2	433.0	219.5
21-May-21	25.3	492.0	242.9				31.2	420.9	203.6
22-May-21	32.5	472.5	232.2				31.2	420.7	202.6
23-May-21	26.7	423.4	198.8				30.8	416.7	197.4
24-May-21	34.0	414.6	221.8				31.9	428.1	212.9
25-May-21	30.8	442.6	211.4				31.6	424.5	208.0
26-May-21	19.5	280.9	101.9				33.1	442.5	232.6
27-May-21							32.0	432.1	218.5
28-May-21	21.4	270.7	132.4				31.5	422.7	205.5
29-May-21	38.3	490.7	233.8				31.6	424.5	207.3
30-May-21	34.4	385.4	240.1				31.8	428.8	214.2
31-May-21	27.5	368.7	216.2				32.2	433.7	220.4

Note : Blank coloum -Unit is in shutdown

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Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 4			Unit 5			Unit 6		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Jun-21	28.9	406.0	251.5				30.7	412.7	192.4
2-Jun-21	35.0	430.8	210.3				30.5	407.3	183.9
3-Jun-21	32.4	417.6	206.5				30.7	413.7	194.4
4-Jun-21	33.2	421.8	213.5				32.3	434.5	221.7
5-Jun-21	28.1	414.5	203.9				30.5	410.0	188.2
6-Jun-21	26.8	405.1	195.8				31.3	419.2	201.6
7-Jun-21	25.7	377.8	193.1				31.2	418.6	200.7
8-Jun-21	32.0	402.9	214.0				31.6	423.5	206.4
9-Jun-21	32.9	395.6	213.8				31.4	422.2	205.1
10-Jun-21	34.5	368.6	212.5				30.9	416.1	197.1
11-Jun-21	30.6	400.8	247.4				30.9	415.7	196.4
12-Jun-21	27.7	385.1	226.6				31.2	420.1	202.3
13-Jun-21	32.0	369.3	225.5				30.9	416.4	197.0
14-Jun-21	34.3	279.0	221.5				31.2	419.2	201.0
15-Jun-21	29.9	247.7	193.9				31.0	418.7	200.2
16-Jun-21	29.1	250.7	193.3				30.4	409.1	187.1
17-Jun-21	26.9	359.1	207.6				30.7	414.5	195.2
18-Jun-21	27.0	324.2	198.0				31.1	418.6	200.9
19-Jun-21	22.6	319.7	197.5				30.7	413.3	193.7
20-Jun-21							30.7	413.4	193.7
21-Jun-21							31.1	417.8	199.4
22-Jun-21	21.8	401.1	194.2				31.6	424.9	209.4
23-Jun-21	33.7	422.3	237.5				31.7	425.0	209.6
24-Jun-21	29.0	381.0	235.3				31.8	427.2	212.4
25-Jun-21	32.0	356.3	253.9				31.1	418.9	201.0
26-Jun-21	34.3	475.7	269.9				30.7	414.0	194.3
27-Jun-21	30.6	453.6	245.7				31.0	418.4	200.4
28-Jun-21	32.2	477.2	259.1				31.3	420.1	202.3
29-Jun-21	29.7	453.3	247.8				33.0	441.8	232.3
30-Jun-21	26.5	418.8	235.9				33.3	450.3	245.2
1-Jul-21	25.2	415.7	235.6				31.6	425.9	211.0
2-Jul-21	22.9	378.0	217.5				30.9	417.3	199.1
3-Jul-21	23.2	424.4	222.1				30.0	403.9	180.3
4-Jul-21	27.9	530.8	246.2				30.0	402.4	177.8
5-Jul-21	28.0	336.7	253.1				30.4	409.7	188.7
6-Jul-21	34.3	408.7	281.9				31.5	424.5	209.0
7-Jul-21	27.2	394.9	295.3				31.4	422.5	206.2
8-Jul-21	24.5	392.8	279.2				31.4	422.2	205.5
9-Jul-21	25.2	380.9	287.1				31.0	416.7	198.2
10-Jul-21	26.9	398.2	281.8				30.3	409.4	187.9
11-Jul-21	27.1	399.3	283.4				31.0	418.6	201.0
12-Jul-21	25.5	432.2	300.9				29.3	397.8	178.0
13-Jul-21				30.6	409.5	214.0			
14-Jul-21				29.9	385.3	206.0			
15-Jul-21				29.5	379.7	201.5			
16-Jul-21				31.0	411.9	217.7			
17-Jul-21				31.4	432.0	223.7			
18-Jul-21				29.4	377.9	199.6			
19-Jul-21				29.2	367.5	198.9			
20-Jul-21				28.8	358.6	194.3			
21-Jul-21				28.8	358.6	194.5			
22-Jul-21				29.5	375.3	202.1			
23-Jul-21				29.7	379.6	203.6			
24-Jul-21				30.6	401.9	213.2			
25-Jul-21				30.4	400.7	211.3			
26-Jul-21				30.7	415.8	215.1			
27-Jul-21				30.2	404.0	209.6			
28-Jul-21				29.2	369.6	199.7			
29-Jul-21				28.8	359.3	194.4			
30-Jul-21				28.6	350.9	190.3			
31-Jul-21				28.6	352.5	191.2			

Note : Blank coloum -Unit is in shutdown

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 4			Unit 5			Unit 6		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Aug-21	0.1	14.1	3.0	29.4	374.1	200.2			
2-Aug-21	0.0	15.1	2.2	29.9	388.5	206.8			
3-Aug-21	0.1	15.4	2.0	31.0	418.2	218.7			
4-Aug-21	0.1	17.2	1.7	30.9	413.1	217.3			
5-Aug-21	0.1	18.8	1.3	31.2	424.0	220.9			
6-Aug-21	0.0	19.4	1.2	31.1	419.8	219.7			
7-Aug-21	10.6	76.5	38.6	31.5	428.9	223.8			
8-Aug-21	28.9	340.8	211.3	30.0	389.5	207.0			
9-Aug-21	32.2	361.8	220.2	29.6	379.6	202.7			
10-Aug-21	25.0	363.8	220.2	30.5	403.1	213.1			
11-Aug-21	18.3	251.8	151.2	30.9	412.7	216.8			
12-Aug-21	4.3	41.4	23.4	31.2	421.5	220.0			
13-Aug-21	28.2	386.6	226.4	31.4	427.9	222.7			
14-Aug-21	28.3	400.7	246.7	31.3	424.5	222.7			
15-Aug-21	7.4	87.1	49.4	30.2	396.0	209.4			
16-Aug-21	34.6	433.7	235.6	31.1	418.8	219.7			
17-Aug-21	34.1	425.1	235.0	32.7	457.8	239.4			
18-Aug-21	29.5	429.6	232.1	32.9	459.8	241.5			
19-Aug-21	27.8	438.3	223.3	31.7	431.3	225.7			
20-Aug-21	33.6	410.0	205.1	31.6	432.5	225.9			
21-Aug-21	34.8	436.6	224.8	30.9	410.0	217.2			
22-Aug-21	26.6	436.8	216.4	30.1	389.0	207.6			
23-Aug-21	28.8	437.0	217.1	30.5	402.5	212.8			
24-Aug-21	31.5	439.3	219.2	30.9	412.0	216.4			
25-Aug-21	27.6	422.5	210.3	31.2	420.6	220.7			
26-Aug-21	34.1	430.9	206.1	33.5	468.8	247.5			
27-Aug-21	34.0	431.1	199.1	34.3	485.5	257.2			
28-Aug-21	33.1	421.8	200.2	32.8	465.0	241.9			
29-Aug-21	32.9	413.1	193.4	33.1	455.0	243.0			
30-Aug-21	29.4	414.7	192.5	31.5	432.7	226.5			
31-Aug-21	13.0	181.6	85.7	31.5	432.3	225.3			
1-Sep-21				30.5	407.8	212.0	23.5	293.0	148.1
2-Sep-21				30.9	414.0	216.2	30.0	416.3	177.9
3-Sep-21				30.7	414.0	215.5			
4-Sep-21				30.6	400.5	213.7			
5-Sep-21				30.8	412.3	215.6			
6-Sep-21				30.6	405.6	212.9			
7-Sep-21				30.2	394.0	208.9			
8-Sep-21									
9-Sep-21									
10-Sep-21									
11-Sep-21									
12-Sep-21									
13-Sep-21									
14-Sep-21									
15-Sep-21									
16-Sep-21									
17-Sep-21									
18-Sep-21									
19-Sep-21									
20-Sep-21									
21-Sep-21				26.4	313.0	176.2			
22-Sep-21				30.2	512.2	209.8			
23-Sep-21				30.3	477.5	210.6			
24-Sep-21									
25-Sep-21									
26-Sep-21									
27-Sep-21									
28-Sep-21									
29-Sep-21									
30-Sep-21	28.3	424.7	219.8						

Note : Blank coloum -Unit is in shutdown

adani

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 7			Unit 8			Unit 9		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Apr-21	31.1	165.6	232.3	SD	SD	SD	31.3	168.1	257.8
2-Apr-21	31.2	166.2	234.8	SD	SD	SD	32.3	174.9	262.6
3-Apr-21	32.5	170.3	240.5	30.2	149.5	204.9	33.1	177.9	266.3
4-Apr-21	32.1	168.9	237.7	33.5	163.8	279.9	34.1	178.4	268.4
5-Apr-21	32.9	170.0	242.3	34.4	165.4	287.6	34.0	179.0	269.1
6-Apr-21	30.5	164.2	227.6	33.1	162.5	275.8	34.3	177.4	267.6
7-Apr-21	32.5	170.2	242.3	34.2	164.8	288.2	37.0	181.3	273.4
8-Apr-21	32.7	171.5	246.1	34.2	157.1	249.6	34.6	181.9	272.1
9-Apr-21	31.9	168.9	239.0	33.5	164.3	288.7	33.9	178.9	269.3
10-Apr-21	31.1	166.1	232.9	32.5	162.7	282.0	32.3	170.9	261.4
11-Apr-21	30.0	163.4	228.6	31.7	161.2	276.6	30.7	162.2	251.3
12-Apr-21	31.7	167.7	236.2	32.6	163.4	284.2	32.9	176.0	265.4
13-Apr-21	31.9	169.0	238.5	33.5	164.7	294.7	34.2	180.1	269.9
14-Apr-21	32.3	169.1	238.3	32.5	162.8	282.1	32.2	173.7	262.3
15-Apr-21	32.3	168.9	237.4	33.4	164.8	290.3	34.5	179.6	269.2
16-Apr-21	31.5	167.4	233.7	32.6	162.7	280.8	32.9	176.5	264.4
17-Apr-21	32.0	168.7	237.3	33.0	163.7	286.4	32.1	171.0	260.9
18-Apr-21	30.0	162.8	226.3	31.3	160.1	270.9	31.8	167.8	257.8
19-Apr-21	30.2	164.2	227.1	30.3	158.5	263.9	32.3	168.4	258.1
20-Apr-21	32.1	169.6	237.2	33.0	163.4	284.8	34.0	175.4	265.7
21-Apr-21	30.3	164.2	227.6	31.3	160.4	273.0	29.4	151.2	239.7
22-Apr-21	30.3	163.8	228.1	31.1	160.1	273.7	30.8	159.2	251.3
23-Apr-21	30.3	164.5	227.0	30.0	157.2	258.6	28.5	153.4	242.2
24-Apr-21	29.9	162.9	224.1	30.2	157.7	260.4	30.1	156.7	243.8
25-Apr-21	29.0	159.9	219.2	29.2	156.1	253.5	28.5	152.5	238.7
26-Apr-21	31.1	167.6	232.2	32.4	162.1	282.5	32.5	168.5	259.7
27-Apr-21	30.8	165.9	230.3	32.3	162.1	280.8	33.7	178.5	266.9
28-Apr-21	30.9	166.5	231.8	32.6	162.7	283.9	35.0	180.8	269.9
29-Apr-21	30.4	164.4	227.7	33.0	163.4	284.7	34.2	175.5	265.8
30-Apr-21	30.7	165.2	230.1	32.9	163.3	288.6	35.9	178.5	269.6
1-May-21	30.0	164.1	225.8	31.1	159.6	269.5	30.6	158.7	249.9
2-May-21	28.4	156.8	217.4	29.1	156.1	253.0	27.9	143.6	229.0
3-May-21	28.5	158.0	220.0	29.9	158.0	266.6	29.0	149.7	235.3
4-May-21	28.9	159.9	220.4	31.4	160.6	276.4	28.6	153.5	244.7
5-May-21	29.3	161.0	222.2	30.9	159.8	271.0	28.7	150.6	238.3
6-May-21				31.0	159.6	270.9	28.9	153.2	241.8
7-May-21				30.2	156.7	257.5	26.2	133.9	215.4
8-May-21				30.8	159.3	270.5	28.1	147.5	236.2
9-May-21				30.1	157.8	263.1	29.3	160.4	248.9
10-May-21				30.3	157.8	264.2	27.0	138.1	221.0
11-May-21				29.1	155.7	251.2	27.6	143.7	228.4
12-May-21				29.3	156.1	254.7	26.1	134.1	217.5
13-May-21				29.4	156.3	255.3	27.1	134.9	213.6
14-May-21				30.8	158.7	265.2	32.9	165.7	255.5
15-May-21				32.6	162.0	284.5	29.9	165.2	252.0
16-May-21				30.4	158.2	264.1	31.4	163.2	251.8
17-May-21				32.9	162.6	281.3	31.8	165.8	255.1
18-May-21				32.2	161.0	273.2	33.5	173.0	261.4
19-May-21				30.1	157.9	263.0	27.6	147.3	233.9
20-May-21				29.8	156.9	260.7	28.0	143.2	227.0
21-May-21				30.3	158.5	266.3	28.8	151.1	235.7
22-May-21				30.0	157.7	262.6	27.0	136.7	217.9
23-May-21				29.2	155.9	252.9	27.3	142.2	225.8
24-May-21				29.7	157.0	259.2	28.4	148.6	233.7
25-May-21				29.9	157.4	260.7	31.2	166.6	254.5
26-May-21				31.6	160.4	277.1	33.5	178.2	264.4
27-May-21				30.2	158.0	265.6	35.9	181.3	270.8
28-May-21				33.1	163.0	286.6	35.2	180.5	269.4
29-May-21				31.5	160.2	273.0	31.2	170.6	256.5
30-May-21				30.7	158.5	267.6	29.6	162.6	248.4
31-May-21				31.1	158.9	267.3	30.8	163.4	249.3

Note : Blank coloum -Unit is in shutdown

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 7			Unit 8			Unit 9		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Jun-21				29.1	154.9	247.2	27.9	141.3	225.1
2-Jun-21				30.7	158.6	271.1	32.3	174.0	260.7
3-Jun-21				30.5	158.3	268.2	31.1	164.8	253.9
4-Jun-21				31.1	159.4	272.4	31.1	165.9	255.0
5-Jun-21				30.6	157.9	262.1	29.2	158.8	245.5
6-Jun-21				31.5	160.1	271.7			
7-Jun-21				30.8	159.2	270.3			
8-Jun-21				31.3	159.7	274.8			
9-Jun-21				31.1	159.4	272.1			
10-Jun-21				30.8	158.7	267.5			
11-Jun-21				30.0	156.8	260.2			
12-Jun-21				31.2	159.6	268.3			
13-Jun-21				30.3	157.3	260.1			
14-Jun-21				31.4	159.8	274.7			
15-Jun-21				31.8	160.2	275.0			
16-Jun-21				30.8	158.0	262.1			
17-Jun-21				31.7	160.0	275.4			
18-Jun-21				31.6	160.2	276.4			
19-Jun-21				30.6	158.2	267.9			
20-Jun-21				29.6	156.2	256.5			
21-Jun-21				30.6	158.6	271.1			
22-Jun-21				31.9	160.9	279.7			
23-Jun-21				31.6	160.2	277.0			
24-Jun-21				31.7	160.1	273.1			
25-Jun-21				29.9	156.7	256.5			
26-Jun-21				31.2	159.1	270.4			
27-Jun-21				31.3	159.8	276.9			
28-Jun-21				32.0	160.4	280.2			
29-Jun-21				33.5	163.4	292.0			
30-Jun-21				32.9	162.8	285.4			
1-Jul-21				31.0	158.7	264.4	SD	SD	SD
2-Jul-21				30.3	157.6	262.1	SD	SD	SD
3-Jul-21				30.4	158.0	263.0	SD	SD	SD
4-Jul-21				33.7	119.2	54.0	29.9	147.0	234.4
5-Jul-21							29.9	148.9	237.1
6-Jul-21							31.6	158.9	247.8
7-Jul-21							30.8	154.7	245.0
8-Jul-21							29.8	148.7	235.1
9-Jul-21							30.5	154.3	241.8
10-Jul-21							29.8	146.2	234.1
11-Jul-21							29.2	143.3	230.3
12-Jul-21							28.3	136.2	222.2
13-Jul-21							29.2	142.9	228.6
14-Jul-21							29.5	143.0	229.0
15-Jul-21							29.8	144.1	230.3
16-Jul-21							30.1	146.9	233.4
17-Jul-21							29.3	144.2	229.4
18-Jul-21							28.5	137.9	224.2
19-Jul-21							27.1	123.6	203.0
20-Jul-21							26.8	120.6	198.7
21-Jul-21							27.7	127.9	206.5
22-Jul-21							28.7	136.8	219.0
23-Jul-21							29.5	142.9	227.5
24-Jul-21							30.8	151.6	239.1
25-Jul-21							29.0	142.9	229.3
26-Jul-21							29.5	143.6	229.7
27-Jul-21							29.5	143.9	228.4
28-Jul-21							28.0	131.2	213.1
29-Jul-21							27.8	129.3	209.1
30-Jul-21							27.9	130.1	209.1
31-Jul-21							28.0	128.7	207.5

Note : Blank coloum -Unit is in shutdown

Adani Power (Mundra) Limited, Mundra

Continues Environment Monitoring System Reports (Apr' 2021 TO Sep'2021)

	Unit 7			Unit 8			Unit 9		
Date	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)	PM mg/Nm3 (Avg)	SOx mg/Nm3 (Avg)	NOx mg/Nm3 (Avg)
1-Aug-21							27.9	130.6	212.3
2-Aug-21							28.7	136.4	218.6
3-Aug-21							30.1	147.4	234.6
4-Aug-21							29.9	143.9	229.1
5-Aug-21							29.9	145.5	231.5
6-Aug-21							30.7	151.2	239.9
7-Aug-21							32.6	163.6	253.7
8-Aug-21							29.5	140.0	222.7
9-Aug-21							29.1	136.5	215.9
10-Aug-21							29.7	144.7	230.2
11-Aug-21							29.6	142.2	226.8
12-Aug-21							31.3	150.5	239.5
13-Aug-21							30.6	147.2	233.7
14-Aug-21							30.3	145.9	230.7
15-Aug-21							28.3	135.6	213.1
16-Aug-21							32.0	152.6	242.5
17-Aug-21							35.7	174.9	265.2
18-Aug-21							34.1	169.8	259.0
19-Aug-21							30.8	151.6	237.6
20-Aug-21							31.5	157.8	244.5
21-Aug-21							28.7	139.0	224.5
22-Aug-21							28.0	132.3	216.4
23-Aug-21							30.0	141.2	225.1
24-Aug-21							31.7	152.9	242.3
25-Aug-21									
26-Aug-21									
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30-Sep-21									

Note : Blank coloum -Unit is in shutdown

Terrestrial Ecology Report
(April 2021 to September 2021)

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 **April 2021 to September 2021** in two different seasons comprising Pre monsoon and monsoon season.

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

Sr. No.	Name of Location	Aerial Distance from Plant (Approx. Km)	GPS Location
1	Near Siracha Village	2.0	N 22° 50' 21.95" E 69° 33' 46.74"
2	Near Tunda Village	1.5	N 22° 50' 13.72" E 69° 32' 10.12"
3	Near Kandagra Village	3.0	N 22° 50' 22.85" E 69° 31' 32.85"
4	Near Navinal Creek	8.5	N 22° 48' 14.25" E 69° 37' 57.21"
5	Near Vandh Village	0.5	N 22° 48' 44.63" E 69° 32' 33.38"
6	Near Desalpar Village	7.0	N 22° 52' 51.22" E 69° 34' 44.82"
7	Common Intake Channel area	3.8	N 22° 47' 32.02" E 69° 32' 10.25"
8	Outfall Channel and Kotdi creek area	3.5	N 22° 48' 08.21" E 69° 34' 34.08"

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*. *Acasia 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 (Amli)* etc are also commonly observed in the study area.

Plate 2: Figure showing dry arid thorn forest type (Before Monsson)

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 nevulia, Prosopis juliflora, Zizyphus mauritiana, Zizyphus nummularia, Tamarix dioica, etc. forms middle layer of vegetation.

Ground layer vegetation consists of *Aloe vera, Achyranthes aspera, Boerrhavia 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^2, 25 m^2 and 1 m^2 respectively. The data obtained was further used to estimate Relative Density, Relative Frequency, Relative Dominance and calculation of Importance Value Index (IVI).

Plate 3: shows dry saline soil turns into wetland during Monsoon Season

The Importance Value Index (IVI) for trees varies between 22.69 and 45.86. The highest IVI of studied tree recorded in study area is of *Cocos nucifera* (45.86) and lowest IVI recorded is of *Casuarina equisetifolia* (22.69) during study period. For shrubs, IVI varies between 12.53 and 35.69. The highest IVI of studied shrubs recorded in study area is of *Cassia auriculata* (35.69) and lowest IVI recorded is of *Calotropis procera* (12.53) during study period. The undergrowth vegetation (herbs) shows IVI in between 9.67 and 26.90. The highest IVI of studied herbs recorded in study area is of *Suaeda fruticosa* (26.90) and lowest IVI recorded is of *Solanum xanthocarpum* (9.67) 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:

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

Where H' = Shannon-Wiener diversity index

Pi = Proportional abundance of the i th (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 **2.04, 2.21** and **2.20** 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)
Acacia nilotica	NE	6	20	45	7.16	14.32	0.02	200	7.94	0.16	4.98	0.6	12.00	24.92	0.0794	-2.5337	0.20
Azadiracta indica	NE	8	28	67	10.66	21.32	0.04	280	11.11	0.36	11.04	0.8	16.00	38.15	0.1111	-2.1972	0.24
Borassus flabellifer	NE	3	9	87	13.84	27.69	0.06	90	3.57	0.60	18.62	0.3	6.00	28.19	0.0357	-3.3322	0.12
Casuarina equisetifolia	NE	4	35	18	2.86	5.73	0.00	350	13.89	0.03	0.80	0.4	8.00	22.69	0.1389	-1.9741	0.27
Cocos nucifera	NE	6	34	91	14.48	28.96	0.07	340	13.49	0.66	20.37	0.6	12.00	45.86	0.1349	-2.0031	0.27
Mangifera indica	DD	6	32	55	8.75	17.50	0.02	320	12.70	0.24	7.44	0.6	12.00	32.14	0.1270	-2.0637	0.26
Phoenix dactylifera	NE	5	19	95	15.12	30.24	0.07	190	7.54	0.72	22.20	0.5	10.00	39.74	0.0754	-2.5850	0.19
Prosopis juliflora	NE	8	65	34	5.41	10.82	0.01	650	25.79	0.09	2.84	0.8	16.00	44.64	0.2579	-1.3550	0.35
Salvadora persica	NE	4	10	69	10.98	21.96	0.04	100	3.97	0.38	11.71	0.4	8.00	23.68	0.0397	-3.2268	0.13
Total			**252**					**2520**	**100.00**	**3.23**	**100.00**	**5**	**100.00**	**300.00**			**2.04**
																Shannon-Wiener	**2.04**

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)
Aerva javanica	NE	3	7	18	5.65	0.30	7.69	13.34	0.0565	-2.8744	0.16
Calotropis gigantea	NE	5	8	20	6.45	0.50	12.82	19.27	0.0645	-2.7408	0.18
Calotropis procera	NE	3	6	15	4.84	0.30	7.69	12.53	0.0484	-3.0285	0.15
Capparis deciduas	NE	3	8	20	6.45	0.30	7.69	14.14	0.0645	-2.7408	0.18
Cassia auriculata	NE	7	22	55	17.74	0.70	17.95	35.69	0.1774	-1.7292	0.31
Euphorbia spp.	NE	3	15	38	12.10	0.30	7.69	19.79	0.1210	-2.1122	0.26
Tamarix dioica	NE	3	15	38	12.10	0.30	7.69	19.79	0.1210	-2.1122	0.26
Thevetia peruviana	NE	3	8	20	6.45	0.30	7.69	14.14	0.0645	-2.7408	0.18
Zizyphus mauritiana	NE	5	16	40	12.90	0.50	12.82	25.72	0.1290	-2.0477	0.26
Zizyphus numularia	NE	4	19	48	15.32	0.40	10.26	25.58	0.1532	-1.8758	0.29
		Total	**124**	**310**	**100.00**	**3.90**	**100.00**	**200.00**			**2.21**
										Shannon-Wiener	**2.21**

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)
Achyranthes aspera	NE	4	26	0.26	14.05	0.4	11.76	25.82	0.1405	-1.9623	0.28
Aloe vera	NE	5	22	0.22	11.89	0.5	14.71	26.60	0.1189	-2.1293	0.25
Boerrhavia diffusa	NE	2	11	0.11	5.95	0.2	5.88	11.83	0.0595	-2.8225	0.17
Citrullus colocynthis	NE	2	23	0.23	12.43	0.2	5.88	18.31	0.1243	-2.0849	0.26
Ipomoea biloba	NE	6	6	0.06	3.24	0.6	17.65	20.89	0.0324	-3.4286	0.11
Salicornia brachiata	NE	1	26	0.26	14.05	0.1	2.94	17.00	0.1405	-1.9623	0.28
Solanum xanthocarpum	NE	2	7	0.07	3.78	0.2	5.88	9.67	0.0378	-3.2744	0.12
Indigofera cordifolia	NE	2	22	0.22	11.89	0.2	5.88	17.77	0.1189	-2.1293	0.25
Sporolobus maderaspatenus	NE	4	28	0.28	15.14	0.4	11.76	26.90	0.1514	-1.8882	0.29
Suaeda fruticosa	NE	6	14	0.14	7.57	0.6	17.65	25.21	0.0757	-2.5813	0.20
Tridax procumbens	NE	4	26	0.26	14.05	0.4	11.76	25.82	0.1405	-1.9623	0.28
		Total	**185**	**1.85**	**100.00**	**3.4**	**100.00**	**200.00**			**2.20**
										Shannon-Wiener	**2.20**

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.

Plate 4: Indian Jackal recorded within Study Area of 10 Km

***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 and Mojave fringe-toed lizard are 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
	Mammals			
1	Nilgai	*Boselaphus tragocamelus*	*LC*	Schedule III
2	Indian Jackal	*Canis aureus*	*LC*	Schedule II
3	Common Mongoose	*Herpestes edwardsii*	*LC*	Schedule II
4	Indian Hare	*Lepus nigricollis*	*LC*	Schedule IV
5	Wild Boar	*Sus scrofa*	*LC*	Schedule III
6	Camel	*Camelus bactrianus*	*LC*	Schedule IV
7	Palm squirrel	*Funambulus pennanti*	*LC*	Schedule IV
8	Fruit Bat	*Cyanopterus sphynx*	*LC*	Schedule V
	Reptiles			
1	Garden lizard	*Calotes versicolor*	NE	-
2	Indian Monitor lizard	*Varanus bengalensis*	LC	Schedule II
3	Fan-throated lizard	*Sitana ponticeriana*	LC	Schedule IV
4	Indian cobra	*Naja naja*	LC	Schedule II: Part – II
5	Python	*Python molurus*	NT	Schedule I: Part – II
6	Spiny-tailed Lizard	*Uromastix hardwickii*	LC	Schedule II
7	Indian FringeToed Lizard	*Acanthodactylus cantoris*	LC	Schedule IV
8	John Sand Boa	*Eryx johni*	LC	Schedule IV
	Amphibians			
1	Indian Skipping Frog	*Euphlyctis cyanophlyctis*	LC	Schedule IV
2	Indian bullfrog	*Hoplobatrachus tigerinus*	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 **April 2021 to September 2021**. 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:

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

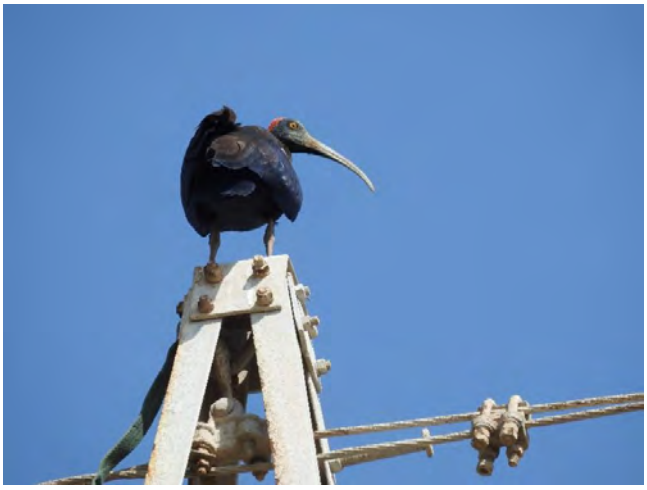
Where H' = Shannon-Wiener diversity index
Pi = Proportional abundance of the i th (individual) species
S = species richness (total number of species present)
ln = natural log (base $_e$)

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 5 to 8)**. 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 **3.83** during this period and total 4324 birds were recorded during the monitoring. The Species richness for the study area is found to be **57.** Proportional abundance of the individual species varies between 0.0014 and 0.0664. The highest abundance recorded was of **Blue Rock Pigeon (*Columba livia*)** (0.0664) and the lowest recorded were of **Little tern (*Sternula albifrons*)** (0.0014) which is observed in study area for the first time ever. The details are presented in **Table 6**.



Black Ibis (*Pseudibis papillosa*)

Black-crowned sparrow-lark (*Eremopterix nigriceps*)

Black-Winged Stilt (*Himantopus himantopus*)

Common Crested Lark (*Galerida cristata*)

Common teal (*Anas crecca*)

Blue Cheeked Bee Eater (*Merops persicus*)

Plate 5: Birds Observed in the Study Area of 10 Km

Painted Stork (*Mycteria leucocephala*)

Eurasian Whimbrel (*Platalea leucorodia*)

Greater Flamingo (*Phoenicopterus roseus*)

Indian Roller (*Coracias benghalensis*)

Large Egret (*Ardea alba*)

Little Cormorant (*Microcarbo niger*)

Plate 6: Birds Observed in the Study Area of 10 Km

Pied Kingfisher (*Ceryle rudis*)

Purple Sunbird (*Nectarinia asiatica*)

Red Vented Bulbul (*Pycnonotus cafer*)

Western Reef Heron (*Egretta gularis*)

White Breasted Kingfisher (*Halcyon smyrnensis*)

White Wagtail (*Motacilla alba*)

Plate 7: Birds Observed in the Study Area of 10 Km

White-Throated Munia (*Lonchura malabarica*)

Little tern (*Sternula albifrons*)

Plate 8: Resident 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	ln Pi	SWI
1	Asian Koel	*Eudynamys scolopaceus*	LC	Schedule IV	78	0.0180	-4.015	0.0724
2	Black-crowned sparrow-lark	*Eremopterix nigriceps*	LC	Schedule IV	77	0.0178	-4.028	0.0717
3	Black Drongo	*Dicrurus macrocercus*	LC	Schedule IV	91	0.0210	-3.861	0.0813
4	Black Headed Gull	*Chroicocephalus ridibundus*	LC	Schedule IV	12	0.0028	-5.887	0.0163
5	Black Ibis	*Pseudibis papillosa*	LC	Schedule IV	71	0.0164	-4.109	0.0675
6	Black-necked Stork	*Ephippiorhynchus asiaticus*	NT	Schedule IV	28	0.0065	-5.04	0.0326
7	Black-Winged Stilt	*Himantopus himantopus*	LC	Schedule IV	138	0.0319	-3.445	0.1099
8	Black-Shouldered Kite	*Elanus caeruleus*	LC	Schedule IV	49	0.0113	-4.48	0.0508
9	Blue Cheeked Bee Eater	*Merops persicus*	LC	Schedule IV	89	0.0206	-3.883	0.0799
10	Blue Rock Pigeon	*Columba livia neglecta*	NE	Schedule IV	287	0.0664	-2.712	0.1800
11	Brahminy Starling	*Sturnia pagodarum*	NE	Schedule IV	44	0.0102	-4.588	0.0467
12	Cattle Egret	*Bubulcus ibis*	LC	Schedule IV	90	0.0208	-3.872	0.0806
13	Common Babbler	*Turdoides caudata*	LC	Schedule IV	131	0.0303	-3.497	0.1059
14	Common Coot	*Fulica atra*	LC	Schedule IV	21	0.0049	-5.327	0.0259
15	Common Crested Lark	*Galerida cristata*	LC	Schedule IV	64	0.0148	-4.213	0.0624
16	Common Hoopoe	*Upupa epops*	LC	Schedule IV	38	0.0088	-4.734	0.0416
17	Common Iora	*Aegithina tiphia*	LC	Schedule IV	43	0.0099	-4.611	0.0459
18	Common Myna	*Acridotheres tristis*	LC	Schedule IV	68	0.0157	-4.152	0.0653
19	Common Quail	*Coturnix coturnix*	LC	Schedule IV	51	0.0118	-4.44	0.0524
20	Common Greenshank	*Tringa nebularia*	LC	Schedule IV	25	0.0058	-5.153	0.0298
21	Common Swallow	*Hirundo rustica*	LC	Schedule IV	85	0.0197	-3.929	0.0772
22	Desert Wheatear	*Oenanthe deserti*	LC	Schedule IV	80	0.0185	-3.99	0.0738

23	Great Stone Plover	*Esacus recurvirostris*	NT	Schedule IV	19	0.0044	-5.427	0.0238
24	Eurasian Collared Dove	*Streptopelia decaocto*	LC	Schedule IV	90	0.0208	-3.872	0.0806
25	Eurasian Whimbrel	*Platalea leucorodia*	LC	Schedule IV	18	0.0042	-5.482	0.0228
26	Greater Flamingo	*Phoenicopterus roseus*	LC	Schedule IV	198	0.0458	-3.084	0.1412
27	Greater Short-toed Lark	*Calandrella brachydactyla*	LC	Schedule IV	79	0.0183	-4.002	0.0731
28	Green Bee Eater	*Merops orientalis*	LC	Schedule IV	95	0.0220	-3.818	0.0839
29	Grey Heron	*Ardea cinerea*	LC	Schedule IV	71	0.0164	-4.109	0.0675
30	Grey Francolin	*Francolinus pondicerianus*	LC	Schedule IV	102	0.0236	-3.747	0.0884
31	House Crow	*Corvus splendens*	LC	Schedule V	119	0.0275	-3.593	0.0989
32	House Sparrow	*Passer domesticus*	LC	Schedule IV	286	0.0661	-2.716	0.1796
33	Indian Pond Heron	*Ardeola grayii*	LC	Schedule IV	54	0.0125	-4.383	0.0547
34	Indian Robin	*Saxicoloides fulicatus*	LC	Schedule IV	59	0.0136	-4.294	0.0586
35	Indian Roller/ Neelkanth	*Coracias benghalensis*	LC	Schedule IV	55	0.0127	-4.365	0.0555
36	Large Egret	*Ardea alba*	LC	Schedule IV	85	0.0197	-3.929	0.0772
37	Laughing Dove	*Spilopelia senegalensis*	LC	Schedule IV	96	0.0222	-3.808	0.0845
38	Little Cormorant	*Microcarbo niger*	LC	Schedule IV	30	0.0069	-4.971	0.0345
39	Little Tern	*Sternula albifrons*	LC	Schedule IV	6	0.0014	-6.58	0.0091
40	Oriental White Ibis / Black-Headed ibis	*Threskiornis melanocephalus*	NT	Schedule IV	67	0.0155	-4.167	0.0646
41	Painted Stork	*Mycteria leucocephala*	NT	Schedule IV	118	0.0273	-3.601	0.0983
42	Pied Kingfisher	*Ceryle rudis*	LC	Schedule IV	22	0.0051	-5.281	0.0269
43	Purple Sunbird	*Nectarinia asiatica*	LC	Schedule IV	101	0.0234	-3.757	0.0878
44	Red Vented Bulbul	*Pycnonotus cafer*	LC	Schedule IV	123	0.0284	-3.56	0.1013
45	Red Wattled Lapwing	*Vanellus indicus*	LC	Schedule IV	104	0.0241	-3.728	0.0897
46	Ring Dove	*Streptopelia capicola*	LC	Schedule IV	68	0.0157	-4.152	0.0653
47	Rose-Ringed Parakeet	*Psittacula krameri*	LC	Schedule IV	38	0.0088	-4.734	0.0416
48	Shikra	*Accipiter badius*	LC	Schedule IV	32	0.0074	-4.906	0.0363
49	Small Blue (Common) Kingfisher	*Alcedo atthis*	LC	Schedule IV	42	0.0097	-4.634	0.0450
50	Snake Bird/ Darter	*Anhinga melanogaster*	NT	Schedule IV	15	0.0035	-5.664	0.0196
51	Spot billed duck	*Anas poecilorhyncha*	LC	Schedule IV	34	0.0079	-4.846	0.0381
52	Western Reef Heron	*Egretta gularis*	LC	Schedule IV	60	0.0139	-4.278	0.0594
53	White Breasted Kingfisher	*Halcyon smyrnensis*	LC	Schedule IV	55	0.0127	-4.365	0.0555
54	White Wagtail	*Motacilla alba*	LC	Schedule IV	57	0.0132	-4.329	0.0571
55	White-Eared Bulbul	*Pycnonotus leucotis*	LC	Schedule IV	80	0.0185	-3.99	0.0738
56	White-Throated Munia	*Lonchura malabarica*	LC	Schedule IV	106	0.0245	-3.708	0.0909
57	Wire-tailed Swallow	*Hirundo smithii*	LC	Schedule IV	80	0.0185	-3.99	0.0738
Total					**4324**			**3.83**
Shannon Wiener Index								**3.83**

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 April 2021 to September 2021 total 232.41 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 April 2021 to September 2021 total 2692 kg of organic manure was produced from kitchen waste.

New nursery is established to cater the needs of new plantation and gap filing 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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adani

MARINE MONITORING REPORT

September– 2021(Monsoon)

FOR

M/s. ADANI POWER (MUNDRA) LIMITED

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

Prepared by

UniStar
Environment & Research Labs Pvt. Ltd.

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 (Monsoon) September 2021.

Date: 21/09/2021

M/S.UniStar Environment and Research Labs Pvt. Ltd.
White House, Char Rasta,
Vapi-396 191

Sampling by	Report Prepared By	Approved by
		
(Bhavin Patel)	**(Shweta Rana)**	**(Jaivik Tandel)**

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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 the world. 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 660MW 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. The sampling was carried out along the sea intake channel (2 stations) and discharge/outfall water mixing (3 stations) region. 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. This report presents the detailed results observed during the Marine Monitoring Study at the vicinity of the APMuL.

1.2 OBJECTIVES

a) To analyses the physico-chemical seawater parameter for understanding the water quality in the study area.

b) Estimation of the selected trace metals concentrations from sediment samples.

c) 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).

d) To recommend adequate marine environmental management measures

2. STUDY PROGRAM

2.1 STUDY PERIOD

The field investigation was carried out on 21st and 22nd September 2021. 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 located in the sea intake channel and 3 along the discharge mixing (outfall channel) region. One intertidal station was located along the sea intake channel and 2 were along the discharge missing 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 September 2021.

Subtidal station							
Station	**Station code**	**Locations**	**Coordinates**		**Water depth**	**Tide**	**Sediment texture**
1	St-1	Intake point	22°48’31’69”N	69°32’57.18”E	6.5 m	Ebb	Silty sand
2	St-2	Mouth of intake point	22°46’54.62”N	69°32’02.89”E	7 m	Ebb	Sandy
3	St-3	West port area	22°45’16.56”N	69°34’45.26”E	9 m	Flood	Sandy
4	St-4	Outfall area	22°44’30.23”N	69°36’17.02”E	8.5 m	Flood	Silty sand
5	St-5	Outfall area	22°44’47.17”N	69°36’35.74”E	7 m	Flood	Loamy clay

Table 2: Geographic coordinates, water, and sediment parameters at the inertial sampling stations, APMuL during September 2021.

Intertidal transect						
Station	**Station code**	**Tide Level**	**Coordinates**	**Water depth**	**Intertidal exposed area**	**Sediment texture**
I	IT-1 (HW)	High Tidewater level	22°36'16.59" N	69°52'26.63" E	36 m	Sandy
	IT-1 (LW)	Low Tide water level	22°48'09.42"N	69°22'31.52"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°50'28.63" N	69°48'29.40" E	40 m	Sandy
	IT-2 (LW)	Low Tidewater level	22°38'40.48" N	69°36'42.13" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°59' 12.30" N	69°39'32.52"E	41 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°49' 21.46" N	69°45'19.31" 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 the 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 PHs collected in glass bottles. Dissolve oxygen (DO) samples were collected in glass BOD bottle and Biological Oxygen Demand (BOD) samples were collected in polyethylene or glass bottle. 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^2. 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, 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 are given in Table 3.

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 was filtered through Whatman glass microfiber filters (GF/F: 47 mm) and paper was macerated in 90% acetone and one night stored in the dark at 4ºC. For estimation of Chl*a* fluorescence of extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl (0.1 ml).

2.4.3c Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of 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 quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplanktons 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 slandered 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	8.09	8.12	8.05	8.04	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	28	27	28	27	IS 3025(Part 9)1984
3.	Turbidity (NTU)	1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	46	46	56	72	(APHA 23rd Ed.,2017,2540- D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	4.9	3.9	4.6	3.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4(mg/l)	3379	2971	2796	2606	(APHA 23rd Ed.,2017,4500- SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500- NH3 B)
5.	Salinity	34.3	34.6	35.7	35.8	By Calculation
6.	Dissolved Oxygen (mg/l)	5.5	6.0	5.4	5.0	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	6.3	5.3	5.8	5.6	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.5	0.6	0.5	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25 ° C	8.06	8.14	8.08	8.02	IS 3025(Part 11)1983
2.	Temperature ^{0}C	28	27	28	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	5	5	5	5	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	104	110	128	156	(APHA 23rd Ed.,2017,2540- D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	3.9	2.8	4.1	3.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4(mg/l)	2821	2725	2322	2848	(APHA 23rd Ed.,2017,4500- SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500- NH3 B)
5.	Salinity	35.0	35.7	34.3	35.3	By Calculation
6.	Dissolved Oxygen (mg/l)	5.6	5.3	5.4	5.5	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	5.3	5.1	4.9	4.6	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	0.18	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.6	0.4	0.6	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25 ° C	8.09	8.08	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	29	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	5	5	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids	112	84	(APHA 23rd Ed.,2017,2540-D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	4.4	3.6	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO_4 (mg/l)	2249	3067	(APHA 23rd Ed.,2017,4500-SO4 E)
4.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	(APHA 23rd Ed.,2017,4500-NH3 B)
5.	Salinity	34.7	33.8	By Calculation
6.	Dissolved Oxygen (mg/l)	5.4	5.6	IS 3025(Part 38)1989,
7.	Total Nitrogen (µmol/l)	4.7	4.5	(APHA 23rd Ed.,2017,4500-O,B),
8.	PO_4^3-P (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	APHA 23rd Ed.,2017,4500 NH3 - B
9.	(NO_3-N)e (µmol/l)	0.5	0.4	(APHA 23rd Ed.,2017,4500-P,D)
10.	(NO_2-N) Nitrite (µmol/l)	BDL(MDL:0.1)	BDL(MDL:0.1)	(APHA 23rd Ed.,2017,4500 NO3-B)
11.	Phenol(µmol/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,4500NO2B
12.	PHc(ppb)1M Level	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

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 27^{0}C to 28^{0}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 8.05 to 8.09 at the surface and 8.02 to 8.14 at bottom water.

3.1.3 Salinity: Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 33.8 to 35.7, which may vary with the riverine or inland influx, rains or evaporation in the region. The average salinity during the present monsoon sampling was 34.3 to 35.7 at surface and 33.8 to 35.7 at bottom water.

3.1.4 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 5.4 to 5.6 mg/l at the water surface and 5 to 6 mg/l at bottom water. The average DO value during the monsoon season was 5.5 mg/l, which indicates the oxygenated conditions in the study region.

BOD is generally indicating 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 3.9 to 4.9 mg/l at surface and 2.8 to 4.6 mg/l at bottom water.

3.1.5 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 anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. Phosphorous compounds are present predominantly as reactive phosphate while combined nitrogen is present as nitrate, nitrite and ammonium species. In the present study, Phosphate concentration was below detection limits (BDL) at the surface and 0.18 µmol/l at bottom water. Nitrate concentration was range from 0.4 to 0.6 µmol/l on the surface and 0.4 to 0.6 µmol/l at bottom water. Nitrite concentration was below detection limits at the surface and bottom waters. These nutrient concentration values indicate water healthiness.

3.1.6 PHc and phenol: The Phenol compounds and PHc were not detected in the present investigation

.**3.1.7 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 46 to 128 mg/l and in the bottom water, it was range from 46 to 156 mg/l.

4 SEDIMENT QUALITY MONITORING

The sediment quality at different sampling stations was e measured during this investigation. The results are presented in Tables 4 and 5.

Table 4: Subtidal sediment quality parameters and their test methods.

No.	Parameters	SUBTIDAL SEDIMENT QUALITY(µgm/gm)					Test Method Permissible
		Station 1	Station 2	Station 3	Station 4	Station 5	
1	Texture	Silty sand	sandy	sandy	Silty sand	Loamy sand	--
2	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 55)2003
3	Cobalt as Co(µg/g)	7.8	9.9	8.0	8.1	8.6	AAS Method
4	Copper as Cu(µg/g)	10.3	8.3	9.9	8.9	11.2	IS 3025(Part 42)1992amd.01,
5	Zinc as Zn	30.3	32.3	30.9	30.6	31.7	IS 3025(Part 49)1994
6	Mercury(µg/g)	N.D.	N.D.	N.D.	N.D.	N.D.	(APHA 22nd Ed.,2012,3112-B)
7	Phosphorous (Total)(µg/g)	4.12	5.2	3.92	2.96	3.48	(APHA22nd Ed., 2012,4500-P,D)
8	C(Org.) %	0.8	0.9	1.0	0.8	1.2	Standard method (Walkley and Black, 1934).
9	Chromium(µg/g)	14.1	12.2	18.0	9.9	12.9	IS 3025(Part 52)2003,
10	Nickel(µg/g)	15.3	18.0	15.8	15.0	17.0	IS 3025(Part 54)2003,
11	Manganese	188.2	200.9	182.2	177.7	169.2	APHA22nd Ed.,2012,3500 Mn B
12	Iron%	1.3	2.4	3.2	2.8	2.1	IS 3025(Part 53)2003,
13	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	N.D.	G.C. Method
14	Arsenic(µg/g)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL:0.05)	APHA22nd Ed.2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5: Intertidal sediment quality parameters and their test methods.

INTER TIDAL SEDIMENT QUALITY (µgm/gm)						
Sr. No	Parameters	Transect 1		Transect 2		Test Method Permissible
		High Tide	Low Tide	High Tide	Low Tide	
1.	Texture	Sandy	Sandy	Sandy	Sandy	--
2.	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 55)2003
3.	Cobalt as Co(µg/g)	N.D.	N.D.	N.D.	N.D.	AAS Method
4.	Copper as Cu(µg/g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 42)1992amd.01,

5.	Zinc as Zn	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 49)1994
6.	Mercury(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL :0.05)	BDL(MDL:0.0 5)	(APHA 22nd Ed.,2012,3112-B)
7.	Phosphorous (Total)(µg/g)	2.65	3.91	3.11	3.76	(APHA 22nd Ed.,2012,4500-P,D)
8.	C(Org.) %	0.4	0.6	0.5	0.8	Standard method (Walkley and Black, 1934).
9.	Chromium(µg /g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 52)2003,
10.	Nickel(µg/g)	BDL(MDL: 1.0)	BDL(MDL: 1.0)	BDL(MDL :1.0)	BDL(MDL:1.0)	IS 3025(Part 54)2003,
11.	Manganese	6.25	8.24	4.90	6.11	APHA 22nd Ed.,2012,3500 Mn B
12.	Iron%	2.7	2.3	1.8	1.4	IS 3025(Part 53)2003,
13.	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	G.C. Method
14.	Arsenic(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL :0.05)	BDL(MDL:0.0 5)	APHA 22nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5 Continued 2

Sr. No	Parameters	Transect 3		Test Method Permissible
		High Tide	Low Tide	
1.	Texture	Sandy	Sandy	--
2.	Aluminium as Al%	N.D.	N.D.	IS 3025(Part 55)2003
3.	Cobalt as Co(µg/g)	N.D.	N.D.	AAS Method
4.	Copper as Cu(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part42)1992amd.01,
5.	Zinc as Zn	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 49)1994
6.	Mercury(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	(APHA 22nd Ed.,2012,3112-B)
7.	Phosphorous (Total)(µg/g)	2.93	3.60	(APHA 22nd Ed.,2012,4500-P,D)
8.	C(Org.) %	0.4	0.6	Standard method (Walkley and Black,1934).
9.	Chromium(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 52)2003,
10.	Nickel(µg/g)	BDL(MDL:1.0)	BDL(MDL:1.0)	IS 3025(Part 54)2003,
11.	Manganese	5.25	6.05	APHA 22nd Ed.,2012,3500 Mn B
12.	Iron%	1.4	2.0	IS 3025(Part 53)2003,
13.	PHc(µg/g)	N.D.	N.D.	G.C. Method
14.	Arsenic(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	APHA 22nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

- The sediment in the subtidal region was mainly composed of silty sand to loamy sand. In the intertidal region, sediment **texture** was sandy.
- In the subtidal stations, the highest **phosphorus** content (5.2µgm/gm) was recorded at ST-2 whereas the lowest was at ST-4 (2.96 µgm/gm). In the intertidal region highest phosphorus content (3.91 µgm/gm) was recorded at IT-1(LWL) and lowest at (2.65 µgm/gm) IT-1(HWL)

- The **Chromium** content of marine sediment was ranged from 9.9 to 18 µgm/gm. The highest chromium content was recorded at ST-3 and the lowest at ST-4. In the Intertidal region, the chromium content was fount below the detection limit.
- The highest **Nickel** content (18.0 µgm/gm) was recorded at ST-2 and lowest (15.0µgm/gm) at ST-4. In the intertidal region nickel content was fount below the detection limit.
- At ST-5, the highest **Copper** content (11.2 µgm/gm) was recorded, whereas the lowest was detected at ST-2 (8.3 µgm/gm). In the intertidal region copper content was fount below the detection limit.
- The **Zinc** content (32.3 µgm/gm) was highest at ST-2 and the lowest zinc content (30.3 µgm/gm) at ST-1. The zinc content in the intertidal region was below the detection limit.
- The highest **Organic carbon** content (1.2 %) was recorded at ST-5 and the lowest (0.8%) at ST-4. In the intertidal region, the highest Organic carbon content (0.8%) was recorded at IT-2(LWL) and lowest (0.4%) at IT-1 (HWL).
- The **Iron** content was higher at ST-3 (3.2 %) and lower at ST-1 (1.3%). In the Intertidal region, the highest iron content was recorded at IT-1(HWL) (2.7%) and lowest at IT-1(LWL) (1.4%).
- In the subtidal region, the highest **Manganese** content was recorded at ST-2 (200.9µgm/gm), whereas the lowest was recorded at ST-5 (169.2µgm/gm). In the intertidal region highest Manganese content was recorded at IT-1(LWL) (8.24µgm/gm). The lowest Manganese content (4.90µgm/gm) was found at IT-2(HWL).
- The **Aluminium** was not detected.
- The highest **Cobalt** content (9.9µgm/gm) was recorded at ST-2 and lowest at ST-1 (7.8µgm/gm). In the intertidal region, Cobalt was not detected.
- The **PHc**, **Arsenic** & **Mercury** was not detected in the sediments during this study.

5 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)

The Marine environment is unique ecosystem that involve the complex interaction between abiotic and biotic components. Any change in the abiotic factors leads to change in aquatic organisms (biotic factor). Human interventions always 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 study at APMuL, the abundance and distribution of marine organisms (plankton and benthos) were studied as part of routine environmental monitoring.

5.1 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. By 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.

5.1.1 Phytoplankton

The organisms responsible for primary production in all aquatic ecosystems are known as “phytoplankton.” These miraculous microscopic organisms not only form the base of life in our oceans but also produce up to 90% of the oxygen in our atmosphere.

Phytoplankton are microscopic plants that live in the ocean, freshwater, and other terrestrial-based water systems. 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.

5.1.2 Zooplankton:

Zooplankton are the consumer organisms, incapable of making their food from light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival. They are primarily depending on the phytoplankton and other small organisms’ groups for their nutritional needs.

5.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are the major primary producers of organic matter in the aquatic ecosystem. They contribute up to 90% in primary productivity in the Oceanic environment. As part of the photosynthesis process, they produce organic compounds from carbon dioxide with the help of sunlight and inorganic compound. Collectively, they directly or indirectly support the entire animal population and thus form the basis of most marine food webs. Phytoplankton also helps in the carbon dioxide sequestration process. The significance of zooplanktons is

found in their role in 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 a large number of 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 depend on them.

Table: 6 Test methods for phytoplankton and zooplankton analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 21, Part 10000, 10200 F
2	Chlorophyll *a* and Pheophytin	APHA, Edition 21, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 21, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 21, Part 10000,10500 A-10500 D

5.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. The sampling location is given in the following table.7

During the sampling period (September 2021) the phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 19 phytoplankton genera belonging to diatoms (17 genera) and dinoflagellates (2 genera) (Table 8). The diatoms species belonging to genus *Bacteriastrum*, *Chaetoceros*, *Corethron*, *Coscinodiscus*, *Cylindrotheca*, *Ditylum*, *Fragilaria*, *Gunardia*, *Hemialus*, *Leptocylindrus*, *Navicula*, *Odontella*, *Pleurosigma*, *Rhizosolenia*, *Skeletonema*, *Surirella*, *Thalassionema* and *Thalassiosira* dominated phytoplankton assemblage in the study region. Among them, species belonging to the genus *Thalassiosira* (48.7%) and *Fragilaria* (29.7%) were predominant. The maximum number of diatom species (12) were observed at station 2. Dinoflagellate population in the region was represented by only 2 species (*Alexandrium*, *Prorocentrum*) in very low abundance only at St-1 (bottom water).

The phytoplankton abundance in the study region was ranged from 64 to 1123 cells$\times10^{-2}$ L^{-1}. The highest phytoplankton abundance was observed at St-2 in surface (1123 cells$\times10^{-2}$ L^{-1}) and bottom (883 cells$\times10^{-2}$ L^{-1}) waters. The predominance of species belonging to the genus

Thalassionema (567 to 734 cells×10^{-2} L^{-1}) and *Fragilaria* (282 to 335cells×10^{-2} L^{-1}) was observed also at this station. The lowest phytoplankton abundance (61 cells×10^{-2} L^{-1}) was observed at St-4 in surface water (Table 7; Figure 2). The study shows that the marine water around APMuL, Mundra is nurturing and supporting the phytoplankton population.

Table 7: Phytoplankton abundance (cells×10^{-2} L^{-1}) at different sampling stations in the coastal waters of APMuL, Mundra during September 2021.

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
Diatoms										
Bacteriastrum	0	0	0	0	41.4	0	0	0	0	0
Chaetoceros	24.6	19.2	9	6	0	12	9	51	7.8	12
Corethron	0	0	0.6	0	0	0	0	0	1.2	0
Coscinodiscus	4.8	0	3.6	0.6	6	6.6	3	6.6	4.8	3
Cylindrotheca	0	1.8	0	1.8	0.6	0	0	1.8	0	0
Ditylum	13.2	4.2	6	3	9.6	15.6	6	6.6	15	13.2
Fragilaria	67.2	109	335	282	63	17.4	33	9	12	12
Gunardia	0	0	1.8	0	0	0	0	0	0	0
Hemialus	0	1.8	0	0	0	0	0	0	0	0
Leptocylindrus	0	0	0	0	5.4	0	0	0	0	0
Navicula	4.2	0.6	6.6	4.2	3.6	4.2	1.8	3	0.6	1.8
Odontella	0.6	0	6.6	6.6	4.2	5.4	1.8	3.6	15	1.8
Pleurosigma	0	0	0.6	1.8	0.6	0	0	0	0	1.2
Rhizosolenia	2.4	0	0.6	0.6	0	0.6	0	0.6	0	3
Skeletonema	4.2	10.8	0	0	0	0	0	0	1.2	0
Surirella	0	0	0	0.6	0	1.8	0	0	1.2	0
Thalassionema	12.6	6.6	18.6	8.4	6.6	12.6	4.2	10.8	15	136
Thalassiosira	1.8	196	734	567	11.4	4.8	4.8	4.8	6	9
Dinoflagellates										
Alexandrium	0	0.6	0	0	0	0	0	0	0	0
Prorocentrum	0	0.6	0	0	0	0	0	0	0	0
Total phytoplankton (cells×10^{-2} L^{-1})	**136**	**351**	**1123**	**883**	**152**	**81**	**64**	**98**	**80**	**193**

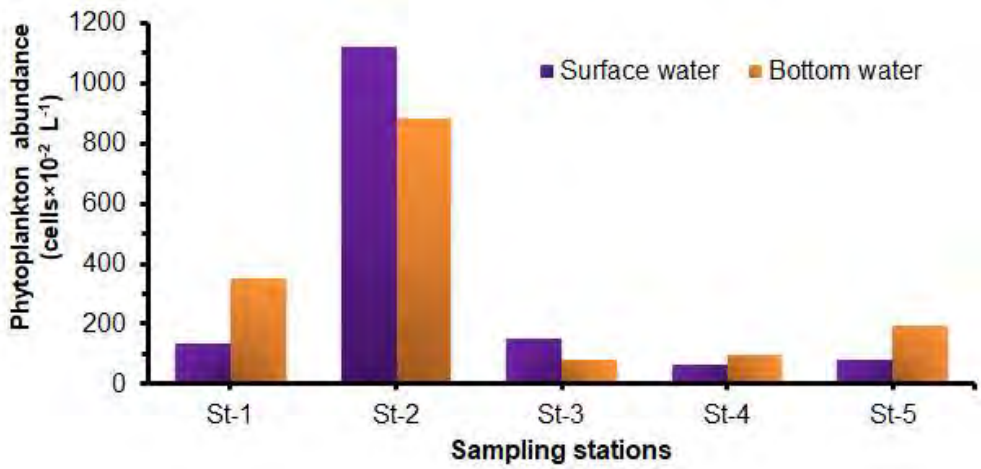
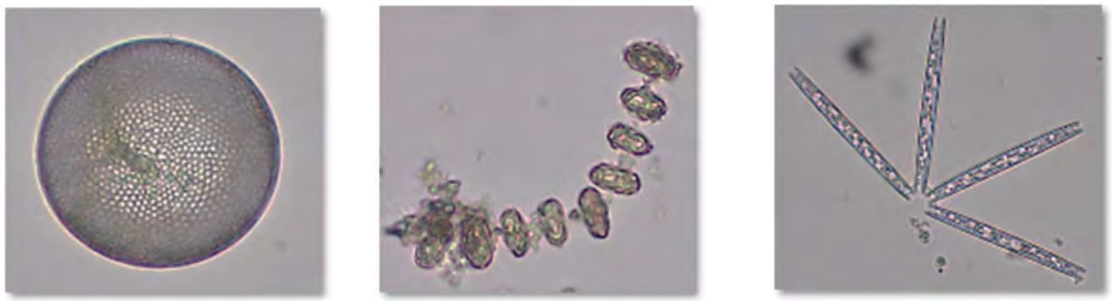


Figure 2: Phytoplankton abundance (cells×10^{-2} L^{-1}) reported in the surface and bottom waters along the APMuL coast, Mundra during September 2021.



***Coscinodiscus* sp.** ***Thalassiosira* sp.** ***Thalassionema* sp.**

Chaetoceros* sp.** ***Fragilaria* sp.** ***Odontella sp.

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APMuL, Mundra during September 2021.

5.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL *a* AND PHEOPHYTIN):

Marine phytoplankton contains the essential as well as accessory pigment similar to that of terrestrial plants. Chlorophyll is the essential photosynthetic, green molecule responsible for energy fixation in the process of photosynthesis. The energy fixed by the phytoplankton gets transferred to higher tropic levels in the food web through the grazing process by the consumers. Chlorophyll is a measure of algal biomass and it acts as an empirical link between nutrient concentrations.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells, a filtered water sample will also contain coloured degradation products of these pigments. 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 centre 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 *a* filtered seawater contains colour degradation products of phytoplankton pigments.

5.4a CHLOROPHYLL *a* AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll a (Chl*a*) and phaeophytin at selected stations in the coastal region of APMuL, Mundra is presented in Table 8. The Chl*a* concentrations in the study region were ranged from 1.24 to 5.03 µg. L^{-1}. The phaeophytin content was ranged from 0.81 to 2.63 µg. L^{-1}. The Chl*a* and phaeophytin concentrations were more in the bottom water as compared to the surface water. The small variations observed between the surface and bottom waters could be due to the natural biological variability inherent to such dynamic ecosystems. The highest Chl*a* and phaeophytin concentrations were observed at St-2 both in surface and bottom waters (Table 8).

The concentration of phaeophytin 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*a*. The ratio from concentrations of Chl*a* and phaeophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton life. In healthy environments, ratios of Chl*a* to phaeophytin generally exceed 1.2. In the present study, this ratio was ranged from 1.11 to 3.14 (Table 8). The Chl*a* and Phaeophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl*a* and phaeophytin

concentration in the study region were generally high (>1) except ST-1, indicating that the appropriate conditions prevailed for the phytoplankton growth.

Table 8: Chlorophyll *a*, Phaeophytin concentrations along with their ratios (Chl*a*: Phaeophytin) in the marine waters of APMuL, Mundra during September 2021.

Sampling stations		Chlorophyll a (µg. L^{-1})	Phaeophytin (µg. L^{-1})	Chl*a*: Phaeophytin ratio
St-1	**Surface**	2.31	1.99	1.16
	Bottom	2.88	1.53	1.88
St-2	**Surface**	4.85	1.55	3.14
	Bottom	5.03	2.63	1.91
St-3	**Surface**	2.65	0.96	2.77
	Bottom	1.50	1.22	1.23
St-4	**Surface**	1.24	1.06	1.17
	Bottom	1.34	0.81	1.66
St-5	**Surface**	2.01	1.80	1.11
	Bottom	2.52	1.78	1.41

5.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of abundance and species composition revealed substantial spatial variation within all 5 stations (Table 9). The maximum zooplankton abundance (793 no. m^{-3}) and biomass (0.19 ml m^{-3}) were recorded at Station 1, whereas the lowest zooplankton abundance (553 no. m^{-3}) and biomass (0.11 ml m^{-3}) were observed at Station 4 (Figure 4).

A total of 11 groups of zooplankton including Copepods, Copepod nauplii, Oikopleura, Decapod larvae, Fish eggs and larvae, polychaete larvae, Gastropod larvae, Rotifera, Foraminifera and Mysids were identified during this study (Table 9). Among these groups Copepods (28 to 69 %) and Copepod nauplii (26 to 67%) were most dominant. Decapod larvae was another dominant group that contribute 2 to 35% to the zooplankton population in this region. Gastropod, polychaete larvae as well as fish eggs were another major group reported in the study area. 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.

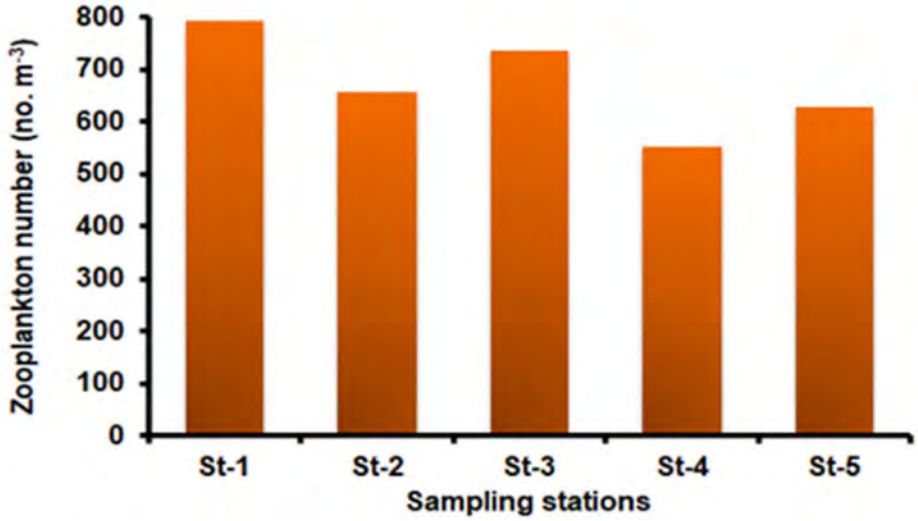
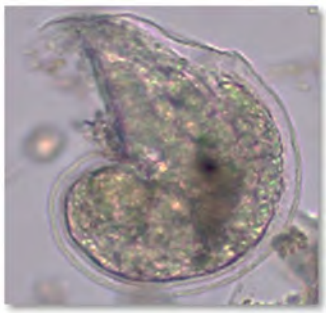


Figure 4: Zooplankton density (nos. / m^3) reported in the subtidal waters (Station 1 to 5) along the APMuL coast, Mundra during September 2021.

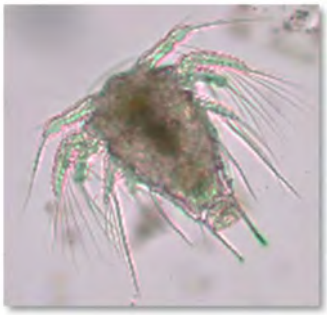
Table 9: Density (no. m^{-3}), percentage contribution (%) and biomass (ml. m^{-3}) of various zooplankton groups in the coastal waters at the APMuL, Mundra during September 2021.

Note: The values in the bracket indicates the percentage contribution of a particular group.

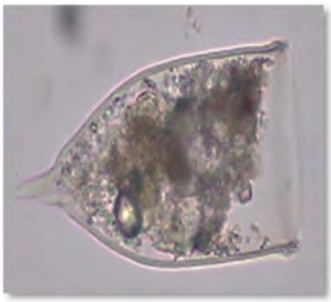
Zooplankton groups	Sampling stations				
	St-1	St-2	St-3	St-4	St-5
Copepods	419 (53)	236 (36)	478 (65)	152 (28)	432 (69)
Copepod nauplii	349 (44)	386 (59)	239 (32)	371 (67)	163 (26)
Oikopleura	6 (1)	0	2	0	3 (1)
Fish egg	1	5 (1)	0	7 (1)	6 (1)
Decapod larvae	4	21 (3)	11 (1)	19 (3)	16 (3)
Polychaete larvae	9 (1)	1	0	4 (1)	0
Gastropod larvae	5 (1)	8 (1)	7 (1)	0	6 (1)
Fish larvae	0	0	0	4 (1)	0
Rotifera	5 (1)	3 (1)	7 (1)	7 (1)	10 (2)
Foraminifera	0	1	9 (1)	0	0
Mysids	0	1	0	4 (1)	0
Total abundance (no m^{-3})	**793**	**656**	**736**	**553**	**627**
Biomass (ml. m^{-3})	**0.19**	**0.16**	**0.12**	**0.11**	**0.15**



Gastropod larvae

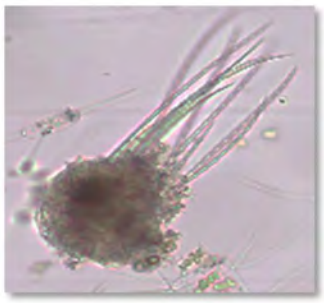


Copepod larvae



Rotifer

Polychaete larvae



Polychaete larvae

Copepod

Figure 5: Microphotographs of zooplanktons reported in the coastal waters of APMuL, Mundra during September 2021.

5.6 MACROBENTHIC FAUNA

The benthic zone is the ecological region at the lowest level of water (such as an ocean or a lake) which include the sediment surface and some sub-surface layers. The superficial layer of sediment is an integral part of the benthic zone, as it influences greatly the biological activity, which takes place there. Organisms living in this zone are called benthos. They generally live in a close relationship with the substrate bottom; many such organisms are attached to the bottom. Some benthic organisms are mainly dwelling at the bottom of the substratum but at times may travel upwards in the water column. They may also occupy rock crevices, organic debris, and another microhabitat at the bottom. The benthic invertebrates range from microscopic (e.g., micro invertebrates, <10 microns) to a few centimetres or more in length (e.g., macroinvertebrates).

Benthic organisms are morphologically different from that 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.

5.6.1 Significance of macrobenthic organisms

The biomass of microbenthic organisms in estuaries and coastal embayment is often high. It declines if communities are affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbations) 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.

5.6.2 Benthic Diversity

5.6.2a Subtidal region:

The sediment texture at the sampling stations ranged from sandy-silty to silty sediment (Table 1 and 4), which directly affects the distribution of the benthic organisms in this region. The fluctuation in tidal level and exposer time also influences the occurrence of benthic organisms in the intertidal transects.

During the present study, high macrobenthos abundance and biomass was reported at subtidal stations than intertidal stations at APMuL, Mundra (Table 10). The macrobenthos density was ranged from 850 no. m^{-2} to 3225 no. m^{-2} at sampling stations (Table 10; Figure 6). Similarly, the biomass of the macrobenthic community in the study region was ranged from 0.57 g. m^{-2} to 1.66 g. m^{-2} in the study region. The maximum density and biomass of benthic macro-organisms were reported at Station 3 (3225 no. m^{-2} and 1.66 g. m^{-2} respectively). Similarly, the least maximum density (850 no. m^{-2}) and biomass (0.57 g. m^{-2}) were reported was observed at ST-1 (Table 10; Figure 6). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Orbiniidae, Cossuridae, Spionidae, Nereidae, Capitellidae, Nephtyidae contributed (93.4%) to the total macrobenthic abundance in this region. More occurrence of this group could indicate the organic carbon enrichment in the sediment. Overall, the presence of Polychaete, Sipuncula worms and amphipods suggest the availability of food organisms for benthic predators in the area.

Table 10: Faunal composition, density (no. m^{-2}) and biomass (g. m^{-2}) of the macrobenthos community in the subtidal region at APMuL, Mundra during September 2021.

Faunal groups	Subtidal stations				
	St-1	St-2	St-3	St-4	St-5
Phylum Annelida					
Polychaeta	725	850	3125	1425	1300
Phylum Protozoa					
Foraminifera	25	0	25	0	0
Phylum Mollusca					
Bivalve	25	50	0	50	0
Phylum Arthropoda					
Amphipoda	50	50	75	50	50
Isopoda	0	0	0	0	0
Phylum Sipuncula					
Sipunculids	25	0	0	0	50
Total density (no. m^{-2})	**850**	**950**	**3225**	**1525**	**1400**
Biomass (g. m^{-2})	**0.57**	**0.76**	**1.66**	**0.90**	**0.80**

5.6.2b Intertidal region

The unstable sandy substratum with low organic matter affects the occurrence of the macrobenthic community in the intertidal region. Low macrobenthos biomass was measured (from 0.08 g. m^{-2} to 0.16 g. m^{-2}) in the intertidal region at the APMuL marine monitoring area (Table 11, Figure 6). The lowest density of macrobenthic organisms was reported at station IT-1 (HW) (50 no. m^{-2}), whereas, the highest density was reported at Station IT-1 (LW) (125 nos.

m^{-2}). Amphipoda species contributed (40%) to the total macrobenthic abundance at these stations followed by Polychaete (30%) (Table 11). No macrobenthic community was observed at ST-2 (HW) and ST-3 (HW and LW) may be due to unstable sandy sediment

Table 11: Faunal composition, density (nos. m^{-2}) of macrobenthos from the sediments collected at High Tide Levels (HTL) and Low Tide Levels (LTL) in the inter-tidal region at APMUL, Mundra during September 2021.

Note: LW=low water during low tide; HW=high water during high tide
Blank cells represent no organism count

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
Phylum Annelida						
Polychaetae	0	50		25		
Phylum Mollusca	0	0		0		
Bivalve	0	25		0		
Phylum Arthropoda	0	0		0		
Amphipoda	25	50		25		
Isopoda	25	0		0		
Phylum Sipuncula	0	0		0		
Sipunculids	0	0		25		
Total density (no. m^{-2})	50	125		75		
Biomass (g. m^3)	0.08	0.16		0.09		

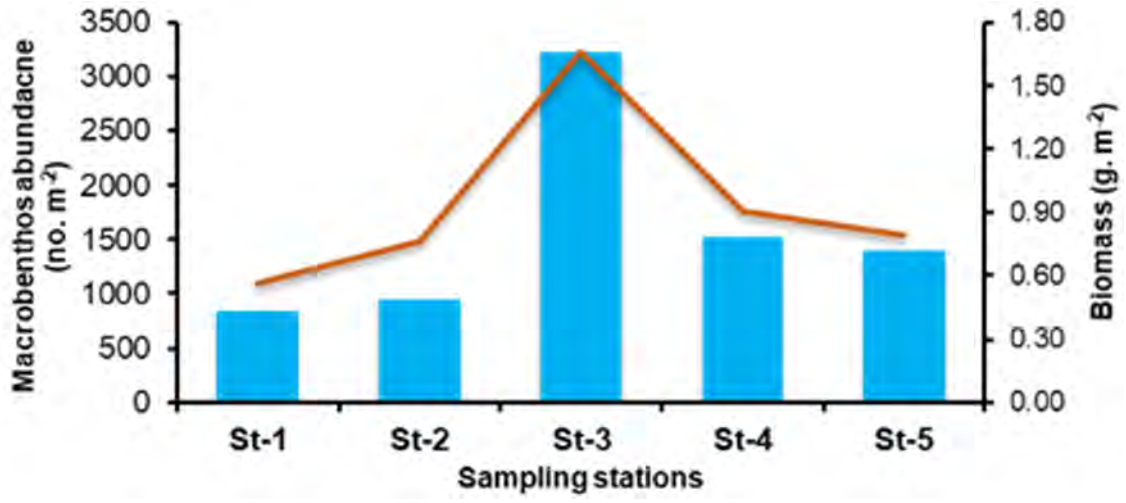


Figure 6: Subtidal macro benthos abundance (no. m^{-2}) at different sampling stations at APMuL, Mundra during September 2021

Amphipod

Polychaete (Family: Cossuridae)

Polychaete (Family: Spionidae)

Polychaete (Family: Nephtyidae)

Polychaete (Family: Nephtyidae)

Polychaete (Family: Capitellidae)

Figure 7: Microphotographs of microbenthic organisms observed in the sediment samples collected in the vicinity of APMuL, Mundra during September 2021.

6 CONCLUSION

Overall assessment reveals that the physicochemical and biological parameters of the present sampling data did not deviate from the baseline monitoring data. The diverse phytoplankton and zooplankton population indicates favourable water condition for their survival and growth. This diverse planktonic flora and together with enriched subtidal benthic fauna could substantially support the fishery population in the region. However, the unstable benthic sediment as the effect of natural (tidal currents, circulations) and anthropogenic activity (dredging, ship movement) activity could affect the settlement of the benthic fauna, especially in the west port and outfall area.

Table 12: Names of the Marine Monitoring Team Members

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

DIFFERENT TYPES OF SAMPLING PHOTOGRAPHS

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Annexure - IV

adani	Adani Power (Mundra) Limited, Mundra
	Summary of Continues Ambient Air Quality Monitoring System Reports (Apr'2021 TO Sep'2021)

		Station: ECO Park				Station: Near Main Gate				Station: Near Ash Pond			
Parameters		PM10	PM2.5	SO_2	NO_2	PM10	PM2.5	SO_2	NO_2	PM10	PM2.5	SO_2	NO_2
UNIT		ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
MONTH	GPCB LIMIT	100	60	80	80	100	60	80	80	100	60	80	80
Apr'21	Minimum	61.3	20.1	19.3	17.2	54.1	21.5	20.7	16.4	55.5	26.9	18.3	19.5
	Maximum	80.8	34.3	32.0	27.8	82.9	33.8	33.0	29.7	73.5	35.7	22.0	24.2
	Average	73.9	28.9	27.8	22.9	69.9	28.4	27.6	20.8	63.9	32.2	20.3	22.1
May'21	Minimum	60.4	32.4	17.8	12.6	52.7	28.6	17.4	16.2	38.4	15.9	13.8	18.7
	Maximum	78.0	42.1	29.8	20.8	83.9	41.5	31.3	20.5	71.8	34.6	25.5	30.8
	Average	71.5	36.6	26.2	17.2	71.6	36.1	24.5	17.6	51.8	25.4	19.9	23.5
Jun'21	Minimum	43.3	18.2	8.3	19.5	56.8	11.0	15.1	19.1	39.1	15.9	14.3	18.7
	Maximum	87.6	53.0	22.2	24.7	88.5	31.3	23.1	26.3	63.7	33.3	25.4	28.7
	Average	70.6	34.3	18.9	22.9	69.7	21.9	19.2	22.5	48.8	24.7	19.5	23.2
Jul'21	Minimum	52.2	18.6	9.6	20.6	58.6	17.7	10.3	18.5	56.8	23.2	15.5	20.9
	Maximum	75.1	29.7	22.8	39.9	79.5	29.2	19.9	29.6	77.4	35.2	23.9	29.5
	Average	68.2	24.0	17.0	30.5	69.4	22.0	15.5	23.6	63.2	29.9	18.0	24.9
Aug'21	Minimum	47.5	14.1	8.2	10.4	52.6	16.4	9.0	14.2	47.2	18.5	16.6	27.9
	Maximum	63.9	24.6	15.8	21.5	67.1	28.0	20.6	20.5	66.9	26.6	20.6	34.2
	Average	60.3	19.0	12.6	16.9	61.1	22.0	15.6	17.6	56.1	21.9	18.3	31.8
Sep'21	Minimum	45.8	16.9	12.6	11.8	48.7	13.8	12.4	12.6	47.2	14.5	15.7	16.3
	Maximum	63.2	23.4	20.1	26.7	61.4	20.3	19.3	22.9	60.2	27.2	23.2	25.2
	Average	55.2	20.0	16.5	19.0	54.5	17.2	15.8	17.4	55.7	20.4	18.6	20.4

adani	Adani Power (Mundra) Limited, Mundra
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: April'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01.04.2021	27.0	31.0	4.0
02.04.2021	27.5	32.0	4.5
03.04.2021	27.0	30.5	3.5
04.04.2021	27.5	31.0	3.5
05.04.2021	27.5	31.5	4.0
06.04.2021	28.0	32.0	4.0
07.04.2021	28.5	31.5	3.0
08.04.2021	28.0	32.0	4.0
09.04.2021	27.5	30.5	3.0
10.04.2021	27.0	31.0	4.0
11.04.2021	27.5	30.5	3.0
12.04.2021	27.5	30.5	3.0
13.04.2021	27.0	31.0	4.0
14.04.2021	28.0	31.5	3.5
15.04.2021	27.5	31.0	3.5
16.04.2021	27.5	32.0	4.5
17.04.2021	27.5	31.0	3.5
18.04.2021	28.0	31.5	3.5
19.04.2021	27.0	31.0	4.0
20.04.2021	27.0	31.0	4.0
21.04.2021	27.5	31.0	3.5
22.04.2021	28.0	32.0	4.0
23.04.2021	28.5	32.0	3.5
24.04.2021	28.0	32.5	4.5
25.04.2021	28.0	32.0	4.0
26.04.2021	28.5	32.5	4.0
27.04.2021	28.0	32.5	4.5
28.04.2021	27.5	32.0	4.5
29.04.2021	28.5	32.0	3.5
30.04.2021	28.5	32.5	4.0
Min.	**27.0**	**30.5**	**3.0**
Max.	**28.5**	**32.5**	**4.5**
Average	**27.7**	**31.5**	**3.8**

adani	Adani Power (Mundra) Limited, Mundra
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: May'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01.05.2021	29.5	33.0	3.5
02.05.2021	29.0	32.5	3.5
03.05.2021	30.0	33.5	3.5
04.05.2021	30.5	33.5	3.0
05.05.2021	29.5	32.5	3.0
06.05.2021	29.0	33.0	4.0
07.05.2021	29.5	33.5	4.0
08.05.2021	30.0	33.5	3.5
09.05.2021	30.5	34.0	3.5
10.05.2021	30.0	33.5	3.5
11.05.2021	30.5	34.0	3.5
12.05.2021	29.0	33.5	4.5
13.05.2021	29.5	34.0	4.5
14.05.2021	29.5	33.5	4.0
15.05.2021	30.5	34.0	3.5
16.05.2021	29.5	33.5	4.0
17.05.2021	29.5	34.0	4.5
18.05.2021	30.0	34.0	4.0
19.05.2021	29.0	33.5	4.5
20.05.2021	30.5	34.0	3.5
21.05.2021	30.0	33.5	3.5
22.05.2021	29.0	33.0	4.0
23.05.2021	29.5	33.5	4.0
24.05.2021	30.5	34.0	3.5
25.05.2021	29.5	33.5	4.0
26.05.2021	30.0	33.5	3.5
27.05.2021	29.5	33.0	3.5
28.05.2021	30.0	33.5	3.5
29.05.2021	29.5	34.0	4.5
30.05.2021	30.0	34.5	4.5
31.05.2021	29.5	33.5	4.0
Min.	**29.0**	**32.5**	**3.0**
Max.	**30.5**	**34.5**	**4.5**
Average	**29.7**	**33.5**	**3.8**

adani	Adani Power (Mundra) Limited, Mundra
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: June'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01.06.2021	29.9	33.7	3.8
02.06.2021	30.3	34.2	3.9
03.06.2021	30.0	33.5	3.5
04.06.2021	30.1	34.6	4.5
05.06.2021	30.4	34.3	3.9
06.06.2021	29.3	33.8	4.5
07.06.2021	29.9	34.1	4.2
08.06.2021	29.9	33.9	4.0
09.06.2021	29.7	34.0	4.3
10.06.2021	29.6	33.7	4.1
11.06.2021	29.6	33.9	4.3
12.06.2021	29.8	33.7	3.9
13.06.2021	29.8	34.1	4.3
14.06.2021	29.5	33.3	3.8
15.06.2021	29.6	33.8	4.2
16.06.2021	29.8	34.1	4.3
17.06.2021	30.0	33.5	3.5
18.06.2021	30.2	33.9	3.7
19.06.2021	29.4	33.9	4.5
20.06.2021	29.6	33.7	4.1
21.06.2021	29.8	33.6	3.8
22.06.2021	28.7	33.3	4.6
23.06.2021	29.9	33.7	3.8
24.06.2021	29.8	34.0	4.2
25.06.2021	29.4	33.3	3.9
26.06.2021	29.1	33.2	4.1
27.06.2021	29.5	33.2	3.7
28.06.2021	29.6	33.5	3.9
29.06.2021	30.1	34.3	4.2
30.06.2021	29.9	34.4	4.5
Min.	**28.7**	**33.2**	**3.5**
Max.	**30.4**	**34.6**	**4.6**
Average	**29.7**	**33.8**	**4.1**

adani	Adani Power (Mundra) Limited, Mundra
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: July'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01.07.2021	32.0	35.0	3.0
02.07.2021	30.3	33.8	3.5
03.07.2021	30.4	33.9	3.5
04.07.2021	30.7	34.2	3.5
05.07.2021	31.0	34.0	3.0
06.07.2021	31.2	33.7	2.5
07.07.2021	30.1	33.1	3.0
08.07.2021	30.9	33.9	3.0
09.07.2021	30.0	33.0	3.0
10.07.2021	29.9	33.4	3.5
11.07.2021	29.7	33.7	4.0
12.07.2021	30.0	33.5	3.5
13.07.2021	30.2	33.2	3.0
14.07.2021	30.1	33.1	3.0
15.07.2021	29.7	33.2	3.5
16.07.2021	29.7	33.2	3.5
17.07.2021	30.9	33.4	2.5
18.07.2021	30.0	33.5	3.5
19.07.2021	29.1	32.6	3.5
20.07.2021	29.9	32.4	2.5
21.07.2021	29.5	32.0	2.5
22.07.2021	29.5	32.0	2.5
23.07.2021	28.9	32.4	3.5
24.07.2021	29.2	32.7	3.5
25.07.2021	29.0	32.5	3.5
26.07.2021	29.1	32.6	3.5
27.07.2021	29.1	32.6	3.5
28.07.2021	29.1	32.6	3.5
29.07.2021	28.5	32.0	3.5
30.07.2021	28.3	31.8	3.5
31.07.2021	29.5	33.0	3.5
Min.	**28.3**	**31.8**	**2.5**
Max.	**32.0**	**35.0**	**4.0**
Average	**29.9**	**33.1**	**3.2**

adani	**Adani Power (Mundra) Limited, Mundra**
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: August'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01.08.2021	30.0	33.2	3.2
02.08.2021	29.9	32.7	2.8
03.08.2021	29.5	32.7	3.2
04.08.2021	29.4	33.1	3.7
05.08.2021	29.9	32.9	3.0
06.08.2021	30.0	32.6	2.6
07.08.2021	30.1	33.4	3.3
08.08.2021	30.5	34.0	3.5
09.08.2021	30.7	33.4	2.7
10.08.2021	29.9	33.2	3.3
11.08.2021	30.2	33.4	3.2
12.08.2021	29.5	32.8	3.3
13.08.2021	30.3	33.1	2.8
14.08.2021	29.9	33.2	3.3
15.08.2021	29.8	32.1	2.3
16.08.2021	29.5	32.7	3.2
17.08.2021	30.1	33.4	3.3
18.08.2021	30.0	33.5	3.5
19.08.2021	30.2	33.6	3.4
20.08.2021	30.5	33.6	3.1
21.08.2021	30.7	33.2	2.5
22.08.2021	31.0	34.2	3.2
23.08.2021	30.5	33.3	2.8
24.08.2021	30.5	31.8	1.3
25.08.2021	29.0	32.0	3.0
26.08.2021	29.0	32.8	3.8
27.08.2021	29.8	33.0	3.2
28.08.2021	30.0	32.0	2.0
29.08.2021	30.5	32.0	1.5
30.08.2021	31.0	32.5	1.5
31.08.2021	30.0	31.5	1.5
Min.	**29.0**	**31.5**	**1.3**
Max.	**31.0**	**34.2**	**3.8**
Average	**30.1**	**32.9**	**2.9**

adani	Adani Power (Mundra) Limited, Mundra
	Differential Water Temperature Report (April'21 to Sept'21)

Annexure – V

Month: September'2021			
Date	**Intake Reservoir (°C)**	**Outfall channel (°C)**	**Temp. difference (°C)**
01/09/2021	29.0	32.5	3.5
02/09/2021	29.5	31.0	1.5
03/09/2021	29.5	32.0	2.5
04/09/2021	30.0	32.5	2.5
05/09/2021	30.0	31.0	1.0
06/09/2021	30.5	OUM	OUM
07/09/2021	30.0	OUM	OUM
08/09/2021	30.5	OUM	OUM
09/09/2021	30.0	OUM	OUM
10/09/2021	30.0	OUM	OUM
11/09/2021	31.0	OUM	OUM
12/09/2021	29.5	OUM	OUM
13/09/2021	30.0	OUM	OUM
14/09/2021	31.0	OUM	OUM
15/09/2021	30.0	OUM	OUM
16/09/2021	31.0	OUM	OUM
17/09/2021	29.5	OUM	OUM
18/09/2021	30.0	OUM	OUM
19/09/2021	30.0	OUM	OUM
20/09/2021	30.0	OUM	OUM
21/09/2021	30.5	OUM	OUM
22/09/2021	30.0	OUM	OUM
23/09/2021	31.5	OUM	OUM
24/09/2021	30.0	OUM	OUM
25/09/2021	30.5	OUM	OUM
26/09/2021	30.0	OUM	OUM
27/09/2021	31.0	OUM	OUM
28/09/2021	31.5	OUM	OUM
29/09/2021	30.5	OUM	OUM
30/09/2021	30.0	OUM	OUM
Min.	**28.0**	**31.0**	**1.0**
Max.	**31.5**	**32.5**	**3.5**
Average	**30.2**	**31.8**	**2.2**

Note: OUM=Outfall Channel Under Maintenance

adani	Adani Power (Mundra) Limited, Mundra
	Greenbelt Details

Annexure: VI

Greenbelt Details:

Area (ha)	No. of Trees & Palm Planted	No. of Shrubs Planted
141.09	265420	1400954

Plant species planted at Adani Power Limited, Mundra

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

Annex- VII

Adani Power (Mundra) Limited, Mundra

Ash Production & Disposal (April 2021 to September 2021)

Month	Ash Production (MT/month)	For Cement manufacturing (MT/Month)	For Brick / Construction / Traders (MT/ month)	Reclamation of Low-Lying Areas (MT/month)	Ash Dyke (MT/ month)	Bottom Ash (Sold/ Export) MT/month	Dyke Ash lifted for reutilization (MT)	Total Ash Utilized (Silo + Dyke) (MT)	% of Ash Utilization	Previous Month's Stock (MT)
										1619
Apr-21	80788	62325	4495	5337	0	8072	0	80228	99.31	2179
May-21	51622	32300	11142	5568	0	3106	0	52116	100.96	1685
June-21	40947	21287	13275	0	0	7168	25	41756	101.98	901
July-21	29033	11036	13034	0	0	4896	861	29826	102.73	969
Aug-21	34997	10836	17327	0	0	6103	1425	35691	101.98	1700
Sep-21	12674	4028	7167	0	0	2300	491	13986	110.35	879
Total	**250062**	**141811**	**66441**	**10904**	**0**	**31646**	**2802**	**254483**	**101.42**	

Note: Total 879 MT Ash stocked (322 MT Ash in ash silo and 557 MT Ash filled in bags) and will be utilized in upcoming Months

adani

Power

Ref: APMuL/Env/Ash/MoEF/569/21
Date: 07.07.2021

To,
The Additional Principal Chief Conservator of Forest (APCCF),
Ministry of Environment Forests and Climate Change,
Regional Office, Western Region,
Kendriya Paryavaran Bhavan,
Link Road No. -3, E-5, Ravi Shankar Nagar,
Bhopal – 462 016 (M.P.)

Sub.: Advisory regarding implementation of Notification No. G.S.R. 02(E) dated: 2nd 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 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 MoEF&CC, 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 Mundra power plant during the period of **April 2021 to June 2021** 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)

Encl: As above

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

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info@adani.com
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Adani Power (Mundra) Limited

Annexure I

ASH PERCENTAGE IN COAL

(From April' 2021 to June' 2021)

Sl. No.	Month	Coal Consumption (MT)	Ash Content in Coal (%)	Quarterly Average (%)
1	April 2021	1,512,005	**5.34**	**5.30 %**
2	May 2021	976,223	**5.29**	
3	June 2021	780,751	**5.24**	

adani

Power

Ref: APL/ENV/FLYASH/288/10/21
Date: 06/10/2021

To,
The Additional Principal Chief Conservator of Forest (APCCF)
Ministry of Environment Forests and Climate Change
Regional Office, Western Region
Kendriya Paryavaran Bhavan,
Link Road No.- 3, E-5, Ravi Shankar Nagar
Bhopal - 462 016 (M.P)

Sub: Advisory regarding implementation of Notification No. G.S.R. 02 (E) dated 2nd January 2014 for supply and use of Coal with Ash content – reg.

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

Dear Sir,

With 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 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 power plant during the period of **July'2021 to September'2021** as Annexure **- I.**

Total Capacity of TPP: **4620 MW**

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

This is for your kind information & record please.

Thanking You,
Yours faithfully,
for **Adani Power (Mundra) Limited**

(R N Shukla)
Encl.: As above

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ADANI POWER (MUNDRA) LIMITED

Annexure – I

ASH PERCENTAGE IN COAL
(From July'2021 – September'2021)

Month	Coal Consumption (MT)	Ash Content in Coal (%)
July 2021	536345	5.41
August 2021	642764	5.44
September 2021	220515	5.75
Quarterly Average (%)	-	**5.53**

MT: Metric Tonne

UniStar
Environment and Research Labs Pvt. Ltd.

White House
Near G.I.D.C. Office, Char Rasta,
Vapi – 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

MoEF&CC [GOI] Recognized Environmental Laboratory under the EPA-1986 (12.01.2020 to 17.03.2023) | QCI-NABET Accredited EIA Consultant Organization | GPCB Recognized Environmental Auditor (Schedule-II) | ISO 9001 : 2015 Certified Company | ISO 45001 : 2018 Certified Company

TEST REPORT

ULR No.	--	Report No.	URC /21/06/L-0231
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	22/06/2021
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0231**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.49
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	16190
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	10824
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4986.3
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	BDL(MDL:4.0)
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	214.2
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	175.4
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	365.5
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	249.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1805
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	110.2
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	672.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	28.5
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	2.93
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.65
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.03)
18	Iron (as Fe)	IS 3025(Part 53)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01,	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0231**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0231**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
(Nilesh C. Patel)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0231**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0231**		

TEST RESULTS

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	9.0
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

********* 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.	**URC /21/06/L-0232**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0232**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.29
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	17880
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	11962
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4525.3
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	BDL(MDL:4.0)
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	209.3
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	171.6
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	356.3
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	218.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	2110
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	129.3
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	836.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	31.5
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	3.35
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	3.05
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.03)
18	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01,	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0232**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0232**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By

(Nilesh C. Patel)
(Sr. Chemist)

Authorized By

(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0232**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0232**		

TEST RESULTS

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	8.18
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
(Nilesh C. Patel)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F–2/05

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0233**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 3**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0233**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.61
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	15620
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	10424
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4725.2
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	BDL(MDL:4.0)
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	206.3
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	169.1
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	310.2
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	165.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1405
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	102.3
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	689.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	24.8
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	2.35
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.25
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.03)
18	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01,	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0233**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 3**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0233**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
(Nilesh C. Patel)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0233**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 3**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0233**		

TEST RESULTS

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	8.54
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

********* 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.	URC /21/06/L-0234
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	22/06/2021
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0234**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.33
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	16680
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	11146
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4744.3
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	BDL(MDL:4.0)
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	198.3
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	162.5
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	384.4
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	213.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1710
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	105.8
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	793.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	31.5
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	3.22
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	3.05
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992,	mg/L	BDL(MDL:0.03)
18	Iron (as Fe)	IS 3025(Part 53)2003,	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994,	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01,	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0234**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0234**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003,	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
(Nilesh C. Patel)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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

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TEST REPORT

ULR No.	--	Report No.	**URC /21/06/L-0234**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**22/06/2021**
		Customer's Ref.	--
Sample Details	**Nr. Emergency Ash Pond Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**14/06/2021**	Sample Received Date	**16/06/2021**
Test Started Date	**16/06/2021**	Test Completion Date	**21/06/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**21/06/L-0234**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	8.57
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	APHA 23rd Ed.2017-3500 –Ba,	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
(Nilesh C. Patel)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F–2/05

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0244**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0244**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.63
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	14370
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	9544
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4152
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	18.9
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	205.9
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	366
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	322.2
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	225.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1425
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	78.5
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	536.5
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	25.3
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	2.65
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.4
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.003)
18	Iron (as Fe)	IS 3025(Part 53)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0244**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0244**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
GENERAL CHEMICAL PARAMETERS				
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
Jesai
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

UERL/CHM/F–2/05

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0244**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 1**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0244**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
GENERAL CHEMICAL PARAMETERS				
1.	Salinity	By Calculation	ppt	7.5
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	AAS Method	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
Jagruti
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0245**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0245**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.42
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	16170
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	10962
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4205.3
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	25.1
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	169.9
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	385.2
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	315.5
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	195.6
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1896
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	110.3
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	744.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	27.5
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	2.95
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.27
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.003)
18	Iron (as Fe)	IS 3025(Part 53)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0245**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0245**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0245**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 2**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0245**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	7.8
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	AAS Method	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
Desai
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	URC /21/09/APML-0246
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	27/09/2021
		Customer's Ref.	--
Sample Details	Bore well Water Sample - 3	Location	--
Sample Qty.	2 Lit	Appearance	Colourless
Sampling Date	17/09/2021	Sample Received Date	20/09/2021
Test Started Date	20/09/2021	Test Completion Date	25/09/2021
Sampled By	UniStar Env. & Research Labs	Sampling Method	UREL/CHM/SOP/116
UERL Lab ID. No.	21/09/APML-0246		

TEST RESULTS:

DISCIPLINE : Chemical Testing			NAME OF GROUP: Water	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.65
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	14460
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	9524
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4284.3
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	28.2
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	145.5
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	365.2
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	277.2
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	142.3
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1165
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	62.3
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	562.3
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	21.1
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	1.96
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.0
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.003)
18	Iron (as Fe)	IS 3025(Part 53)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0246**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	–
Sample Details	**Bore well Water Sample - 3**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0246**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
Jesau
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0246**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 3**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0246**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	7.17
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	AAS Method	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
Jesai
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0247**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0247**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		PHYSIO-CHEMICAL PARAMETERS		
1.	pH @ 25 ° C	IS 3025(Part 11)1983	--	7.49
2.	Conductivity	IS 3025(Part 14)1984	(µS/cm)	15070
3.	Total Dissolved Solids	(APHA 23rd Ed.,2017,2540- C)	mg/L	10040
		GENERAL CHEMICAL PARAMETERS		
1.	Chloride as Cl^-	(APHA 23rd Ed.,2017,4500-Cl)	mg/L	4333.2
2.	Carbonate as CaCO3	IS 3025(Part 51)2001	mg/L	27.3
3.	Bicarbonate as CaCO3	IS 3025(Part 51)2001	mg/L	161
4.	Total Alkalinity	[IS 3025(Part 23)1986, Amd.2]	mg/L	410.7
5.	Calcium as Ca	(APHA 23rd Ed.,2017,3500 Ca.B)	mg/L	359.3
6.	Magnesium as Mg	(APHA 23rd Ed.,2017,, 3500 Mg.B)	mg/L	176.7
7.	Sodium as Na	APHA 23rd Ed.,2017,3500 Na,B	mg/L	1424
8.	Potassium as K	APHA 23rd Ed.,2017,3500 K,B	mg/L	82.1
9.	Sulphate as SO4-2	IS 3025(Part 24)1986	mg/L	685.2
10.	Nitrate as NO3	(APHA 23rd Ed.,2017,4500 NO3-B)	mg/L	26.5
11.	Phosphate as PO_4	(APHA 23rd Ed.,2017,4500-P,D)	mg/L	2.35
12.	Fluoride as F	(APHA 23rd Ed.,2017,4500 F,D)	mg/L	2.7
DISCIPLINE : Chemical Testing			**NAME OF GROUP: Residues in Water**	
13	Mercury as Hg	(APHA 23rd Ed.,2017,3112-B)	mg/L	BDL(MDL:0.001)
14	Arsenic as As	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
15	Lead as Pb	(APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.01)
16	Chromium as Cr	APHA 23rd Ed.,2017,3125	mg/L	BDL(MDL:0.05)
17	Cadmium as Cd	IS 3025(Part 41)1992, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.003)
18	Iron (as Fe)	IS 3025(Part 53)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.1)
19	Zinc (as Zn)	IS 3025(Part 49)1994, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)
20	Cobalt as Co	APHA 23rdEd.2017-3500-Co	mg/L	BDL(MDL:0.1)
21	Copper as Cu	IS 3025(Part 42)1992amd.01, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.05)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0247**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0247**		

TEST RESULTS:

DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
22.	Manganese as Mn	APHA 23rd Ed.,2017,3500 Mn B	mg/L	BDL(MDL:0.1)
23.	Nickel as Ni	IS 3025(Part 54)2003, (APHA 23rd Ed.,2017,3111-B)	mg/L	BDL(MDL:0.02)
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit,				
Opinion & Interpretation (If required): --				

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

Checked By
Desai
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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TEST REPORT

ULR No.	--	Report No.	**URC /21/09/APML-0247**
Name & Address of Customer	**M/s. Adani Power (Mundra) Ltd.** Village: Tunda &Siracha, Tal. Mundra, Dist.: Kutch. GUJARAT – 370 435.	Date of Report	**27/09/2021**
		Customer's Ref.	--
Sample Details	**Bore well Water Sample - 4**	Location	--
Sample Qty.	**2 Lit**	Appearance	**Colourless**
Sampling Date	**17/09/2021**	Sample Received Date	**20/09/2021**
Test Started Date	**20/09/2021**	Test Completion Date	**25/09/2021**
Sampled By	**UniStar Env. & Research Labs**	Sampling Method	**UREL/CHM/SOP/116**
UERL Lab ID. No.	**21/09/APML-0247**		

TEST RESULTS:

DISCIPLINE : Chemical Testing			**NAME OF GROUP: Water**	
Sr. No.	**Parameters**	**Test Method Permissible**	**Unit of Measurement**	**Results**
		GENERAL CHEMICAL PARAMETERS		
1.	Salinity	By Calculation	ppt	7.69
DISCIPLINE: Chemical Testing			**NAME OF GROUP: Residues in Water**	
2.	Barium as Ba	AAS Method	mg/L	N.D.
Remarks: N.D. = Not Detectable,				
Opinion & Interpretation (If required): --				

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

Checked By
Jesai
(Jagruti P. Desai)
(Sr. Chemist)

Authorized By
(Nitin B. Tandel)
(Technical Manager)

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

1C

Annex-IX

adani

Power

Ref.: APMuL/Env/GPCB/358/21
Date: 08.07.2021

To,
The Regional Officer,
Gujarat Pollution Control Board,
Kandala Port Trust Office,
Sector 8, Ghandhidham,
Kutch, Gujarat 370 201

Sub: Submission of Environment Statement for the Year of 2020-21 for 4620 MW Mundra Thermal Power Plant by Adani Power (Mundra) Limited, Mundra Kutch
Ref: CTO No. – AWH 102106 on dated 17/07/2019
GPCB ID - 29389

Dear Sir,

With reference to above subject, kindly find enclosed herewith Environment Statement 4620 MW Mundra Thermal Power Plant for the financial year 2020-21 duly filed as per format of Environment Statement prescribed by GPCB (Form V).

Kindly request to acknowledge the same.

Thanking you,

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

(Santosh Kumar Singh)
Head – Environment

Encl: As Above

CC:
The Member Secretary,
Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector- 10 A,
Gandhinagar 382 010

9/07/21

Gujarat Pollution Control Board
Head Office
Sector No. 10-A,
Gandhinagar-382010

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

Registered Office: Adani House, Nr Mithakhali Six Roads, Navrangpura, Ahmedabad 380 009, Gujarat, India

ENVIRONMENTAL STATEMENT

FOR THE FINANCIAL YEAR

2020 - 2021

Adani Power (Mundra) Limited

Vill: Tunda & Siracha

Mundra, Kutch Gujarat

ENVIRONMENTAL STATEMENT

FORM-V

(See Rule 14)

From:

Adani Power (Mundra) Ltd.
Plot No. Tunda [180/P], Siracha,
Village: Tunda, Tal: Mundra,
Dist: Kutch
Gujarat – 370435

To,

Gujarat Pollution Control Board,
Paryavaran Bhavan,
Sector 10 A,
Gandhinagar 382010

Environmental Statement for the Financial Year ending the 31st March 2021

PART- A

(i) Name and address of the occupier of the industry operation	: Shri. Pramod Kumar Saxena, **Adani Power (Mundra) Ltd.** Tunda [180/P], Siracha. Village: Tunda Tal: Mundra Dist. Kutch Gujarat: 370435
(ii) Industry Category Primary (STC Code) Secondary – (SIC Code)	: AADCA2957LST001
(iii) Production Capacity (Power)	: Phase I: 2 x 330MW Phase II: 2 x 330M +2x660MW Phase III: 3 x 660 MW
(iv) Year of Establishment	: Phase I – U#1 - Aug'09, U#2-Mar'10 : Phase II –U#3 -Aug'10, U#4-Dec'10 -U#5 - Dec'10, U#6-Feb'12 : Phase III –U#7 – Nov'11, -U#8–Mar'12, U#9-Mar'12
(v) Date of the last Environmental Statement submitted	: **10/06/2020**

PART – B

WATER AND RAW MATERIAL CONSUMPTION

a. Water Consumption for the period (April'20 – March'21)

Process* : 1014 KL/Day

Cooling & Boiler Feed : 639124 KL/day

Domestic** : 5570 KL/day

- * DM water Makeup
- **Domestic water quantity includes Potable water and service water

Name of Product	Process Water Consumption per Unit of Product Output	
	During the previous year (2019-2020)	During the current year (2020 - 2021)
Power Generation	0.0145 Lit/Unit	0.0144 Lit/Unit

b. Raw Material Consumption

Name of Product	Name of Raw Materials	Unit	Consumption of Raw Material Per Unit of Power	
			During the previous Financial Year (2019-2020)	During the current Financial year (2020-2021)
POWER	Fuel Oil	KL	0.030 KL/mus	0.088 KL/mus
	Coal	MT	543.61 MT/mus	543.93 MT/mus

*mus: million units

PART – C

POLLUTION DISCHARGED TO ENVIRONMENT / UNIT OF OUTPUT

a. Water:

Outfall water Quantity	: 527903 KL/day
Avg. Domestic effluent quantity	: 233 KL/ Day

Note:

1. Average temperature of seawater intake and outlet water is enclosed as **Annexure –I.**
2. Effluent treated water is reused for water sprinkling to Coal stack yard and Road.
3. The Cooling tower (CT) blowdown and desalination reject water is utilized for FGD scrubber system to control the sulfur emission and FGD effluent is passes through aeration basin for final discharge. Treated water discharges to sea as per the norms and as per suggested by NIO recommendation.
4. Third party Environment monitoring reports is enclosed as **Annexure - III**.
5. Treated sewage water (STP) is being utilized in plantation & Green Belt development.

b. **Air:**

Sr. No.	Stack Attached to	Pollutant	Quantity of Pollutants Discharge in Mass/day (Kg/Day)	Concentration of Pollution Discharged in Mass/Volume (mg/Nm^3)	Variance (exceeding allowed Quantity)
1	Boiler unit I	PM	1212.1	38.8	No deviation
2	Boiler unit II	PM	1122.2	35.6	No deviation
3	Boiler unit III	PM	1236.5	36.1	No deviation
4	Boiler unit IV	PM	1259.1	37.8	No deviation
5	Boiler unit V	PM	2119.5	34.7	No deviation
6	Boiler unit VI	PM	2115.6	35.6	No deviation
7	Boiler unit VII	PM	2273.4	35.2	No deviation
		SO_2	9790.6	151.4	No deviation
8	Boiler unit VIII	PM	2261.2	34.7	No deviation
		SO_2	9765.9	149.9	No deviation
9	Boiler unit IX	PM	2292.9	35.2	No deviation
		SO_2	9376.3	143.8	No deviation

All Stack Emission data are average of monthly monitoring reports.

PART - D

As specified under Hazardous Waste (Management & Handling & Transboundary movement rules) Amendment Rules 2008

Sr. No.	Hazardous Wastes	Total Quantity (KL)	
		During the previous financial year (2019-2020)	During the current financial year (2020- 2021)
1.	Used Oil	28.56	34.41
2.	Spent Resins	0	0.850
3.	Discarded Container	17.221	19.169
4.	Insulation Waste (Glass Wool)	1.280	2.120
5.	Oily Cotton Waste	0.750	1.750

PART – E

Solid Wastes

Details	Ash Generation (in MT)	
	(2019- 2020)	(2020- 2021)
From Process	**735740**	**679228**
From Pollution Control facilities	NIL	NIL

PART-F

Please specify the characterization (in terms of composition and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both the categories of wastes.

Non-Hazardous Solid Waste

Solid Waste generation : Ash (**Fly ash & Wet ash**)

Ash Utilization in 2020-21 : 105.49 %

Ash utilization data is enclosed as **Annexure –II.**

PART – G

Impact of the Pollution abatement measures taken on conservation of natural resources and the cost of production

The unit has installed highly efficient super critical boilers in Unit 5, 6, 7, 8 and 9. The environmental advantages of super critical boiler are as below:

Reduction in coal consumption
Reduction in Green house gases
Reduction of water requirements
Overall reduction in Auxiliary Power Consumption
Reduction in requirement of Ash Emergency land & Consumptive water

The APL has commissioned the first supercritical 660 MW unit in India. APL, Mundra is also the world's first supercritical technology based thermal power project to have received 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

PART – H

Additional measures / Investment proposal for environmental protection including abatement of pollution, prevention of pollution

1. Greenbelt of about 139.46 developed and further development in progress...

Area (ha)	No. of Trees & Palm Planted	No. of Shrubs Planted
139.46	248455	1400954

2. Online ambient air quality monitoring stations has been installed at three different directions & closed to the plant boundary.

3. Seawater based FGDs has been installed at Unit 7, 8 & 9 for SO_2 reduction in Stack Emissions. The Cooling tower (CT) blow down and Desalination plant Reject will be utilized for FGD scrubber system and FGD effluent will be disposed off to the sea through aeration chamber.

4. Online Effluent Quality monitoring System has installed at final outfall channel.

5. Emergency ash pond provided for disposal of unutilized ash.

6. We have adopted Ammonia Flue Gas Conditioning System in Unit 1 & 7 for bringing down the SPM level from the flue gas is through ESP. It is based on effective dispersion & diffusion of ammonia gas in the flue gas.

7. Regular water sprinkling is being done to control the fugitive dust in CHP area and all other areas. In addition mechanical sweeping machine have been deployed for cleaning the road.
8. Wind breaking wall provided coal yard area for reducing fugitive emission & coal loss.

9. Single Use Plastic Free Project for "Certification for Single Use Plastic Free Company" is being implemented at APMuL, Mundra site in line with compliance of Plastic Waste Management Rule 2011. Various exercised being carried out for compliance of single use plastic ban initiatives at site and based on that inspection checklists are filled and submitted to CII, New Delhi for final assessment and certification process.

PART – I

Any other particulars for improving the quality of the environment

1. We have Implemented **ISO-14001:2015** Environment Management System (EMS) for Mundra TPP of Adani Power Limited. The department wise core team has been established to maintain the compliance of the standard. All Head of the Departments are responsible for ensuring the compliance of the standard.
2. NABL - Desktop Surveillance Audit for continuation of NABL Accreditation status of Environmental laboratory as per ISO/IEC 17025:2017 is successfully carried out by Quality Council of India. Extension in validity of Accreditation letter received on 11.05.2021 having validity period upto:28.05.2022. (Certificate No. TC-5215).
3. APL, Mundra also participated in GRI-G4 Sustainability reporting initiative for sustainable development and published reports for FY2014-15, FY 2015-16, FY 2016-17, FY 2017-18, FY 2018-19 which are available on the website.
4. GPCB appointed Schedule#1 Environmental Auditors (M/s VVP Engineering college, Rajkot) successfully conducted environmental audit of APMuL, Mundra. Audit report received on 05.06.2021 is submitted in the office of GPCB Gandhidham on 15.06.2021
5. Membership with GPCB authorized TSDF agency is renewed with 5 Years validity up to 14.12.2024 for disposal of identified hazardous Waste material generated from our plant operation. Certificates received.
6. Organic waste converter installed for converting the canteen waste into organic manure. The organic manure is used for gardening.
7. Fly ash utilized to produce vermicomposting
8. The Rooftop Rainwater collection & groundwater recharging Scheme has been adopted & installed at three locations within plant premises
9. Green belt development/plantation work is swing and our efforts are being made to develop more greenery in and around the plant.
10. Digital LED Display board is installed at main gate of plant for display the environmental parameters.
11. Integrated Ash silo system has been commissioned & make operational to handle ash at single location to minimize fugitive emission & minimize vehicle movement.

12. Ash bagging plant has been commissioned & make operational for fine ash bagging for export to increase ash utilization.
13. Boiler & turbine high-energy drain passing survey has been done for reducing heat losses
14. Condenser cleaning for vacuum improvement, which increase plant efficiency & improve heat rate
15. Best start-up practices adopted for reducing start-up oil consumption
16. Replacement of cooling tower fans existing blades with energy efficient blades for aux. power saving
17. CW pump & CT fans operation optimization for auxiliary power saving
18. Compressor operation optimization for auxiliary power saving.
19. Periodic energy audit and implementation
20. Elimination of chlorine tonner by replacing sea water based Electro chlorination plant. This eliminates the chlorine gas hazards from the environment.

21. Bio Diversity:

- APL is also committed towards biodiversity conservation by adhering to the Biodiversity Policy and APL is an active signatory member of India Business Biodiversity Initiative (IBBI).
- APL is continuously monitoring by adopting various scientific techniques for monitoring Biodiversity (terrestrial & Marine) of in and around 10 km radius distance of each operational locations.
- An Eco-Park is developed, which is being prepared with waste and reusable material. The main concept for this park is to promote waste recovery, recycling, reuse and environmental engineering among the employees and visitors. It also gives a platform for experimental garden for plantation activities.
- The Eco-Park has been developed to provide shelter and breeding ground to the local and resident birds with an area of approximately 2 ha inside the plant premises. The area is covered with live fencing of Casuarina sp. and Prosopis *juliflora* plant species. To attract birds, *fruitivorus* plants like Sapota (Manilkara zapota), Pomegranates (Punica granatum), Neem tree (*Azadirachta* indica), Banyan Tree (Ficus *benghalensis*), and *Pilu* (Salvadora persica) are planted.
- The Eco-park serves as a habitat for the reptiles like frog, lizard, and snake whereas mammals like *Mangoose* are also occasionally sighted. 28 resident bird species have been identified during the monitoring.

- The company has an ambitious target to create a net positive biodiversity impact at all out operations and projects. At the time of proposing new projects, wildlife and biodiversity studies are carried out.
- Moreover, raising awareness among employees on biodiversity is one of the major efforts towards conservation initiatives.

Sign:

Name: Santosh Kumar Singh
Designation: SVP - Environment
Address: Adani Power (Mundra) Ltd, Mundra

Annexure-1

Monthly Temperature average differential records during

April-2020 to March-2021

Months	Intake Reservoir ºC	Outfall channel ºC	Temp. Difference ºC
April, 2020	28.1	31.2	3.1
May, 2020	29.7	33.5	3.8
June, 2020	29.9	33.3	3.4
July, 2020	29.1	32.6	3.5
August, 2020	27.9	31.1	3.2
September, 2020	28.6	32.4	3.8
October, 2020	29.9	33.8	3.9
November, 2020	27.3	30.8	3.5
December, 2020	22.0	25.2	3.2
January, 2021	29.1	32.6	3.5
February, 2021	23.6	26.5	2.9
March, 2021	26.3	29.6	3.3

Note: * Outfall channel under shutdown

Ash Utilization Report

April-2020 to March-2021

Month	Ash Production (MT/ month)	For Cement manufacturing (MT/ Month)	For Brick/ Construction/Traders (MT/ Month)	Reclamation of Low-Lying Areas (MT/ Month)	Ash Dyke (MT/ Month)	Bottom Ash (Export)	Dyke Ash lifted for Reutilization (MT)	Total Ash Utilized (Silo + Dyke) (MT)	Total Ash Utilized %
April, 2020	31754	10756	5094	4853	0	0	0	20703	65
May, 2020	50398	36288	6286	8113	0	0	0	50687	101
June, 2020	43873	21277	14394	7430	0	0	2621	45721	104
July, 2020	58836	35835	13185	5579	0	4419	8732	67750	115
August, 2020	47920	31837	6481	6135	0	1840	0	46293	97
September, 2020	64426	40067	14950	10037	0	776	0	65829	102
October, 2020	79583	48806	10914	12323	0	908	0	72950	92
November, 2020	68359	33600	18938	14352	0	1470	0	68359	100
December, 2020	75933	54642	14768	8216	0	4461	0	82086	108
January, 2021	64206	31703	22508	8356	0	2611	0	65178	102
February, 2021	45812	12162	25414	7207	0	391	0	45174	99
March, 2021	48128	23692	17288	3147	0	4753	36885	85765	178
TOTAL	**679228**	**380663**	**170220**	**95747**	**0**	**21629**	**48237**	**716496**	**105**

Note: Total 1619 MT Ash stocked (834 MT Ash in ash silo and 785 MT Ash filled in bags) and will be utilized in upcoming month.

adani	Adani Power (Mundra) Limited, Mundra Expenditure for Environmental Protection & CER (Period: April 2021 – September 2021)	Annexure – X (A)

Expenditure for Environmental Protection & CER		
		(Fig. in Rs. Lacs)
Sr. No.	**Particular**	**Expenditure from April'21 to September' 21**
1	Rural Development/CER/CSR Activities	405.24
2	Green belt development	58.74
3	Legal, Consent Fee, GPCB lab bills & Environment Audit	1.55
4	World Environment Day Celebration	0.28
5	Hazardous waste disposal cost	0.17
6	Single use plastic certification and banner preparation	2.20
7	Treatment and Disposal cost (Wastewater & Sewage Treatment)	23.19
8	Maintenance cost of ESP & FGD (Material Cost)	187.09
9	Third party monitoring and Equipment & instruments maintenance, materials, communication cost.	22.35
10	Insurance, training, and external environmental management	0.11
	Total	**700.92**

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5th June 2021

World Environment Day, 2021 Celebration at Adani Power (Mundra) Limited

World Environment Day, 2021 Celebration at Adani Power (Mundra) Limited

International days are occasions to educate the public on issues of concern and resources to address global issues and to celebrate and reinforce achievements of humanity. World Environment Day takes place every year on 5th June. It is the United Nations flagship day for promoting worldwide awareness and action for the environment. Over the years, it has grown to be the largest global platform for environmental public outreach and is celebrated by millions of people in more than 100 countries.

This annual event seeks to draw awareness on a particular theme. The theme slogan for this year's WED has been declared as ***"Ecological Restoration"***.

For too long, humans have been exploiting and destroying the planet's ecosystems. Every three seconds, the world loses enough forest to cover a football pitch and over the last century, we have destroyed half of the wetlands. Ecosystem loss is depriving the world of carbon sinks. We must now fundamentally rethink our relationship with the living world, with natural ecosystems and their biodiversity and work towards its restoration.

World Environment Day, 2021 Celebration at Adani Power (Mundra) Limited

To raise an awareness among APMuL Employees, Housewives, Children and associates, APMuL has celebrated this event this year during 3rd to 5th June for three days by organizing various activities such as **Symbolic Tree Plantation, Online Quiz competitions(03 Days),** Environmental **Poster Competition, Model Making from waste Materials Competition, Single Using Plastic Free Initiatives at Plant/Home and Awareness Session for Homemakers/Housewives etc,** with lot of enthusiasm.

An event was opened on 3rd by releasing online quiz, poster making competition, and mass tree plantation. A successful mass tree plantation Near Hydrogen Plant was organized on 5th in the presence of Shri Pramod Kumar Saxena, Station Head, Shri Mayank Kumar Doshi, Head O&M; APMuL employees and associate business partners.

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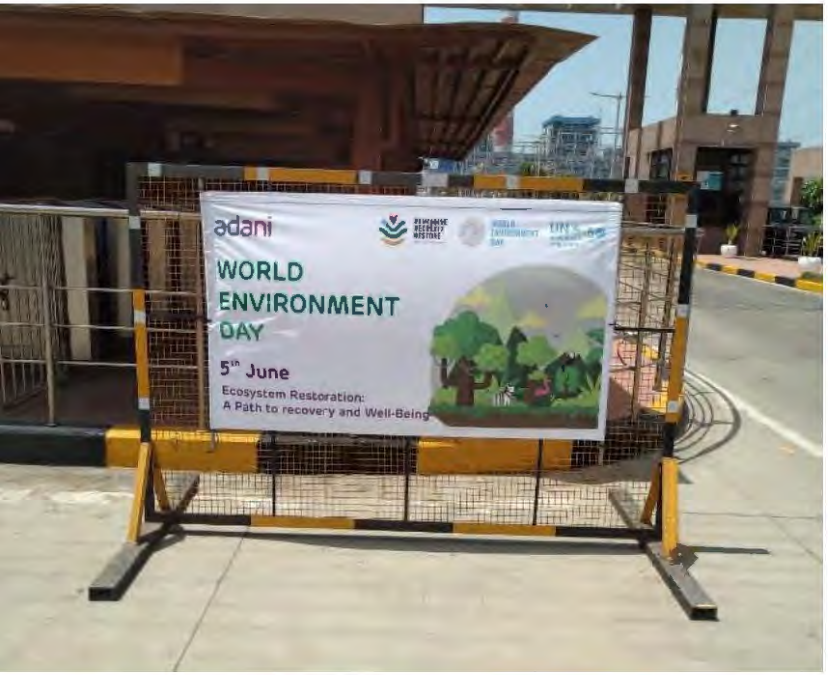
#GenerationRestoration

WORLD ENVIRONMENT DAY

UN environment programme 50 1972-2022

Sensitizing APMuL Employees and associates through Banners and Circulars



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Symbolic Plantation

Shri Pramod Kumar Saxena, Station Head and Shri Mayank Kumar Doshi, Head O&M, planting saplings on the WED, 2021 Celebration

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DAY

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APMuL Dignitaries and Employees planting saplings on the WED, 2021 Celebration

Glimpse of Environmental Posters and Models

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Winners of Environmental Posters Competition

1st Winner
Mr. Sumit Roy
EMD Department

2nd Winner
Mr. Tajvirsinh Jadeja
C & I Department

3rd Winner
1. Keval H Kuchchhi, MMD-BOP
2. Sohil Multani, C & I Department

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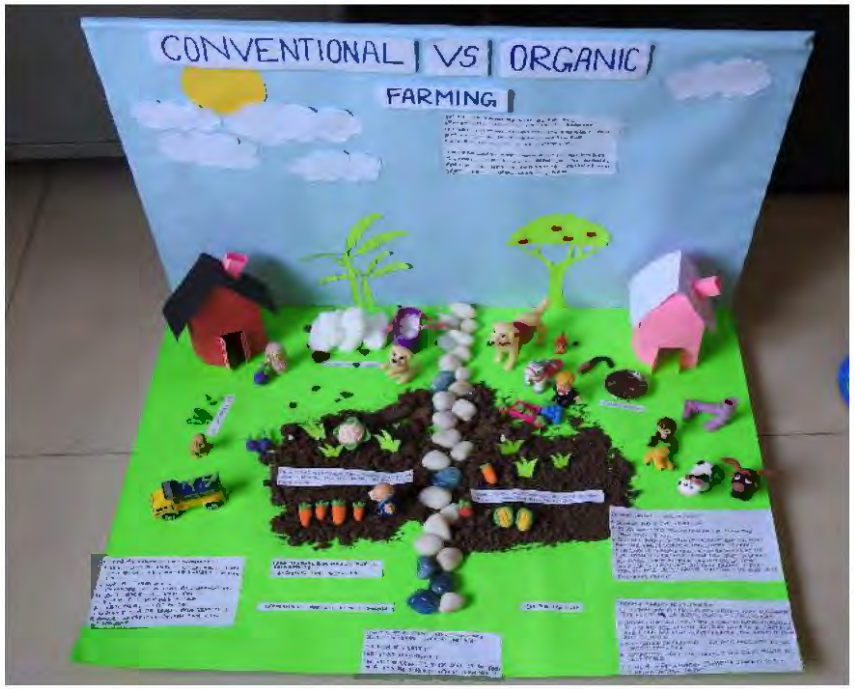
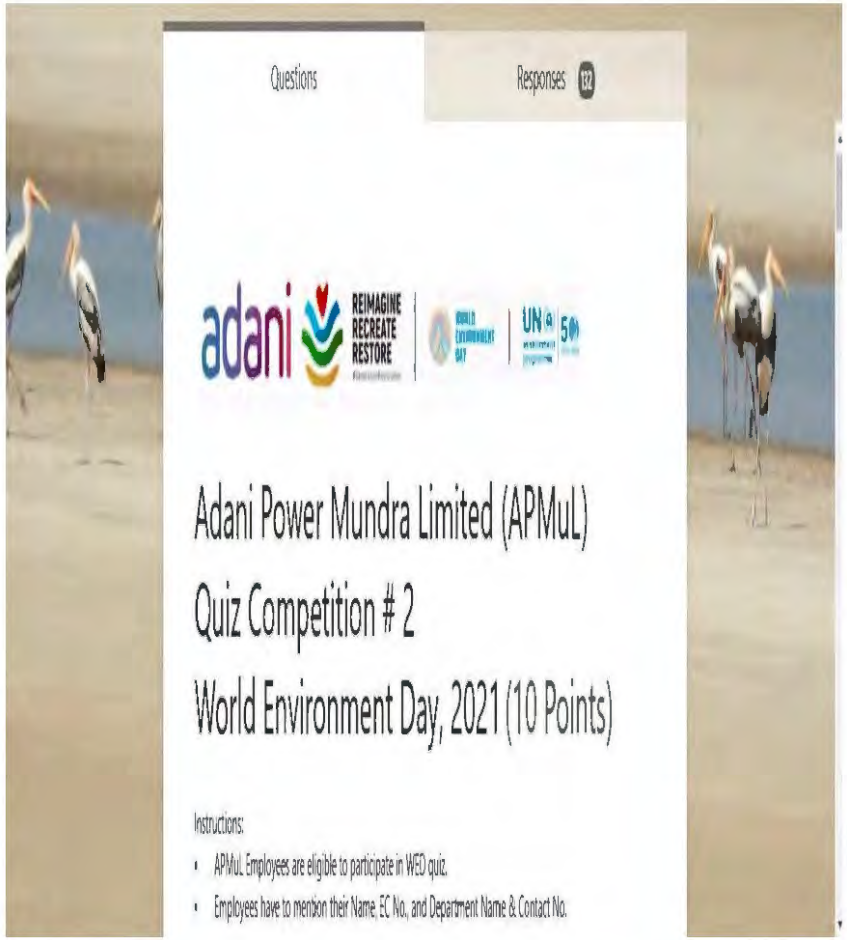
Winners of Model Making from waste Materials Competition

1st Winner
Mr. Amit Kotak
MTP & OE Department



2nd Winner
Mr. Vishwa Modi
(Do. of Kalpesh Modi)
Operation-660

3rd Winner
Mr. Jay Patel
EMD Department



Environmental Online Quiz Competition(03 Days)

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Winners of Online Quiz

Online Quiz # 1		
Prize	**Employee Name**	**Department**
1st	Mr. Binoy Pati	MTP & OE
2nd	Mr. Chirag B Patel	AHP
3rd	Mr. Yakshit Raval	STORES (TC)

Online Quiz # 2		
Prize	**Employee Name**	**Department**
1st	Mr. Kaushik Pambhar	Mechanical Maintenance
2nd	Mr. Amit Tank	AHP
3rd	Mr. Rakesh Kumar Rout	MTP

Online Quiz # 3		
Prize	**Employee Name**	**Department**
1st	Mr. Balkrishan Gupta	C & I
2nd	Mr. Debasis Das	HR
3rd	Mr. Shaktidan Mod	C & I

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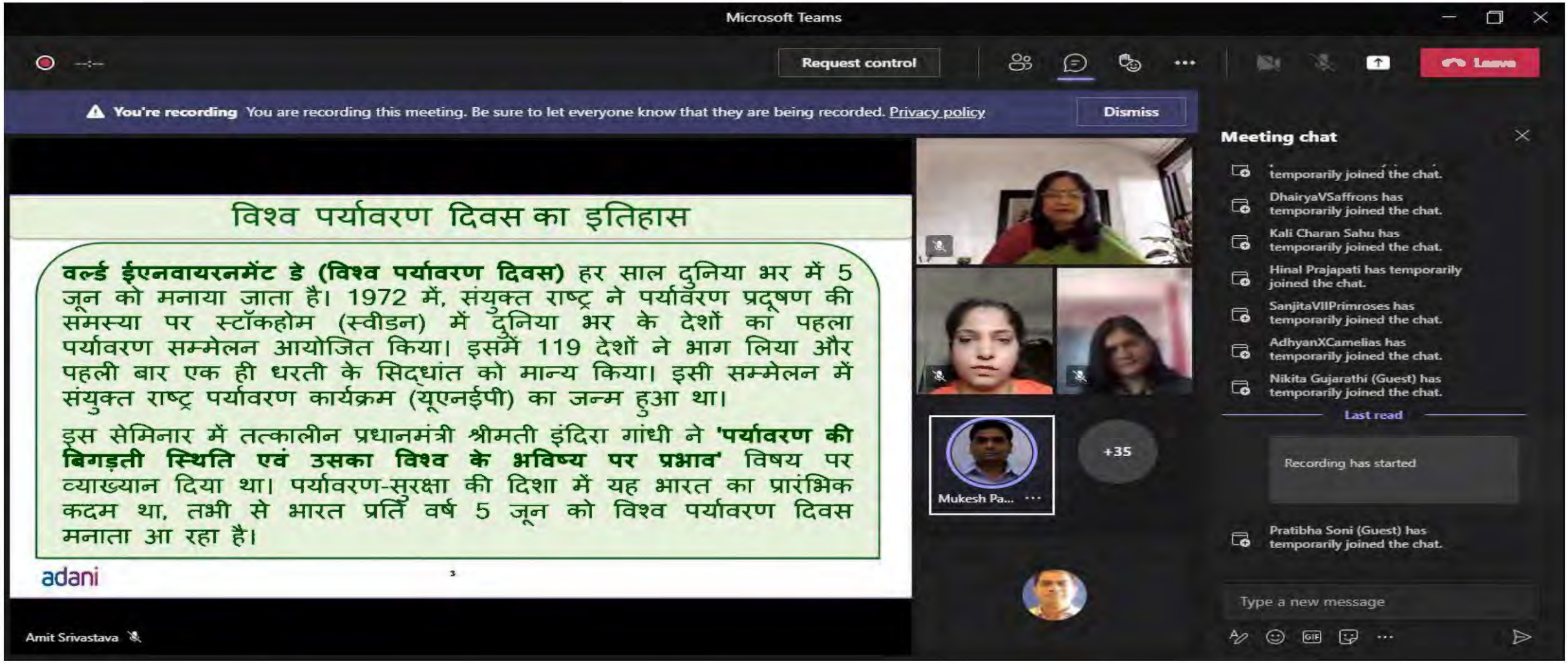
Online Awareness Program on Environment for Homemakers/Housewives



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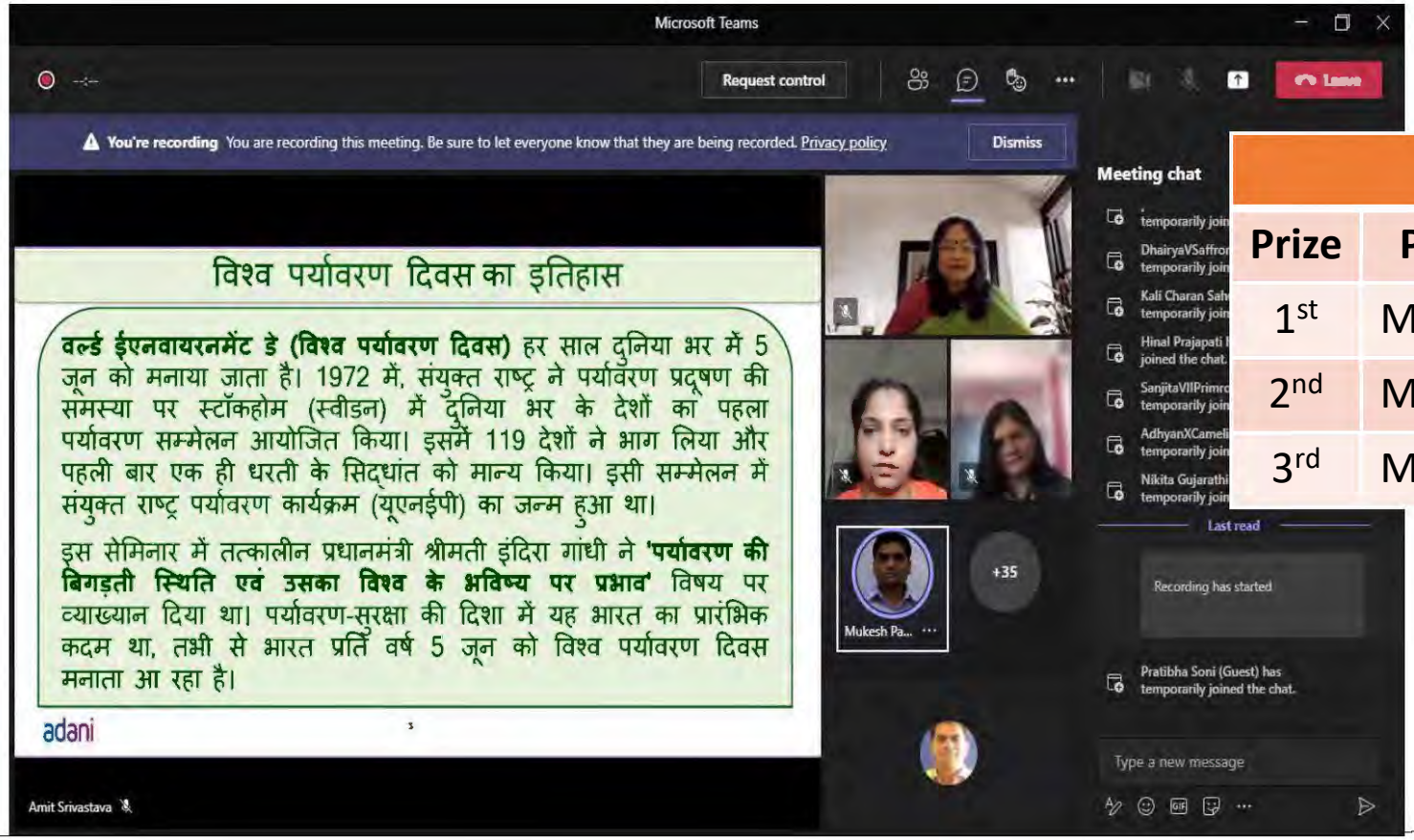
WORLD ENVIRONMENT DAY

UN environment programme 50 1972-2022

Glimpse of Awareness program on Environment for Homemakers/Housewives



Winners of Online Quiz for Homemakers/Housewives

Online Quiz # for Homemakers

Prize	Participant Name	Employee Name	Dep.
1st	Mrs. Mula Lakshmi	Mr. Mula Ravi	O & M
2nd	Mrs. Nanda Tulaje	Mr. Manjunath Tulaje	O & M
3rd	Mrs. Jyoti MIttal	Mr. Anshuman Mittal	IT

Summations on Single Use Plastic (SUP) free Initiatives at Home & Plant by APMuL employees and their family members

Mrs. Sunita Sharma (W/o Mr. Virendra Sharma), Deputy Manager (Operation 330)

Making beautiful Flowers and handing Flower Bucket form one time use Plastic bags

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#GenerationRestoration

WORLD ENVIRONMENT DAY

UN environment programme 50 1972-2022

Summations on Single Use Plastic (SUP) free Initiatives at Home & Plant by APMuL employees and their family members

Mr. Pankaj Kumar Jangid, Deputy Manager (Central Store)

Material preservation done with 100% Compostable materials instead of single use plastic sheet

Mr. Ghanshyam Makwana , Deputy Manager (C & I Dept)

Always carry own jute bag during Grocery and Fruit vegetable Shopping


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Resources
Logistics
Energy

CII-ITC Centre of Excellence for Sustainable Development

Confederation of Indian Industry

Certificate

Single-use Plastic Free

Adani Power (Mundra) Limited

Mundra Thermal Power Plant, Village: Tunda & Siracha, Taluka: Mundra,
District Kutch-370435, Gujarat, India

This is to certify that Adani Power (Mundra) Limited, (a subsidiary of Adani Power Limited) at the location mentioned above, is Single-use Plastic Free as verified by the Confederation of Indian Industry, under the provisions of the **Plastics-use Protocol: Verification and Certification (1.0)**.

This Certificate is valid from 25 June 2021 to 24 June 2022.

PLASTICS-USE PROTOCOL

CONFEDERATION OF INDIAN INDUSTRY CII NEW DELHI

Ms Seema Arora
Deputy Director General
Confederation of Indian Industry (CII)
Centre of Excellence for Sustainable Development (CESD)

Certificate Date: 05 July 2021

Certificate No.: CII/PuP/2021/019

This certificate has been awarded after the company fulfilled the requirements for phasing-out single-use plastics and provided evidence for it. Responsibility for the data provided to CII rests solely with the company. The conditions of certification, and items are detailed in the Annex.

Annex

The certification applies to the following single-use plastic items:

- Plastic cutlery-use and throw (forks, knives, spoons and chopsticks)
- Plastic plates-use and throw
- Plastic straws
- Plastic beverage stirrers
- Plastic sticks (attached with the balloons)
- Plastic food containers-use and throw
- Plastic water bottles-use and throw
- Plastic cups for beverages-use and throw
- Plastic banners
- Gift wrapping sheets
- Dustbin liners

Organizational Boundary: Adani Power (Mundra) Limited

Operational Boundary: Office areas, canteen and operations

Material Boundary: Single-use Plastics

Reference
Verification Date: 25 May 2021
Verification Report No.: PuP/Verification/2021/APMuL/001
Mode: On account of the COVID-19 pandemic, the verification process was virtual and followed provisions outlined in the Verification Procedure 1.0 of the Protocol

Annexure - XI

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Foundation

CSR KUTCH

Six Monthly Report 2021-22

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

PREFACE

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

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

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

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

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

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

INDEX

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

Reducing Carbon footprint

1. Miyawaki – Nana Kapaya

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

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

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

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

Reducing Carbon footprint

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

Reducing Carbon footprint

Species Name/ Botanical Name	Local Name in Gujarati	Saplings Required	TOTAL ACTUAL	TOTAL ACTUAL	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4	Mixed Plantation dominant Drought Resistant Plants PLOT 1	Mixed Plantation dominant by Larger Leaves PLOT 2	Mixed Plantation dominant by Saline Resistant Plants PLOT 3	Mixed Plantation dominant by Medicinal Values PLOT 4
Adhatoda zeylanica Medic.	અરડૂસી	100	100	100	15	20	25	40	86	57	55	29
Parkinsonia aculeata	રામ બાવળ	100	100	100	20	10	50	20	65	114	28	58
Albizia lebbeck (L.) Bth.	કાળો શિરીષ	100	100	100	25	20	35	20	52	57	40	58
Terminalia arjuna (Roxb.) W. & A.	અર્જુન સાદડ	100	80	80	20	20	20	20	65	57	69	58
Grewia tiliaefolia Vahl var. tiliaefolia	ફાલસા	100	60	60	15	20	10	15	86	57	139	77
Abrus precatorius L.	ચણોઠી	50	50	50	15	10	15	10	86	114	92	115
Aegle marmelos (L.) Corr.	બીલીપત્ર	50	50	50	15	10	10	15	86	114	139	77
Ailanthus excelsa Roxb.	અરડૂસો	50	50	50	15	10	10	15	86	114	139	77
Asparagus racemosus Willd. var. javanicus	શતાવરી	50	50	50	15	10	10	15	86	114	139	77
Cassia fistulaL.	ગરમાળો	50	50	50	15	10	10	15	86	114	139	77
Cordia dichotoma Forst.	મોટા ગુંદા	50	50	50	15	10	10	15	86	114	139	77
Holoptelia integrifolia	કણજી	50	50	50	10	15	10	15	129	76	139	77
Murraya koenigii (L.) Spr.	મીઠો લીમડો	50	50	50	10	15	10	15	129	76	139	77
Psidium guajava L.	જામફળ	50	50	50	15	10	10	15	86	114	139	77
Punica granatum L.	દાડમ	50	50	50	15	10	10	15	86	114	139	77
Syzygium cumini	જાંબુ	50	50	50	15	10	10	15	86	114	139	77

Reducing Carbon footprint

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

TOTAL SAPLINGS PLANTED 4965

Reducing Carbon footprint

Smritivan Memorial park– Bhuj

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

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

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

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

Reducing Carbon footprint

Smritivan Memorial park– Bhuj

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

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

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

Reducing Carbon footprint

Grassland Ecosystem Restoration project - Guneri

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

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

Guneri village is situated north of Lakhpat fort with a population of 967 as per the 2011census. A Biodiversity Management Committee (BMC)already exists there and hence it becomes easy to undertake grassland restoration with the help of committee members.The gauchar land available for restoration is around 100 Ha and about 40 Ha of the area can be considered for restoration. The restoration process will be spread over a time period of three years, starting initially with 10 Ha and slowly moving up to 40 Ha by the third year.

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

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

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

Reducing Carbon footprint

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Reducing Carbon footprint

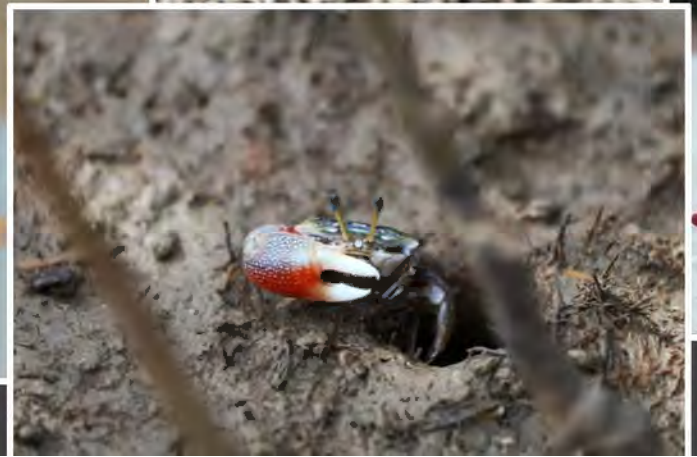
Coastal Biodiversity

In the coastal environment mangroves and mudflats are dynamic ecosystems that usually support a large population of floral and faunal life forms. Mangrove forests are highly productive ecosystems, which provide numerous goods and services both to the marine environment and people. Mangroves in India are spread over nine maritime states and three Union Territories. Gujarat has the longest (1,650 km) coastline among the maritime states of the country. With the second largest mangrove cover in India after West Bengal, Gujarat's mangrove area has increased from 1,140 km2in 2017 to 1,177 km2now.

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

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

Current year 3 hector development is planned to extend biodiversity park



Reducing Carbon footprint

Homebiogas -

Home biogas is the Israel based company was founded in 2012 manufactures dynamic biogas unit not only for farm waste but for kitchen waste too.
Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Current year supported 117 home biogas in Dhrub, Zarpara and Navinal Villages.
•Reducing organic waste,
•Transitioning to renewable energy
•Motivation for reduction in use for fertilizer
Promotion of Natural Farming–Home biogas
And Improving the health and living conditions for the millions of families that are still cooking on charcoal and wood. Adani Foundation is not only supporting but creating awareness to save environment and health of the community who regularly cooking on Chula. **It is proven that one hour cooking on Chula is as dangerous as smoking 40 cigrates**.
As a Main Process, Bacteria break down organic waste in a naturally occurring process, and Home Biogas stores and harnesses the energy created so that it can be used for gas.
Earlier we had proceeded for capacity 2 cum but after visit and series of meetings with farmer group –we need to take up plant capacity 6 cum. Till date 120 farmers are utilizing it with satisfaction and considerable outcome by saving Average Rs. 23,400 for gas and fertilizer as well - Homebiogas is base of promotion of natural farming.

2,053 TONS OF ANIMAL MANURE TREATED

159,687 HOURS OF CLEAN COOKING;
4.3 TONS OF BIOGAS CREATED
125 TONS OF FIREWOOD REPLACED;
27,375 HOURS SAVED ON REDUCTION OF FIREWOOD &COLLECTION
625 TONS CO2 EMISSION REDUCTION

Reducing Carbon footprint

See Weed Culture -

Vision

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

Collabration

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

Achievements

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

Water conservation Project

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

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

Water conservation Project

- **Basis of Requirements of Drip Irrigation**

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

- **Process of Drip Support**

Farmer have to applied in the prescribed form of Adani foundation with photograph.
Inspection and verification will be by AF representative.
Ration card, work order of G.G.R.C, 7/12 certificate and all bills must be attached.
Farmer will be informed by telephonic to have form query.
Primary information about farmer land will be received by telephone.
Farm visit within 10 days of after received of application and verified the installation of system as per map and material as per bill will be checked and get farmer feed back.
Verification report submitted to account office.
Payment within 20 days if all document is complete through net banking.
Farmer economic study after our support. – Follow up

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

Education Projects

Utthan

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

Education Projects

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

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

Education Projects

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

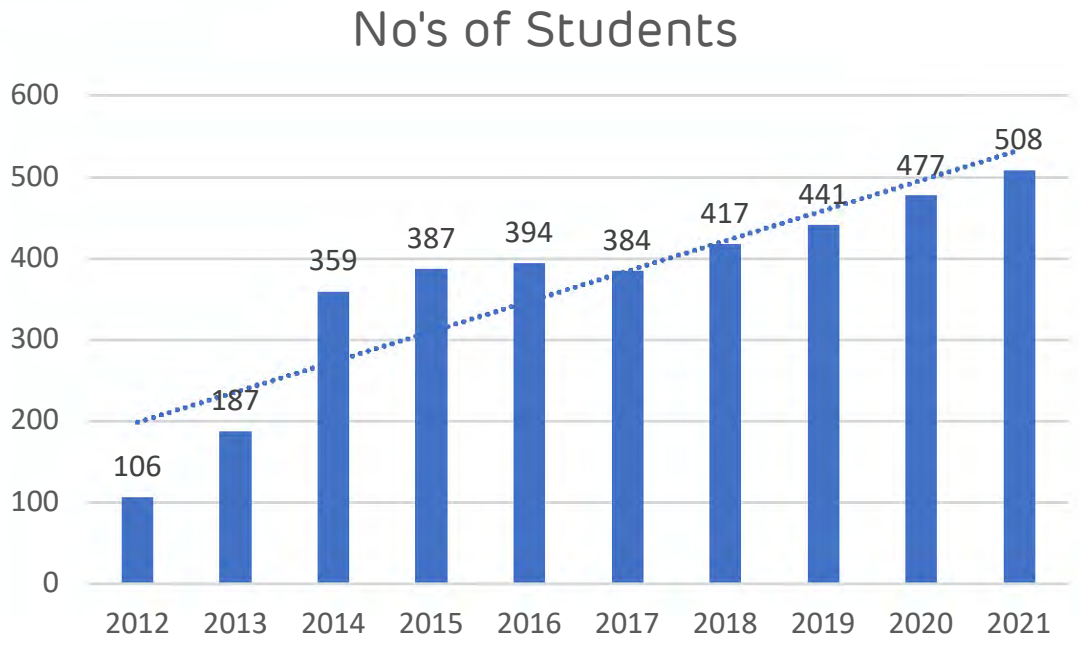
Education Projects

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

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

Due to Covid Pendamic this year Class 1st Admission was done -

Education Projects



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

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

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

Adani Vidya Mandir, Bhadreshwar

Objective

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

Project Activity

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

Outcome

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

Closer to SDG

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

Farmers Sustainable Livelihood Projects

Promotion of Natural Farming

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

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

adani
Foundation
પ્રાકૃતિક ખેતી
જીવામૃત : દુનિયાના શ્રેષ્ઠ ખાતર
જીવામૃત બનાવવા માટેની સામગ્રી
વસ્તુ
પ્રમાણ
ઉપયોગીતા
ગાયનું તાજુ છાણ
૧૦ કિલો
દેશી ગાયનું ગૌમુત્ર
૧૦ લીટર
કોઈપણ કઠોળ નો લોટ
૧ કિલો
પ્રોટીન અને ફાઈબર
દેશી ગોળ
૧ કિલો
સુક્રોઝ અને અસંખ્ય બેક્ટેરીયા
વડની નીચે (તળાવની માટી)
૫૦૦ ગ્રામ
અસંખ્ય બેક્ટેરીયા
જીવામૃત બનાવવાની રીત
જીવામૃતનો ઉપયોગ
૨૦૦ લીટર પાણીમાં બધી જ વસ્તુઓ ઉમેરો
દિવસમાં સવાર-સાંજ ઘડીયાળના કાંટાની દિશામાં ૩-૩ મિનિટ હલાવવું
જીવામૃતને છાંયડામાં રાખવું
૪ - ૬ દિવસમાં જીવામૃત તૈયાર.
જીવામૃત

Farmers Sustainable Livelihood Projects

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

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

Farmers Sustainable Livelihood Projects

Promotion of Horticulture : Date Palm and Dragon fruits

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

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

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

Fisher folk Sustainable Livelihood Projects

- Get the technical and Non-technical Man-power Requirement details from CFS and APSEZ, Mundra And inform to fishermen Youth and Leader. Later Eligible fisher Youth had trained for interview facing and soft skilled practices and interviewed in respective Company. 11 Fisher Youth were interviewed among that 5 have been selected. Our target is to support 60+ Fisherman in alternative livelihood till March 2022.

- Fishermen Government Scheme awareness Program was Arranged at Adani Guest House Mundra on 11th Augusts. The schematic details was Felicitated by Fisheries Department Staff. As well as Facilitation of Pagadiya Welfare scheme & boat license sanction letter to 06 Fishermen. Till date 59 Form has been submitted to fisheries department ,Bhuj for pagadiya and boat License.

- ASDC Courses Induction Meeting with Fishermen Youth at Navinal and as well as listed out their name to start computer & Spoken English classes through Adani Skill Development Center, Mundra.

- During the **Taukate cyclone** fishermen family had been shifted to safe Places As well as support to disaster management team for advance preparation.

- Fishermen's boat get across the vessel approach often while fishing Often , which create issue due to miscommunication Between Fishermen and Vessel crew members to clear vessel approach. its delay vessel berthing

Women Empowerment Projects

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

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

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

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

Women Sustainable Livelihood Projects

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

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

Women Sustainable Livelihood Projects

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

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

/ Registration Number: **20721013000245**

1.	Name and permanent address of Food Business Operator (FBO)	JAY AADHAR SAHELI SVA SAHAY JUTH BAROI , Baroi , Mundra, BHUJ(KUTCHH), Gujarat-370421
2.	Address of location where food business is to be conducted / premises	BAROI, Baroi , Mundra, BHUJ(KUTCHH), Gujarat - 370421
3.	Kind of Business	General Manufacturing
4.	Photo Identity Card	N/A

This Registration certificate is issued under and is subject to the provisions of FSS Act, 2006 all of which must be complied with by the petty food business.

Place / BHUJ(KUTCHH)
Issued On / 12-03-2021 (New Registration)
Valid Upto: 11-03-2022 (For details, refer Annexure)

Registering Authority

Annexures:
1. Product Annexure
2. Validity Annexure
3. Registration Id Card

Note:
1. **Application for renewal of Registration Certificate can be filed as early as 180 days prior to expiry date of Registration Certificate. You can file application for renewal or modification of Registration Certificate by login into FSSAI's Food Safety Compliance System(https://foscos.fssai.gov.in) with your user id and password or call us at 1800112100 for any clarification.**
2. **This Registration Certificate is only to commence or carry on food businesses and not for any other purpose.**
3. **This is computer generated Registration Certificate and doesn't require any signature or stamp by authority.**
4. **This Registration Certificate is allowed to conduct food businesses activities having annual turnover upto Rs. 12 Lacs only.**

Community Health Projects

Mobile Heath Care Units and Rural Clinics

9 Rural Clinics

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

3843 patients.

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

3364 patients benefited during six months

Community Health Projects

Swasthaya Seva to needy Patients

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

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

Promoting preventive health care

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

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

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

Community Health Projects

Corona Related Work at GKGH and AHMPL

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

Community Resource Center

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

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

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

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

Community Infrastructure

Work Completed

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

Work in progress

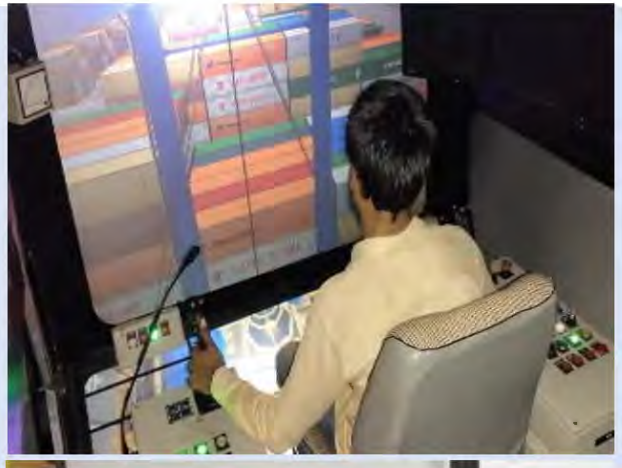
1. Construction of common Gathering Rooms at Wandi village.
2. Development of Chain Link Fencing at tree forestation at Nana Kapaya.
3. Construction of community gathering Shed at Mundra- work in final Stage.

Adani Skill Development Centre

ASDC, Mundra

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

RPL – Recognition of Prior Learning Training given to Adani Group Contractual Employees –Total 218 Employees have been benefitted
Junior Crane Operator practical training to 36 Candidates for (Group-1,2 & 3) At MICT Port
Guest Lecture On Mehendi products , Beauty Therapist & Resin art Total 100 candidate have been benefitted.
Certificate Distributed to Mud work candidates at MICT Colony-30 women learnt Mud work.
Volunteer Support in GKGH and Adani Hospital during covid pandemic
21 students were coordinated for interview in sea bird CFS of Mundra.
Centre Inspection by Mr. Krunal (GSDM) At Solar Mundra Under Sankalp project
We Received 4 Star rating from the Department.



Adani Skill Development Centre

ASDC,Bhuj

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

Other Activities:

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

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

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

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

total 100 Candidate had attend Guest Lecture.

Nakhatrana CSR

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

.

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

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

Nakhatrana CSR

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

Tuna CSR



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

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

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

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

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

Bitta CSR

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

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

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

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

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

Dignity of Work Force Programme - EVP

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

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

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

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

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

Rakshabandhan and Ashadhi bij celebration by Mundra Solar

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

Dignity of Work Force Programme - EVP

India's National TB Elimination Programme (NTEP) aims to meet the ambitious goal, announced by the Honorable Prime Minister Shri. Narendra Modi, of ending the TB epidemic by 2025, five years ahead of the UN Sustainable Development Goals (SDG) of 2030. In response to this call, the Government of India and USAID jointly launched the Corporate TB pledge (CTP), in April 2019 to galvanise corporate support to end TB.
To continue the momentum and efforts, the USAID-supported iDEFEAT TB project, which is working towards institutional strengthening to accelerate actions for Tuberculosis (TB) and drug resistant TB (DR-TB) in India; was launched as USAID/India's flagship TB project. The project works in collaboration with the Central TB Division (CTD), Ministry of Health and Family Welfare (Mo HFW) of the Government of India across a network of diagnostic, treatment, and program management institutions.
The CTP secretariat, hosted at The Union under the iDEFEAT TB project, provides technical assistance to government and corporates to adapt, implement TB interventions, and guide corporate resources for TB and DR-TB care.
Early diagnostics and treatment initiation are key to saving lives and minimizing disease transmission. In 2019, India reached a milestone of 24 lakh notified cases in India, an increase of 12% compared with 2018. Even then, an estimated 5.4 lakh were 'missing' across India, a serious drawback to our TB elimination efforts as what is not measured is unlikely to be improved. Diagnostic delays are also prevalent in India, with studies indicating that these can be attributed to patients as well as health systems.

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

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

Success Stories : Stories of 9 Empowered Women of Mundra

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

Success Stories

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

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

Success Stories

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

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

Success Stories

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

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

Success Stories

Ranjana ba is 28 years old lady lives in bhorara. She has 4 children. Her husband Raghuvirsinh lost his life before 3 months due to corona.
For Ranjan ba it was a very crucial time - socially and financially..
Jagrutiben meet her n fill forms of bal sanrakshan for 4 children. She will start getting 2000 per child - Rs 8000 per month from GOG. This support will be blessings for her.

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

Success Stories

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

The war of Education v/s hunger was the same in the house of Haribhai Khetshi Sheda a resident of Zarpara Village of Mundra. The couple Haribhai Sheda has 7 daughters and 5 sons was earning livelihood through grazing animals, working in others farm, and trying to grow something in his own farm with great difficulty. In the grave financial conditions there was no scope that children could be educated as all were occupied as child labourers and all gave priority to work as compared to education. But, story was different with the fourth child Nagajan Sheda. For him detection of polio followed by permanent defect in leg due to doctors fault turned as a blessing in disguise as he completed education till class 9 and dropped out after failing in class 10.

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

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

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

Success Stories

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

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

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

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

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

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

Events

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

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

Events

❖ **Super specialist health camps**

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

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

Total 961 **Patients** had benefitted.

Doctor's Day Celebration

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

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

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

Events

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

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

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

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

Events

World Environment Day Celebration

Miyawaki forest development inauguration was held in coordination with Gram Panchayat, Forest Department and Mnrega. Additional collector, Sub division Magistrate, Range forest officer, TDO, Head environment, Panchayat members and Talati remained present. Press media was also live in this virtual event. Executive Director Mr. V. S. Gadhvi had given motivational speech on the occasion.
MOU signing ceremony for promotion of Natural farming with KSKV kutchh University. Dr.Jayrajsinh Jadeja vice chancellor and Dr.Mrugesh trivdi HOD of earth and environmental science were present and discussed about the road map for involving more than 2000 farmers for natural farming

International Coastal Clean up Day

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

Visits

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

Mapping AF Projects with Sustainable Development Goals...

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

Stories of change - impact in numbers...

175+

Hectares of Land Luni Mangroves Biodivesity

5820+

Fisherman person days employed in Mangroves Plantation

41000+

Plantations at Smriti Van of **115 varieties**

950+

Beneficiaries of multispecialty health camp

500+

Students at Adani Vidya Mandir

8900+

Beneficiaries of Health Initiatives

15

SHGs under 'Saheli' initiative for Women

121

Home Biogas Plants installed in 5+ villages

8700+

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

1632+

Beneficiaries enrolled in Govt Schemes in FY21

20

Check Dams constructed and rejuvenated

5000+

Students under Utthan initiative in **39 Schools**

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

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

Media coverage

અદાણી ફાઉન્ડેશન દ્વારા નાના કપાયા ખાતે ગાટ જંગલ ઉભું કરાશે

અદાણી ફાઉન્ડેશન દ્વારા ૩૬૦ મુલિ, બકરી સહાય ચોરી વારે રોજગારીય

કચ્છ પત્રિકા

અદાણી ફાઉન્ડેશન અને તાલુકા હેલ્થ ઓફીસના સંયુક્ત ઉપક્રમે "ટી.બી.હારેગા દેશ જીતેગા" અંતર્ગત કાર્યક્રમ યોજાયો

કોરોનાકાળમાં મહિલાઓએ મેળવી રોજગાર

અદાણી સ્કિલ ડેવલપમેન્ટ દ્વારા મુંદરા વિસ્તારમાં તક ઊભી કરાઇ

અદાણી ફાઉન્ડેશનના પ્રયાસો રંગ લાવ્યા...

માછીમારનો દીકરો મિકેનિકલ એન્જિનીયર બન્યો, મોટી કંપનીમાં નોકરી પણ મળી

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અદાણી ફાઉન્ડેશનનો મંત્ર : સેવાનું ઉત્તરદાયિત્વ

મુંદરા એસઇઝેડ ઔદ્યોગિક વિવિધતાની ઓળખ

કચ્છ પત્રિકા

"શાળા બંધ પણ શિક્ષણ નહિ"

અદાણી વિદ્યા મંદિર , ભદ્રેશ્વર દ્વારા અંતરિયાળ ગામોમાં શેરી શિક્ષણ શરુ કરાયું

મુંદરામાં કોમ્યુનિટી રિસોર્સ સેન્ટરનો કરાયેલો પ્રારંભ

અદાણી ફાઉન્ડેશન દ્વારા મહિલા સ્વરોજગારી માટે

મુન્દ્રાની અદાણી હોસ્પિટલમાં કોરોના પોઝિટીવ દર્દીઓની કરાતી સેવા-ચાકરી

Adani Foundation Kutch

Thank You