

HINDUJA NATIONAL POWER CORPORATION LIMITED

Corporate Office : Hinduja House, 171 Dr. Annie Besant Road, Worli, Mumbai-400 018 www.hindujagroup.com, Office Tel : +91-22-61360407, Fax : 91-22-2497 4208 Plant Office : Palavalasa Village, T. Devada Post, Steel Plant (Sub Office), Pedagantyada Mandal, Visakhapatnam-530 031. A.P. India.

HNPCL/VSKP/APPCB/156/2023-24/291223 Date: 29 Dec' 2023

То

Regional Directorate - Bengalure A – Block, Nisarga Bhavan, 1<sup>st</sup> and 2<sup>nd</sup> Floors, 7<sup>th</sup> D Cross, Thimmaiah Road, Shivanagar, Bengalure-560079

Dear Sir,

Sub: HNPCL – 2X520MW TPP Submission of compliance status report from April 2023 - Sept 2023

Ref: E C Letter No. J-13011/11/90-IA-II(T) dated 3rd September, 1996 & Letter No: J-13012/92/2008-IA.II(T) dated 10th June, 2010

Hinduja National Power Corporation Ltd. here with submitting half-yearly EC compliance report for the period from April 2023 - September 2023 for your kind perusal.

Thanking you,

Yours faithfully, For Hinduja National Power Corporation Limited

lubberje

Sabyasachi Mukherjee Sr. Vice President

Encl: as above



Regd. Office : C/o Gulf Oil Corporation Ltd, Post Bag No. 1, Kukatpally, Sanathnagar I.E., Hyderabad - 500 018

## ENVIRONMENTAL COMPLIANCE STATUS REPORT FOR 1040 MW (2 x 520 MW) THERMAL POWER PLANT VISAKHAPATNAM, ANDHRA PRADESH

## **APRIL - SEPTEMBER 2023**



### HINDUJA NATIONAL POWER CORPORATION LIMITED VISAKHAPATNAM, ANDHRA PRADESH

Prepared by:



VIMTA Labs Ltd., 142, IDA, Phase-II, Cherlapally, Hyderabad-500 051, Telangana State www.vimta.com,www.env@vimta.com

## PREFACE

## HINDUJA NATIONAL POWER CORPORATION LIMITED

## ENVIRONMENTAL COMPLIANCE STATUS REPORT FOR 1040 MW (2 x 520 MW) THERMAL POWER PLANT VISAKHAPATNAM, ANDHRA PRADESH

### **APRIL – SEPTEMBER 2023**

For and on behalf of VIMTA Labs Limited		
Approved by	: M. Janardhan	
Signed	: MENG-	
Designation	: Head & Vice President (Environment)	
Date	: 27 <sup>th</sup> December, 2023	

This report has been prepared by **Vimta Labs Limited** with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.





Table of Contents

Chapter #	Title	Page #
1.0	Introduction	· · · · · · · · · · · · · · · · · · ·
1.1	The Background	1
1.2	Project Setting	1
1.3	Process Description	2
1.4	Scope of the Study	3
1.5	Compliance of Environment	4
2.0	Compliance Status Report	8
3.0	Description of the Environment	
3.1	Meteorology	24
3.2	Ambient Air Quality	26
3.3	Fugitive Dust Emission monitoring	39
3.4	Ambient Noise Quality	39
3.5	Water Quality	42
3.6	Soil Quality	54
3.0	Waste Water Quality	59
20	Stack Emission Monitoring	61
5.0		61
3.9	Pizeo wells Monitoring	62
3.10	Sewage Treatment Plant Outlet Water Quality (STP)	63
	List of Figures	
1.1	Geographical Location Map	5
1.2	Location Map 10-km Radius	6
1.3	Typical Layout of Plant	7
3.1	Wind Rose for April to September 2023	25
3.2	Ambient Air Quality Locations	27
3.3	Noise Monitoring Locations	41
3.4	Water Sampling Locations	43
	List of Tables	
3 1	Meteorological Data Generated at Project Site	24
3.1	Details of Ambient Air Quality Monitoring Locations	28
3.2	Tochniquos Used for Ambient Air Quality Monitoring	20
J.J 2 4	Summany of Ambient Air Quality Data	51
5.4		27
	(April to September 2023)	37
3.5	Summary of Ambient Air Quality Data	
	(April to September 2023 )	38
3.6	Fugitive Dust Monitoring Results (April to September 2023)	39
3.7	Ambient Noise Monitoring Locations	39
3.8	Ambient Noise Level Monitoring Results	
5.5	(April to September 2023.)	40
3.0	Noise level monitoring results inside the plant	40
5.9	(April to September 2022)	70
	(April to September 2025)	



42
44
51
52
53
59
60
61
62
63



Chapter-I Introduction

#### 1.0 INTRODUCTION

#### **1.1** The Background

**Hinduja National Power Corporation Limited (HNPCL)** is part of Hinduja Group to realize the ambitions of the Group in Power Sector. HNPCL is planning to create a power generation capacity of 10,000 MW over the next ten years at an expected investment of over \$10 billion across India. The total projected capacity will be a mix of thermal, hydro, nuclear and renewable energy.

As a first step in power sector, HNPCL is setting up a 1,040 MW coal based merchant power plant and is located on the coast of the Bay of Bengal at Palavalasa, Pedagantyada Mandal, Visakhapatnam District in the State of Andhra Pradesh, India. The project configuration is 2x520 MW.

The earlier Environmental Clearance (EC) has been confirmed from Ministry of Environment & Forests, Consent for Establish (CFE) and Consent for Operation (CFO) from Andhra Pradesh Pollution Control Board (APPCB) has been obtained.

Hinduja National Power Corporation Limited (HNPCL) has retained M/s VIMTA LABS LIMITED, Hyderabad to undertake Environmental Data Generation for various environmental factors on monthly and seasonal basis, which may be affected due to the likely impact arising out of the existing Power plant. Environmental data has been collected for various environmental components viz. Air, water, Noise and Soil guality during October 2022 to March 2023 and prepared compliance to Environmental clearance involved by MOEF vide No:J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> Letter September, 1996, No: 1-13012/92/2008.IA.II(T) dated 4<sup>th</sup> March 2009, No. J 13012/92/2008-IA.II(T) dated 10<sup>th</sup> June 2010 and CRZ Clearance vide letter F. No 11-58/2011-1A-III dated 3<sup>rd</sup> January 2014, F. No: 11-58/2011-IA-III dated 17/19<sup>th</sup> March, 2015, Letter No: 245/Env/CZMA/2015, dated 05<sup>th</sup> June, 2015, F. No: 11-58/2011-IA-III dated 01<sup>th</sup> October, 2015, F. No: 11-58/2011-IA-III dated 01<sup>th</sup> 2019, 2015 (Amendment), CFO No: APPCB/VSP/VSP/19/HO/CFO/2020, dated 06<sup>th</sup> March, 2020.

#### **1.2 Project Setting**

The existing plant is located in Palavalasa, Pedagantyada Mandal, Visakhapatnam District of Andhra Pradesh and the same is identified on the survey of India toposheet no 65 O/2, O/6 at the Latitude  $17^{0}34'30''$  North and Longitude  $83^{0}07'30''$  East at an elevation of 8.5 m above Mean Sea Level (MSL).

The present study of various environmental attributes establishes the post operational characteristics and this will help in identifying the incremental concentrations if any, due to the operation of the existing plant.

The geographical location of the plant is shown in **Figures-1.1**. The topographical features of the project area (within 10 km radius of plant site) are depicted in **Figures-1.2**.

Chapter-I Introduction

The long-term data recorded at India Meteorological Center at Visakhapatnam indicates temperature in the range of 15.8°C to 37.7°C. The mean total rainfall is about 1300 mm for the whole year. The relative humidity is generally high during the period from September to January and is least during the summer afternoons.

The predominant wind direction and wind speed as recorded by IMD Visakhapatnam during the winter season are E (32.4%) followed by ESE (19.9%) and during the Pre monsoon season are SW (42.5%) followed by SSW (35.8%). This variation in wind pattern can be attributed to the hilly terrain prevailing in the region. The Relative Humidity was observed to be in the range of 63 to 80% during the winter and Pre monsoon seasons.

#### **1.3 Process Description**

Each of the coal-fired power projects currently in development would employ pulverized coal combustion (PCC) technology. In the PCC process, the coalhandling plants receive coal, crush it to the required size and feed it to the boiler plants. The boiler plants then use coal pulverisers to grind the coal to a finer size before it is fed to the boiler furnace. The boilers are enclosures encased by tubes filled with flowing water. As the boiler furnace heats, the water flowing in the boiler tubes is converted into high pressure and high temperature steam. This steam is conveyed to the turbine through steam pipelines. The steam produced in the boiler drives steam turbines, making the turbines' rotors rotate at high speeds. Alternators are coupled to the steam turbines and rotate with the turbines' rotors. The alternators convert the energy generated by the rotation of the turbines' rotors into electricity. Step-up transformers then step up the voltage of generated electricity before it is fed to the grids for transmission. Transmission of electricity is done at very high voltage to minimize transmission losses.

The coal-fired power process is illustrated below:



The process of generation of power from coal (water steam cycle) essentially entails two main stages. In the first stage, the chemical energy stored in coal is converted into heat energy in the coal-fired boilers. In the second stage, the high-pressure steam, which is generated in the boilers, is passed through turbines (conversion of heat energy into mechanical energy) which in turn is coupled to generators (conversion of mechanical energy into electrical energy), thereby generating electricity.

Chapter-I Introduction

The water steam cycle essentially contains the coal fired steam generator, the steam turbine with condenser, feed-water tank, low-pressure (LP) heaters and high-pressure (HP) heaters and the connecting pipelines. The superheated steam produced in the steam generator is supplied to the steam turbine, which drives the three-phase AC generator. After leaving the HP turbine, the steam is reheated in the steam generator and fed to the Intermediate Pressure (IP) turbine. In the LP turbine the steam coming directly from the IP turbine expands to condenser pressure and is condensed in the condenser.

Once through system is used for cooling of the condenser. The condensate collected in the condenser hot well is discharged by the condensate pumps and supplied via the LP condensate heaters into the feed water tank. The feed water is further heated by bled steam from turbine and dissolved gases from the feed-water are liberated. The boiler feed pumps discharge feed water from the feed-water tank via the HP heaters to the economizer. Steaming starts from this point onwards. The high temperature steam-water mix is further converted into steam in water walls and finally passed through the super heaters sections for converting the saturated steam into superheated steam.

The power station would be designed with two power generating units of 520 MW each, along with the auxiliaries and common utility services like plant water system, coal handling system, ash handling plant, and switchyard for power evacuation, plant electrical system and workshop.

The main sections of the power generating unit include Steam Generator along with milling system and electrostatic precipitator, integral piping, integral control system, turbine and generator unit, boiler feed pump, regenerative heaters, condensate extraction pump, circulating and auxiliary cooling water pumps and the generator transformer with bus duct. The main sections of the utility system are the coal handling system, ash handling system, fire fighting system, AC & Ventilation system, switchyard and the plant water system. The power generated at lower voltage of 21 KV would be stepped up to 400 KV and will be connected to the proposed 400 KV switchyard for dispatch.

The plant layout is shown in **Figure-1.3**.

#### **1.4** Scope of the Study

Under the scope of the study, an area of 10 km radius from the centre of the existing plant was covered in detail for various environmental components viz Air, water, Noise and Soil based on the guidelines of Ministry of Environment and Forests, Government of India.

#### 1.4.1 Micrometeorological data

The meteorological and micro-climatic parameters were also recorded simultaneously using automatic weather station located within the plant site. Wind speed, Wind Direction, Relative Humidity and Rainfall were recorded on hourly basis during the study period. Minimum and maximum temperatures were also recorded.

#### 1.4.2 Air Environment

The baseline status of the existing ambient air quality within the study region has been assessed through a monitoring network of Eight Ambient Air Quality (AAQ) sampling stations during study period (April–September 2023). The monitoring network has been established depending on the available climatological norms of predominant wind directions and wind speeds of the study region in the Post monsoon, winter and part of Pre monsoon season. The baseline status of air environment was monitored for Fine Respirable Particulate Matter (PM2.5), Respirable particulate matter PM10 (RPM) and gaseous pollutants like Sulphur dioxide (SO<sub>2</sub>), Nitrogen dioxide (NO<sub>2</sub>) and Carbon monoxide (CO), Ammonia (NH<sub>3</sub>), Ozone (O<sub>3</sub>), Benzene (C<sub>6</sub>H<sub>6</sub>) and metals like Benzo(a)pyrene, Lead (Pb), Arsenic (As) and Nickel (Ni).

#### 1.4.3 Fugitive Dust Emission Monitoring

Fugitive dust emission monitoring was carried out at 5 locations within the plant site to assess the uncontrolled emissions from the sources like dust handling areas, construction areas and roads etc.

#### 1.4.4 Water Quality

Information on water resources (ground) was collected during the study period. The parameters of prime importance were selected under physical, chemical, inorganic, chemical organic and heavy metal groups. Samples were collected for basic nutrient demand; toxic parameters and baseline data on bacteriological aspects were also collected from the existing dug and bore wells. Open well and bore well samples were collected within 10 Km around the existing site.

#### 1.4.5 Noise Quality

A detailed survey on noise environment was carried out in and around the project site to study the levels of noise, as the high dB (A) levels may cause adverse effect on human beings and associated environment. Spot noise levels were measured using a precision noise level meter, at residential areas, schools, hospitals, bus stands and commercial centers etc. The major noise generating sources were identified in the existing plant and were monitored to study noise environment. Ambient noise levels were measured at 8 locations in 5 Km radial distance.

#### **1.5** Compliance to Environmental Clearance

Compliance to Environmental Clearance obtained for 2x520 MW Thermal Power Plant near Visakhapatnam. Vide Letter No: J-13011/11/90-IA-II (T) dated 3<sup>rd</sup> September, 1996 and

CRZ Clearance for the Seawater intake & outfall system and Rail line for Coal transport at palavalasa, Visakhapatnam Vide Letter F.No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014 and 17/19<sup>th</sup> March, 2015.

Consent Order No: APPCB/VSP/19/HO/CTO/2016, dated:21<sup>st</sup>March, 2023. A compliance Status Report is prepared for 6 months' period from April-September 2023 is given in Chapter-2.



FIGURE-1.1 GEOGRAPHICAL LOCATION MAP



FIGURE-1.2 LOCATION MAP-10KM RADIUS

Chapter-I Introduction



FIGURE-1.3 PLANT LAYOUT FOR HNPCL'S 2 X 520 MW THERMAL POWER PLANT AT VISHAKAPATNAM

VIMTA Labs Limited, Hyderabad



*Compliance Status Report* 

#### **COMPLIANCE STATUS REPORT – APRIL TO SEPTEMBER 2023**

## <u>Ref:</u> Environment Clearance & Amendments to Environment Clearance Letter and Consent for Operation as mentioned below:

1. Letter No: J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> September, 1996

- 2. Letter No: J-13011/11/90-IA-II(T) dated 10<sup>th</sup> September, 1996
- 3. Letter No: J-13011/11/90-IA.II dated 15th November, 1996
- 4. Letter No: J-13011/11/90-IA.II(T) dated 20th April, 1999
- 5. Letter No: J-13012/92/2008.IA.II(T) dated 4<sup>th</sup> March, 2009
- 6. Letter No: J-13012/92/2008-IA.II(T) dated 10<sup>th</sup> June, 2010
- 7. F. No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014
- 8. F. No: 11-58/2011-IA-III dated 17/19<sup>th</sup> March, 2015
- 9. Letter No: 245/Env/CZMA/2015, dated 05th June, 2015
- 10. F. No: 11-58/2011-IA-III dated 01<sup>st</sup> October, 2015
- 11. F. No: 11-58/2011-IA-III dated 01st October, 2015 (Amendment)

12. Consent Order No:APPCB/VSP/VSP/19/HO/CFO/2017- dated :10<sup>th</sup> May,2017 13.Consent Order No:APPCB/VSP/VSP/19/HO/CFO/2020- dated :06<sup>th</sup> March,2020 14.Consent Order No:APPCB/VSP/19/HO/CTO/2016- dated :21<sup>st</sup> March,2023

Sr. No.	Condition (Letter No: J-13011/11/90-IA-II(T) dated 3 <sup>rd</sup> September, 1996)	Status
Specific	Conditions	
i)	All the conditions stipulated by Andhra Pradesh Pollution Control board vide their letter No.19/PCB/ C.Estt./RO/VSP/AEE/V111/95-4433 dated 13 <sup>th</sup> November, 1995 should be strictly implemented	Noted and are being complied as applicable. A monthly environmental monitoring report is being submitted to APPCB every month.
ii)	A bi-flue stack of 275 m with continuous stack monitoring system should be installed.	A bi-flue stack of 275 m has been constructed with continuous stack monitoring system.
iii)	Electrostatic precipitator having efficiency of not less than 99.8% should be installed and it should be ensured that particulate emissions would not exceed the prescribed limit of 150 mg/Nm3.	An ESP with 99.8% efficiency has been installed to control the Particulate matter emissions below 50 mg/Nm3.
iv)	Once through cooling system should be provided and the rise in temperature should be maintained within 7 degrees centigrade of the ambient water. The proposed pipeline for sea water intake and outlet should conform to the regulations of the coastal zone notification of February, 1991. Desalination plant should be provided for meeting the water requirement of the power project and other auxiliary activities.	<ul> <li>Water balance of the power plant enclosed as Annexure-II (Please check with HNPCL Engineering for Latest WBD). We have obtained the CRZ clearance from MoEF has been obtained for sea water intake//outfall system.</li> <li>Once through cooling system has been designed to maintain temperature differential within 7 deg centigrade over and above the ambient temperature of receiving water body and being maintained the same during operation of the Plant.</li> <li>Desalination plant with a capacity of 12.5 MLD has been installed to meet the sweet water requirement.</li> </ul>

Sr. No.	Condition (Letter No: J-13011/11/90-IA-II(T) dated 3 <sup>rd</sup> September, 1996)	Status
v)	Adequate space should be provided for installation of flue gas desulphurization plant in future for control of sulphur dioxide.	Space provision for installing FGD if required, has been provided in the plant layout in future for control Sulphur dioxide.
vi)	Acquisition of land should be restricted to 2682 acres including 890 acres for ash disposal.	Complied. The plant has been established in an area of 723 acres including ash pond.
vii)	Only beneficiated coal to the tune of 16080 MT/day should be used with ash content not exceeding 34%. Fly ash generated should be collected in dry form in silos and fully utilized in a phased manner. As indicated in the Environmental Management plan, increase in the dyke height above 8 m should be undertaken through use of fly ash. For avoiding contamination of ground water, ash pond area should be suitably lined and dyked. As provided in the layout, adequate space should be earmarked for getting up of ash user plants to avoid long distance transportation to fly ash.	<ul> <li>MoEF vide its letter mentioned in Ref:3 has modified this condition to be read as</li> <li>"Only beneficiated coal to the tune of 16080 metric tonnes/day should be used with average annual ash content supplied by Mahanadi Coalfields Limited not exceeding 34+ or - 1-2%. Fly ash generated should be collected in dry form in silos and fully utilized in a phased manner. As indicated in the Environmental Management plan, increase in the dyke height above 8 m should be undertaken through use of fly ash. For avoiding contamination of ground water, ash pond area should be suitably lined and dyked. As provided in the layout, adequate space should be earmarked for getting up of ash user plants to avoid long distance transportation to fly ash."</li> <li>Further vide letter mentioned in Ref:4 MoEF has accorded "no objection to the use of fuel from alternative sources which will have the same coal quality as beneficiated coal".</li> <li>With respect to the above we confirm that: Total coal expected to be used in a day will be well within the quantity recommended. Fly ash will be fully utilized in a phased manner as mentioned in the condition.</li> <li>Ash pond is being lined with HDPE to prevent contamination of ground water. Further the Ground water monitoring is being undertaken by a third party on Monthly basis as per the monitored data the levels are within permissible limits.</li> <li>Pond ash and Fly ash will be utilized by the following Agencies: <ol> <li>Simhadri Constructions.</li> <li>Ramco cements</li> <li>My home cements</li> <li>Sagar cements</li> <li>Nagrajuna cements</li> <li>Nagrajuna cements</li> <li>Nagrajuna cements</li> <li>Dirk industries.</li> </ol> </li> </ul>
viii)	Noise level should be limited to 85 dBA and regular maintenance of equipments be	Noise levels are being monitored by third part at locations within the plant area and the results are

Sr. No.	Condition (Letter No: J-13011/11/90-IA-II(T) dated 3 <sup>rd</sup> September, 1996)	Status
	undertaken. For people working in the area of	within prescribed limits.
	ear plugs should be provided.	Requisite personnel protective equipment has already been provided to people working in high noise areas.
ix)	For controlling fugitive dust, regular sprinkling of water in coal handling and other vulnerable areas of the plant should be ensured.	Dust Suppression system installed and regular sprinkling of water on coal in stock yard and conveyors is being ensured.
x)	Afforestation plan should be formulated in consultation with the local DFO and implemented by creating a greenbelt of 500 m along the sea side from High Tide Line. A strip of greenbelt of 150-200 m should also be created along the ash pond area and about 100 m in available spaces within the colony along the road etc. A norm of 1500-2000 trees per ha should be followed and aftercare and monitoring should also be ensured.	The power project including ash pond is restricted to 533 acres. Presently green belt is being developed in and around the power project area and an area of 249.14 acres has already been developed. Further development of Green belt continues.
xi)	Continuous monitoring of ground water should be undertaken by establishing good network of observation wells in consultation with the Central ground water board. Results and data collected should be analysed to ascertain the status of water quality and findings should be submitted for evaluation.	Continuous ground water monitoring is being carried out at seven locations on Monthly basis and the monthly data is being submitted to APPCB. As per the results the limits are within the prescribed norms. The same has been compiled and is enclosed in <b>Chapter-3</b> , <b>Section-3.5</b> .
xii)	All effluents generated in various plant activities should be collected in the Central Effluent Treatment Plant and treated to ensure adherence to specified standards of discharge. The concept of zero discharge should be adopted to a maximum possible extent.	Complied. All the effluents generated are being treated in the Effluent Treatment Plant (ETP). The outflow is being monitored by continuous monitoring system. Zero discharge has been adopted to the maximum possible extent.
	Keeping in view the fact that 2x500 MW	Noted
	thermal power plant by M/s. National Thermal Power Corporation limited proposed in the vicinity of 1040 MW thermal power project, common facilities for coal transportation, laying of rail lines etc. should be worked out with mutual consultation to avoid duplication of facilities and acquisition of additional land.	For coal transportation, the facilities are being explored with NTPC and discussions are under progress.
xiv)	A financial provision of Rs. 250 crores should be provided for implementation of environmental mitigative measures with adequate scope for its enhancement in future. These funds should not be diverted for any other activities and separate account should be maintained.	Noted
xv)	Regular monitoring for SPM, $SO_2$ and NOx around the power plant may be carried out and records maintained. The data also collected should be properly analysed and	Monitoring is being carried out at eight ambient air quality monitoring stations within the 10 km radius study area from the existing power plant complex, with two in the predominantly downward wind

Sr. No.	Condition (Letter No: J-13011/11/90-IA-II(T) dated 3 <sup>rd</sup> September, 1996)	Status
	submitted to the Ministry every six months.	direction. Data on ambient air quality is being submitted to APPCB on monthly basis and also to the regional office of MOEF. As per the AAQ data, the results are within limits. The same has been compiled and is enclosed in <b>Chapter-3</b> , <b>Section-3.2</b> .
xvi)	Full cooperation should be extended to the Scientists/officers from the Regional Office of the Ministry at Bangalore and also to the State Pollution Control Board who would be monitoring the compliance of environmental status. Complete set of impact assessment report and the Management Plans should be forwarded to the Regional Office for their use during monitoring.	Noted.
xvii)	Monitoring committee should be constituted for reviewing the compliance to various safeguard measures by involving recognized local NGOs, Pollution Control Board experts etc.	Internal Environmental Monitoring Committee is in place.
3	The Ministry reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the Ministry	Noted
4	For any deviation or alteration in the project proposed from those submitted to this Ministry for clearance, a fresh reference should be made to the Ministry to assess the adequacy of the conditions imposed and to add additional environmental protection measures required, if any.	Noted
5	The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981 the Environment (Protection) Act, 1986, the public liability Insurance Act, 1991, the Impact Assessment Notification of January, 1994 and its amendments.	Noted

Ref Letter No J-13012/ 92/2008. IA.II ( T) dated 4 <sup>th</sup> March, 2009		
S.No.	Conditions	Compliance status
6	Map indicating CRZ area duly certified by the approved agency and authenticated by the state coastal zone management authority may be submitted on Top priority.	Map has already been submitted to MOEF,
7	Compliance status w.r.to stipulated EC conditions should be uploaded in the company web site and updated twice in a year and the same will also be sent by e-mail to the MOEF regional office located at Bangalore.	Six monthly compliance reports are being regularly uploaded on the company web site. The link is as below. <u>http://www.hindujanationalpower.com/images</u> <u>/compliance-status April - September 2023 -</u> <u>website-version.pdf</u>
8	The ambient levels of criteria pollutants (SO2, NOX & SPM) should be uploaded and displaced on your website and also at a convenient place in the plant premises periodically.	Display is kept at the entrance of power project.

	Condition	Comulian on Chatura
Sr. NO	(Letter No: 11/58/2011 IA.III dated 3 <sup>rd</sup> January, 2014 )	Compliance Status
SPECIFI	CCONDITIONS	
(i)	"Consent for Establishments" shall be obtained from State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.	"Consent for Establishment" was issued by state pollution control board vide their order no 19/PCB/C.ESTI/RO/VSPI AEE- VIII/95 -4433 signed dated 13/11/1995 and complied with.
(ii)	Shall maintain the existing vegetation cover in the area between HTL and 500m line which is approximately 180 acres, belonging to government, located adjacent to the project area, in consultation with the State Government and there shall be no industrial development with in this area as committed.	Existing plantation is being maintained between HTL and 500 m line. Additional 5 acres of land has been developed.
(iii)	The railway line has been shifted from mud flat area and as per the modified line only 160m is with in mud flat area as against the original plan on 1500m. Railway line in CRZ area shall be on stilt.	Noted. Correction in the design has been done for implementation and as per revised proposal length of Railway line in CRZ3 area is 0.375 Route Km and Railway line does not pass through CRZ1 area or Inter tidal waters of mud flat.

	O and the a	
Sr. No	Condition (Letter No: 11/58/2011 IA.III dated 3 <sup>rd</sup> January, 2014 )	Compliance Status
		The proposal was approved by MOEF&CC vide letter No.F.No.11-58/2011-IA-III dated:1 <sup>st</sup> October, 2015.
(iv)	There shall be no construction in mudflat except part of railway line on stilt as committed.	Noted.
(v)	Adequate spare diffuser arms for operation and maintenance of the marine outfall systems shall be Provided.	Noted
(vi)	Pipelines shall be laid with more care to minimize the impact to sand dunes	Noted.
(vii)	The double story switchgear, electro chlorination building and two numbers of storage tanks Proposed between 200 and 500 m from HTL shall be located beyond 500 m from HTL as committed.	Complied. The electro chlorination building and the storage tanks have been constructed beyond 500 m from the HTL with in the plant premises.
(viii)	Periodic monitoring of water quality in terms of temperature chlorine content if applicable, salinity etc at the outfall locations shall be carried out. If the impact of temperature and salinity is found significant in future, necessary remediation measures shall be taken by extending the outfall as well as the intake lines and/or providing augmentation in inland cooling facilities.	Periodic monitoring of water quality is going on at outfall location.
(ix)	Installation of trash bar/screens shall be put in place at the intake well to avoid fish entrapment	Complied. Trash rack has been installed.
(x)	All the conditions laid by the SCZMA shall be strictly adhered to.	Agreed
(xi)	Construction activity shall be carried out strictly as per the provisions of CRZ Notification, 2011. No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	Agreed
(xii)	The project shall be executed in such a manner that there shall not be any Disturbance to the fishing activity.	Noted. There is no disturbance to fishing activity
	It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project	Being followed.
(xiii)	The project proponents shall set up separate Environment management cell for effective implementation of the stipulated environmental Safeguard under the supervision of a Senior executive.	Environment management cell is in place to monitor the implementation on continuous basis.
	The funds earmarked for environment management shall be included in the budget and this shall not be diverted for any other purposes.	Noted.
General	Conditions	
	Condition	Compliance Status
31.140	(Letter F.No: 11-58/2011-IA-III dated 3 <sup>rd</sup>	compnance Status
	January, 2014 )	
(1)	Appropriate measures must be take while undertaking digging activities to avoid any likely degradation of water	Noted.

Sr. No	Condition (Letter No: 11/58/2011 IA.III	Compliance Status
	dated 3 <sup>rd</sup> January, 2014 )	
(::)	quality.	
(II)	Ministry/Regional office at Bengaluru by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan	Noted.
	measures and other environment protection activities	
(iii)	A six-Monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bengaluru regarding the implementation of the stipulated Conditions.	Noted and being complied with.
(iv)	Ministry of Environment & Forests or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with.	Agreed.
(v)	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry.	Noted
(vi)	In the event of a change in project profile or change in the implementation agency, fresh references shall be made to the Ministry of Environment and Forests.	Noted
(vii)	The project proponent shall inform the Regional office as well as the Ministry, the date-of financial closure and final approval of the project by the concerned Authorities and the date of start of land Development work.	Complied.
(viii)	A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion /representation has been Made received while processing the Proposal.	Agreed.
(ix)	State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's Office/ Tehsildar's office for 30 days.	NA

Sr. No.	Condition (Letter No: F.NO. 11-58/ 2011-IA.III dated 17/19 <sup>th</sup> March 2015)	Compliance Status
(i)	Railway line, in the CRZ, shall be on embankment with clear openings or on stilt so as to ensure free flow of water.	Noted. Being complied with.
(ii)	PP shall get an expert opinion on the design of alignment on CRZ area on embankment with clear openings or on stilt so as to ensure free flow of water and submit to Ministry prior to commencement of Railway line work in CRZ area.	Noted
(iii)	The water bodies present adjacent to the proposed to the Railway alignment shall not be disturbed.	Noted. Shall be adhered to.

dated 01 <sup>th</sup> October 2015)     Compliance of the complise of the compliance of the compliance of the compliance	Sr. No.	Condition (Letter No: F.NO. 11-58/ 2011-IA-III dated 01 <sup>th</sup> October 2015) (Amendment in CRZ Clearance-reg)	Compliance Status
---	---------	---	-------------------

e	Sr. No.	Condition (Letter No: F.NO. 11-58/ 2011-IA-III dated 01 <sup>th</sup> October 2015) (Amendment in CRZ Clearance-reg)	Compliance Status
	(i)	All the conditions/recommendation stipulated by Andhra Pradesh Coastal zone Management Authority (APCZMA) vide letter No.245/Env/CZMA/2015 dated 05.06.2015 shall strictly be complied with	Noted. Details are furnished below
	(ii)	All the condition stipulated in the clearance vide letter No.11-58/2011-IA-III dated 3 <sup>rd</sup> January, 2014 and subsequent amendment dated 17 <sup>th</sup> March, 2015 shall remain unchanged.	Noted and complied as detailed above

Sr. No.	Condition (Letter No: F.NO. 11-58/ 2011-IA-III dated 01 <sup>th</sup> October 2015) (Interim arrangement for the sea water intake and outfall system-reg)	II Compliance Status intake		
(i)	All the conditions/recommendation stipulated by Andhra Pradesh Coastal zone Management Authority (APCZMA) vide letter No.245/Env/CZMA/2015 dated 06.07.2015 shall strictly be complied with	Noted. Details are furnished below		
(ii)	All the condition stipulated in the clearance granted by this Ministry vide letter No.11-58/2011-IA-III dated 3 <sup>rd</sup> January, 2014 and subsequent amendment dated 17 <sup>th</sup> March, 2015 shall remain unchanged.	Noted and being complied with		
(iii)	The PP shall use multi diffuser in the outfall. As suggested by NCSCM, the thermal water shall be release at 10 m depth from the 8 diffuser.	Noted and being complied with		
(iv)	A monitoring system shall be deployed by the PP to assess the movement of thermal plume in and around the outfall coolant water jetty due to the occurrence of thermal plume oscillation in south-north direction during monsoon and also to monitor the impact of hot water discharge in to the sea water flora and fauna. The PP shall comply with at the direction of the APCZMA and take necessary corrective measures wherever required.	Noted and being complied with. Hydro dynamic Studies, dispersion modeling studies for Intake and Outfall discharge studies are being carried out by Environ software(P) Ltd and the same is submitting to the concerned parties		
(v)	The PP shall take all necessary clearance from the concerned authorities viz-a-viz from the concerned State Pollution Control Board	Noted and being complied with		
(vi)	Care should also be take to ascertain minimal impact on the shore line change due to construction of coastal structures. For this purpose, shoreline change shall be monitored using the satellite imaginary and by beach profile studies at regular intravels.	Noted and being complied with		

Sr. No.	Condition (Letter No: 245/Env/CZMA/2015, dated 05th June 2015)	Compliance Status
1	The proposed pipeline shall conform to the norms prescribed in the CRZ Notification issued by the Ministry of Environment and Forests, Government of India S. 0. No.19(E), dated 06-01-2011	Complied
2	No activity on the ground shall be undertaken without	Noted

Sr. No.	Condition (Letter No: 245/Env/CZMA/2015, dated 05th June 2015)	Compliance Status
	obtaining Environmental Clearance from the Ministry of Environment and Forests, Government of India as per S. 0. No.19(E), dated 06-01-2011 and the amendments issued thereof	
3	There shall be minimum disturbance to the sand dunes and other vegetation	Noted
4	On account of inversion process occurring along the Vizag coast, wherein the temperature profile gets reversed in such a way that bottom temperature tends to become higher than surface temperature on seasonal basis. Hence, it is suggested that a constant monitoring system shall be established to monitor the physical, chemical and biological activity near the outfall point and its surroundings. The industry shall take necessary steps to attain the safe diffusion of used ballast sea water discharged through outfall system	Temperature is Regularly monitoring at discharge points. All necessary measures has taken for safe discharge of ballast sea water.
5	Marker buoy and light indicators shall be established close to the intake and outfall points to avoid fishing net damage	Maker buoys and light indicators were installed.
6	Residual chlorine in the return water shall be kept at a very low concentration at discharge point. If possible, de-chlorination by hypo may be taken up before disposal of warm water into the sea	Residual chlorine is observed within limit. (<0.2ppm).
7	Additional diffusers shall be installed to enhance the dispersion of the hot water to facilitate the dissipation of temperature	Noted.
8	Regular monitoring of water quality at bottom and surface shall be carried out for pH, TSM, Salinity, DO, BOD, dissolved phosphate, nitrate, ammonia and PHC	Water quality monitoring in sea water is being carried out regularly.
9	Inter-tidal region shall be analyzed for texture, phosphorous, chromium, nickel, copper, cadmium, lead, mercury and PHC	Noted and being complied with
10	Biological characteristics shall be assessed based on primary productivity, phytopigments, phytoplankton populations and their generic diversity, biomass, population and community diversity of benthos, fisheries composition and density as well as species diversity	Noted and being complied with
11	Regular (seasonal) monitoring of temperature at the outfall to take necessary mitigation measures. Online monitoring of salinity and temperature may be implemented	Is being complied
12	Shoreline evolution to be predicted by using Mathematical Model preferably `LITPACK of MIKE.21' due to the impact that may be caused by the piers constructed to carry intake and outfall pipelines	Noted and being complied with
13	Shoreline monitoring shall be carried out regularly by a reputed organization having requisite experience, in order to take up suitable preventive measures.	Noted and being complied with
14	The geographical position of the present HTL, LTL and slope of the beaches shall be maintained i.e. any erosion that may occur need to be prevented. The	Noted and being followed.

VIMTA Labs Limited, Hyderabad

Sr. No.	Condition (Letter No: 245/Env/CZMA/2015, dated 05th June 2015)	Compliance Status
	beach front shall be restored to the normal condition by adopting suitable engineering and vegetative measures	
15	The Ash generated shall be utilized as per the norms stipulated in Fly Ash Notification dated 14-09-1999	Noted and being complied with
16	Environmental audit shall be taken up periodically by the independent agency and submit the report to the Regulatory Agencies	Noted and Form-V is being submitted

Sr	Condition	
No.	(Consent Order No:APPCB/VSP/19/HO/CTO/2016,	Compliance Status
	dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	
	SCHEDULE-A	
1	Any up-set condition in any industrial plant / activity of the	Noted and shall be complied when
	industry, which result in, increased effluent / emission	such condition arises.
	order shall be informed to this Board under intimation to	
	the Collector and District Magistrate and take immediate	
	action to bring down the discharge / emission below the	
	limits.	
2	The industry should carryout analysis of waste water	Noted and being complied with
	discharges or emissions through chimneys for the	
	parameters mentioned in this order on quarterly basis and	
	submit to the Board.	
3	Notwithstanding anything contained in this consent order,	Noted
	the Board hereby reserves the right and powers to review /	
	and to make such variations as deemed fit for the nurnose of	
	the Acts by the Board.	
4	The industry shall ensure that there shall not be any	Noted
	change in the process technology, source & composition	
	of raw materials and scope of working without prior	
	approval from the Board	
5	The applicant shall submit Environment statement in Form V	Noted and being complied with
	before 30th September every year as per Rule No.14 of E(P)	
6	Rules, 1986 & amendments thereof	Notod
0	for renewal of Consent (under Water and Air Acts) and	Noted
	Authorization under HWM Rules at least 120 days before	
	the date of expiry of this order, along with prescribed fee	
	under Water and Air Acts and detailed compliance of CFO	
	conditions for obtaining Consent & HW Authorization of	
	the Board.	
7	The industry should immediately submit the revised	Noted
	application for consent to this Board in the event of any	
	change in the raw material used, processes employed,	
	change in the management shall be informed to the	
	Board. The person authorized should not let out the	
	premises / lend / sell / transfer their industrial premises	
	without obtaining prior permission of the State Pollution	
	Control Board.	
8	Any person aggrieved by an order made by the State	Noted

Sr. No.	Condition (Consent Order No:APPCB/VSP/19/HO/CTO/2016, dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	Compliance Status
	Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority constituted under Section 28 of the Water(Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.	
9	The industry shall be liable to pay Environmental Compensation / Other Environmental Taxes, if any environmental damage caused to the surroundings, as fixed by the Collector & District Magistrate or any other competent authority as per the Rules in vogue.	Noted
10	The industry may explore the possibility of tapping the solar energy for their energy requirements.	Under review.
11	The industry should educate the workers and nearby public of possible accidents and remedial measures	Noted
	SCHEDULE – B	
-	I he industry shall comply with the following condition	ns:
1	31.12.2024 as per MoEF &CC G.S.R.No. 682 dated 05.09.2022	units is 2016. The plant was in reserved shutdown for more than 3 years since COD due to litigation with Discoms. HNPCL plant started operations after Hon'ble Supreme Court's order dated 02-Feb-2022. Meanwhile HNPCL has conducted a Pre-Feasibility Study for FGD by TCE which was sent to CEA for approval 05-05-2018. CEA recommended that the process of tendering and finalization of commercial contracts should be done jointly with procurers, AP Discoms. As per Supreme court order the PPA was approved by APERC in Aug'22. HNPCL has approached AP Discoms for a joint decision on FGD technology and project finalization as per the CEA recommendation. The nomination of a Team from Discom is awaited. Follow-up is being done. Furthermore, HNPCL was categorized in category-A as per the notification dated 31-3-2021 stating that it is under 10KM radius of Visakhapatnam city. HNPCL appealed to MOEF and CPCB for re-categorization of plant to category-C. As per CPCB the task force decision is final. Meanwhile, HNPCL is in process of pursuing MoP for extension of time on grounds that the project has suffered due to regulatory issues.

Sr. No.	Condition (Consent Order No:APPCB/VSP/ dated 21 <sup>st</sup> March 2023) for U	/19/HO/CTO/2016, Init – I & Unit – II	Compliance Status
			As per MOEF&CC Notification Dated 05.09.2022, FGD completion time lines have been extended up to 31.12.2024.
2	The industry shall transmit the da to the Stacks to the APPCB website	ta of CEMS connected without interruption.	Online monitoring systems are available and Connected to board through online website.
	WATER POLLUTION		
3	The effluent discharged shall not excess of the tolerance limits mention	contain constituents in ned below	Noted and the effluent is Within the prescribed limits
	Outlet Parameter	Limiting Standards	
	1 pH	6.50 - 8.50	
	Temperature-not more than 7°C	higher than intake water a	
	per MoEF Communication dated 20	.04.1999.	
	Oil and Grease	20 mg/I	
	Free chlorine	0.5 mg/I	
	Phosphate as PO4	20 mg/I	
	Chromium (Total)	0.2 mg/I	
	Iron	1 mg/I	
	Zinc	1 mg/I	
	2 pH	6.50 — 8.50	
	Oil and Grease	10 mg/l	
	BOD (3 days at 27 °C) 30 mg/I		
	Fecal Coliform (FC) (Most Probable Number per<1000MPN		
	100 milliliter, MPN/100ml	/100 ml	
4	quantities mentioned below:	shall not exceed the	Noted and being complied with
	S.No Purpose	Quantity (m3/hr)	
	1 Condenser & Auxiliary Cooling Water	System 175580	
	2 Ash water sump	2600	
	3 Dust Suppression system     4 For Desalination Plant feed	1600	
	Total	180000	
	Details of specific consumption:	•	
	4 A From Desalination Plant to Reserv	voir	
	A I From reservoir to UF/RU System	503 eneration	
	& other utilities	110	
	b Blow down Quenching	90	
	C Domestic Water	30	
	e Seal Water	75	
	f Service water	52	
	g APH & ESP Wash (As and when requi	red) 06	
	h RO Plant to Clarifier		
	4 A B Water remain in recovery	11	
	Separate meters with necessary pipe-line shall be		
	maintained for assessing the quantity	of water used for each	
	of the purposes mentioned above	for Cess assessment	
	purpose.		
5	The industry shall install a	nd maintain digital	Noted and being complied with
J	electromagnetic flow meters with the	ntalizers for Sea water	Noted and being complied with
	drawl water consumption and wast	e water deperation for	
_	I aramy water consumption and wast		

Sr.	Condition			
No.	(Consent Ord	er No:APPCB/VSP	/19/HO/CTO/2016,	Compliance Status
	different stree	March 2023) for U	Jnit - I & Unit - II	
	water usage st	inulated in this order	r amerent categories of	
6	The industry	shall maintain pro	per arrangements for	Noted and being complied with
Ŭ	collection of s	eepage from ash p	and and pumped back	Noted and being complied with
	into the ash w	ater system, so as	to avoid ground water	
	pollution in the	e surrounding area.	The run-off water from	
	coal yard sha	all be treated to	on land for irrigation	
	standards befo	re final disposal.		
7	The industry	shall discharge the	once through cooling	Noted and being complied with
	The industry shall discharge off once through cooling			
	offluents from	Init – 1 & 2 at a die	stance of 900 mts from	
	the shoreline			
8	The PP shall us	se multi diffuser in th	ne outfall. As suggested	Noted and being complied with
-	by NCSCM, the	e thermal water rele	ase shall be release at	·····
	10 m depth fro	om the 8 diffuse		
9	The industry s	shall monitor all gro	ound water peizo wells	Noted and being complied with
	and submit r	eport to RO Visaki	napatnam every three	
10	months indicat	ing trends		
10	The industry s	nall construct separation	ate storm water drains	No effluents are discharged into
	shall be discha	rand in to the storm	water drains	available in the plant Harvesting of
	Shah be disend	rged in to the storm		Rain water will be reviewed.
11	The industry	shall maintain Conti	nuous Effluent Quality	Being followed.
	Monitoring Sta	tions (CEQMS) for the	ne parameters pH, TSS	5
	and Temperate	ure data is transmitt	ed to CPCB / APPCB on	
	continuous basis. The industry shall comply with CPCB			
	directions dated 05.02.2014 / 02.03.2015 and guidelines			
	Issued regarding online monitoring systems File			
	time. The online monitoring system shall be calibrated			
	periodically as per equipment suppliers manual / CPCB			
	guidelines.			
	AIR POLLUTIO	N		
12	The emissions s	shall not contain cons	tituents in excess of the	Noted.
	prescribed limit	s mentioned below.		
	Chimney No.	Parameter	Emission Standards	
	1	Particulate matter	50 mg/Nm3	
		SO2	200 mg/Nm3	
		NOx	450 mg/Nm3	
		Mercury	0.03 mg/Nm3	
13	The industry shall comply with emission limits for DG sets of			Noted and being complied with.
	capacity upto 800 KW as per the Notification G.S.R.520 (E).			
	dated 01.07.2003 under the Environment (Protection)			The DG sets are standby and used only in the absence of grid power supply
	Amendment Rules, 2003 and G.S.R.448(E), dated 12.07.2004			the absence of grid power supply.
	under the Environment (Protection) Second Amendment			
	Rules, 2004. In case of DG sets of capacity more than 800			
	KW snall comply with emission limits as per the Notification			
	Environment (P	rotection) Act, 1986.	cellar norsey ander the	
14	The industry shall comply with ambient air quality standards			Noted and being complied with
1/7	of PM10 (Part	iculate Matter size l	ess than 10µm) - 100	
VIM	I A Labs Limi	ted, Hyderabad		20

Sr.	Condition	
No.	(Consent Order No:APPCB/VSP/19/HO/CTO/2016, dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	Compliance Status
	$\mu$ g/m3; PM2.5 (Particulate Matter size less than 2.5 $\mu$ m)60 $\mu$ g/m3; SO2 - 80 $\mu$ g/m3; NO2 - 80 $\mu$ g/m3 outside the factory premises at the periphery of the industry. Standards for	
	other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI- I, dated 18.11.2009 <b>Noise Levels:</b> Day time (6 AM to 10 PM) - 75 dB (A) Night time (10 PM to 6 AM) - 70 dB (A).	The Ambient air Quality and noise parameters with in the stipulated standards and reports are being submitted regularly
15	The industry shall provide a sampling port with removable dummy of not less than 15 cm diameter in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform	Noted and being complied
16	The industry shall provide interlocking facility between APC equipment (ESP) and fuel feeding system, in such a way that the feeding of the fuel shall be stopped automatically, in case, the ESP fails/ tripping's are occurred.	Noted Alarm system of ESP fields is hooked up to main plant control room for taking immediate corrective measures.
17	The industry shall maintain suitable control equipment facilities in the coal handling plant and dust suppression in all coal and material handling areas shall be achieved through appropriate methods	Noted and being complied
18	The industry shall maintain 3 CAAQM station at different locations and data File No.APPCB/VSP/VSP/19/HO/CFO/2017 transmitted to APPCB website	3 CAAQMS stations are being maintained.
19	The industry shall not exceed of emissions standards at any point of time. In case the industry exceeds the standards in the CEMS data, environmental compensation will be levied	Noted
20	The industry shall not increase the capacity beyond the permitted capacity mentioned in this order.	Noted
21	.The industry shall maintain permanent mechanical sprinklers for suppression of dust on the haul roads in between the villages and report the compliance to RO- Visakhapatnam	Complied. Mobile water tankers are being used for water sprinkling on roads.
22	The industry shall not use any fuels other than those permitted in this order without prior consent from the Board. They shall maintain log registers on type of fuels & daily consumption, ash content, sulphur content etc., and shall furnish consolidated records to R.O., Visakhapatnam for every three months	Noted
23	The industry shall maintain duly compacted soil cover of requisite thickness as per norms for the ash ponds to avoid dust pollution and report the compliance to RO- Visakhapatnam.	Usually, Abandoned/closed/ not in use ash ponds were compacted with soil cover of requisite thickness. HNPCL is having only two ash ponds, one for filling and one for evacuation. Ash pond for filling is maintained with water curtain and the one which is used for evacuation, is maintained

*Compliance Status Report* 

Sr. No.	Condition (Consent Order No:APPCB/VSP/19/HO/CTO/2016, dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	Compliance Status
		with water sprinklers.
24	The industry shall achieve 100% utilization of fly ash as per the Fly Ash Notification	Noted.
25	The industry shall establish a dedicated Environmental cell for continuous monitoring of plant environment to ensure compliance of CFO conditions.	Dedicated Environment Management cell is in place to ensure compliance to CFO Conditions.
26	<ul> <li>The industry shall maintain the following records and the same shall be made available to the Board Officials during the inspection.</li> <li>Daily power generation details.</li> <li>Quantity of Effluents generated and disposed.</li> <li>Log Books for pollution control systems.</li> <li>Daily Fly ash generated and disposed.</li> </ul>	Noted and being complied with
27	The industry shall provide truck-tyre washing facility near ash pond area to avoid dust emissions during the movement of the trucks.	Complied.
28	The industry shall dispose fly ash to cement / brick units and export, excess to ash pond	Pond ash and Fly ash will be utilized by the following Agencies:
		<ol> <li>Simhadri Constructions.</li> <li>Ramco cements</li> <li>My home cements</li> <li>Sagar cements</li> <li>Sipasana</li> <li>Sri Sai Ganesh Transporter</li> <li>Chettinad cements</li> <li>Nagrajuna cements</li> <li>Ultra tech cements</li> <li>Brick industries.</li> <li>Hari charan logistics- highway work.</li> </ol>
29	The industry shall maintain water curtain in ash ponds as the fly ash is exposing to atmosphere and causing dust emissions during wind blow	Noted and being complied with
30	Thick green belt shall be maintained by the industry covering an area of minimum 33% of total area.	Presently green belt is being developed in and around the power project area in consultation with DFO and an area of 252 acres has already been developed. Further development of Green belt continuous.
31	A monitoring system shall be deployed by the industry to assess the movement of thermal plume in and around the outfall coolant water jetty due to the occurrence of thermal plume oscillation in south-north direction during monsoon and also to monitor the impact of hot water discharge into the Sea and the flora and fauna. The industry shall comply with at the directions of APCZMA and take necessary corrective measures wherever required	Noted and being complied with

VIMTA Labs Limited, Hyderabad

*Compliance Status Report* 

Sr	Condition		
No.	(Consent Order No:APPCB/VSP/19/HO/CTO/2016, dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	Compliance Status	
32	The industry shall maintain valid PLI policy which includes	Complied.	
	Environmental Relief Fund (ERF) and submit copy to RO,		
22	The inductor shall comply with Sole issued by CDCR time	Notod	
22	to time for all the wastes	Noted	
34	The industry shall install digital display boards at publicly	Display is kept at the entrance of	
	visible places at the main gate indicating the products	power project.	
	manufactured Vs permitted quantities, Treated effluent		
	concentrations Vs discharge standards, Stack emission &		
	AAQ concentrations vs standards, nazardous waste		
	validity of CTO: and exhibit the CTO order at a prominent		
	place in the factory premises, as per Hon'ble Supreme		
	Court order.		
35	The industry shall submit Half yearly compliance reports	Noted and being complied	
	to all the stipulated conditions in Environmental Clearance		
	(EC), Consent to Establishment (CTE) and Consent to		
	https://pcb.ap.gov.in by 1st of January and 1st July of		
	every year. The first half yearly compliance reports shall		
	be furnished by the industry and second half yearly		
	compliance reports shall be the audited through MoEF&CC		
	recognized and National Accreditation Board for Laboratory Testing (NABL) accredited third party		
36	The industry shall comply with conditions stipulated in	Noted	
	EC, CRZ, CFE orders & their amendments and Taskforce		
	directions issued by the Board from time to time.		
37	Any other directions / circulars / notices issued by CPCB, MoEF&CC and APPCB shall be followed from time to time.	Noted	
38	The conditions stipulated are without prejudice to the	Noted	
	rights and contentions of this Board in any Hon'ble Court		
	Special Conditions		
39	The industry shall posses a valid NOC issued by the	Complied.	
	Andhra Pradesh State Disaster Response and Fire Service		
	Dept., (APSDRFSD) at concerned Regional Office, APPCB.		
40	The industry shall prepare a safety report and carry out	Noted and being complied with	
	an independent safety audit report of the respective		
	storages by an expert not associated with such industrial		
	activity as required under Rule 10 of MSIHC Rules, 1989		
	and get it approved by the Factories Dept., and submit		
	the compliance along with copy of the safety report,		
	safety audit report and safety certificate at concerned		
41	The industry shall extend training to the working	Noted and being complied with	
71	personnel for the prevention of accidents and necessary	Noted and being complied with	
	antidotes to ensure safety, as per the MSIHC Rules,		
	1989.		
42	The industry shall carryout calibration of safety	Being complied.	
	and shall certify the same with the Factories Department		
	That File No.APPCB/VSP/VSP/19/HO/CFO/2017 certified		
	copy shall be submitted to the APPCB, Regional Office		

VIMTA Labs Limited, Hyderabad

Sr.	Condition (Consent Order No:APPCB/VSP/19/HO/CTO/2016,	Compliance Status	
NO.	dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	-	
43	The industry shall install fluorescent Wind Vane at the highest point in the industry premises	Fluorescent wind socks are provided at 5 strategic highest locations.	
44	The industry shall submit Risk analysis and risk	HARA report is available for hydrogen	
	assessment covering worst scenario clearly describing	plant.	
	impact within the industry premises and outside the		
45	The industry shall submit the conv of the safety audit	Onsite emergency plan is available	
чJ	report and On-Site / Off Site Emergency Plans as	Charle enlergency plan is available.	
	applicable after being certified by the Factories		
	Department to the APPCB, Regional Office from time to		
	time, if the storage quantity of hazardous chemicals is		
	equal to or, in excess of the threshold quantities specified		
	in schedule 2 & 3 of MSIHC Rules, 1989		
	SCHEDULE - C [See fulle 6(2)]	NG HAZAPDOUS WASTES1	
1	The authorized person shall comply with the provisions of	Noted and being complied with	
Ŧ	the Environment (Protection) Act. 1986, and the rules	Noted and being complied with	
	made there under.		
2	The authorisation shall be produced for inspection at the	Noted	
	request of an officer authorised by the State Pollution		
2	Control Board.		
3	The person authorised shall not rent, lend, sell, transfer	Noted	
	except what is permitted through this authorization		
4	Any unauthorized change in personnel, equipment or	Noted	
•	working conditions as mentioned in the application by the		
	person authorized shall constitute a breach of his		
	authorization.		
5	The person authorised shall implement Emergency	Noted and being complied with	
	heing granted considering all site specific possible		
	scenarios such as spillages, leakages, fire etc. and their		
	possible impacts and also carry out mock drill in this		
	regard at regular interval of time;		
6	The person authorized shall comply with the provisions	Noted and being complied with	
	outlined in the Central Pollution Control Board guidelines	Control Board guidelines	
	due to Handling and Dispesal of Hazardeus Waste and		
	Penalty".		
7	It is the duty of the authorised person to take prior	Noted	
	permission of the State Pollution Control Board to close		
	down the facility.		
8	An application for the renewal of an authorization shall be made as laid down under these Rules.	Noted and being complied	
9	Any other conditions for compliance as per the Guidelines	Noted	
	issued by the Ministry of Environment, Forest and Climate		
	Change or Central Pollution Control Board from		
	specific Conditions:		
10	The industry shall comply with the provisions of HWM	Noted and being complied	
10	Rules, 2016 in terms of interstate transport of Hazardous		
	Waste and manifest document prescribed Under Rule 18		
	and 19 of the HWM Rules, 2016.		

Sr. No.	Condition (Consent Order No:APPCB/VSP/19/HO/CTO/2016, dated 21 <sup>st</sup> March 2023) for Unit – I & Unit – II	Compliance Status	
11	The industry shall not store hazardous waste for more	Noted and being complied	
	(Management & Transboundary Movement) Rules, 2016.		
12	The industry shall store Used / Waste Oil and Used Lead	Noted and being complied	
	Acid Batteries in a secured way in their premises till its disposal to the manufacturers / dealers on buyback basis.		
13	The industry shall maintain 7 copy manifest system for transportation of waste generated and a copy shall be submitted to concern Regional Office of APPCB. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter should carry a Transport Emergency (TREM) Card.	Noted and being complied	
14	The industry shall maintain proper records for Hazardous and Other Wastes stated in Authorisation in Form-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form-4 as per Rule 20 (2) of the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.	Noted and being complied	
15	The industry shall route all the hazardous waste through M/s. APEMC	Noted and being complied	



Chapter-3 Baseline Environmental Status

#### 3.0 BASELINE ENVIRONMENTAL STATUS

#### 3.1 Meteorology

Micro - Meteorological data within the project area during the air quality survey period is an indispensable part of the air pollution study. A meteorological station was installed on the top of Plant Security office, which is about 10 m height from the ground level in plant site free from obstructions to free flow of winds.

Wind speed and Wind direction data recorded during the study period are useful for the calculation of relative percentage frequencies of different wind directions and are plotted as wind roses of sixteen directions Viz. N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for twenty-four hours' duration respectively.

Maximum and Minimum temperatures including the percentage relative humidity were also recorded simultaneously.

#### 3.1.1 Wind Pattern during April 2023 - September 2023

The area is marked by high wind speeds in the range of calm to 19 KMPH winds. During the 00-24 hrs, the predominant wind directions were from WSW (19.8%), SW (17.2%), W (12.4%), SSW (9.8 %, S (4.9)%) and E (4.5.0%) of the total time. The calm conditions prevailed for 8.5% of the total time. The winds prevailed for 22.9 % of the total time in other directions. The average wind rose for the study period is shown in **Figure-3.1**.

# • Temperature and Relative Humidity Levels during April 2023 – September 2023.

Maximum and minimum temperatures recorded during the study period were 43.0 °C and 22.5°C respectively. Maximum and minimum relative humidity recorded during the study period was 98 and 26 % respectively. Rainfall was observed during the study period is about 485.5 mm which is given in **Table-3.1**.

Sr.	Parameters	April 2023 – September 2023	
No		Min	Max
1	Temperature (°C)	22.5	43.0
2	Relative humidity (%)	26	98
63	Atmospheric Pressure (mb)	995.4	1018.0
4	Rainfall (mm)	485.5	

TABLE-3.1 METEOROLOGICAL DATA GENERATED AT PROJECT SITE

Chapter-3 Baseline Environmental Status



FIGURE-3.1 WINDROSE FOR APRIL TO SEPTEMBER 2023
Chapter-3 Baseline Environmental Status

#### 3.2 Ambient Air Quality

Dispersion of different air pollutants released into the atmosphere has significant impacts on neighborhood air environment of an industrial project. The existing ambient air quality status with respect to the study zone of 10 km radial distance from the plant site has been assessed through a monitoring network of 8 AAQ stations during the **April 2023 - September 2023.** 

The design of monitoring network in the air quality surveillance program has been based on the GLC's obtained using long term screening model considering the following:

- (i) Meteorological conditions on synoptic scale;
- (ii) Topography of the study area;
- (iii)Representation of regional background levels;
- (iv)Representation of plant site; and
- (v) Representation of cross sectional distribution in the downward direction.

The existing status of Air environment was monitored for PM2.5, PM10, and gaseous pollutants like Sulphur dioxide (SO<sub>2</sub>), Nitrogen dioxide (NO2) and Carbon monoxide (CO), Ammonia (NH<sub>3</sub>), Ozone (O<sub>3</sub>), Benzene (C<sub>6</sub>H<sub>6</sub>) and metals like Benzo(a)pyrene, Lead (Pb), Arsenic (As) and Nickel (Ni).

Ambient Air Quality Monitoring (AAQM) stations were set up at 8 locations with due consideration to the above mentioned points. **Table-3.2** gives the details of environmental setting around each monitoring station. The location of the selected stations with reference to the plant site is given in the same table and depicted in **Figure-3.2**.

3.2.1 Frequency and Parameters for Sampling

The following frequency has been adopted for sampling:

Ambient air quality monitoring has been carried out with a frequency of 2 days per week at 8 locations. (April 2023-September 2023).

The Post monitoring of air environment is generated for the following parameters:

- Fine Respirable Particulate Matter (PM2.5);
- Respirable Particulate Matter (PM10);
- Sulphur dioxide (SO<sub>2</sub>);
- Nitrogen dioxide (NO<sub>2</sub>);
- Carbon Monoxide (CO);
- Ammonia (NH<sub>3</sub>);
- Ozone (O<sub>3</sub>);
- Benzene (C<sub>6</sub>H<sub>6</sub>);
- Benzo(a)pyrene;
- Lead (Pb);
- Arsenic (As) and
- Nickel (Ni).

Chapter-3 Baseline Environmental Status



FIGURE-3.2 AIR QUALITY SAMPLING LOCATIONS

Chapter-3 Baseline Environmental Status

Station Code	Name of the Station	Distance w.r.t. site (km)	Direction w.r.t. site	Environmental Setting
AAQ1	Palavalasa	0.5	Ν	Rural/Residential activities
AAQ2	Appikonda	2.2	NE	Rural/Residential activities
AAQ3	Devada	2.3	NW	Rural/Residential activities
AAQ4	Cheepurupalli	7.4	W	Rural/Residential activities
AAQ5	Dasaripeta	3.7	NNW	Rural/Residential activities
AAQ6	Islampeta	4.3	N	Rural/Residential activities.
AAQ7	Pittavanipalem	4.2	NW	Rural/Residential activities
AAQ8	Kalapaka	5.3	NW	Rural/Residential activities

<u>T/</u>	ABLE-3.2
DETAILS OF AMBIENT AIR Q	<b>OUALITY MONITORING LOCATIONS</b>

#### 3.2.2 Duration of Sampling

The sampling duration for Particulate Matter PM2.5, PM10, SO<sub>2</sub>, NO2, Ammonia, Benzo(a)Pyrene, Benzene, Arsenic, Nockel and Lead is twenty four hourly continuous sample per day and CO and Ozone is sampled for 8 hours continues thrice a day. This is to allow a comparison with the present revised standards mentioned in the latest Gazette notification of the Central Pollution Control Board (CPCB).

#### 3.2.3 <u>Method of Analysis</u>

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB) (16<sup>th</sup> November, 2009); IS: 5182 and American Public Health Association (APHA).

#### 3.2.4 Details of the Sampling Locations

#### AAQ1: PALAVALASA

The monitoring station was installed on top of a residential building at a height of 4.5 m from ground level at a distance of 0.5 km in the N direction from the proposed plant site. This station was selected to assess the air quality levels in the crosswind direction. This location is situated within rural/residential activities.

# AAQ2: APPIKONDA

The monitoring station was installed on top of a residential building at a height of 5.0 m from ground level at a distance of 2.2 km in the NE direction from the plant site. This station was selected to assess the air quality levels in the Down wind direction. This location is situated within rural/residential activities.

# AAQ3: DEVADA

The monitoring station was installed on top of a residential building at a height of 4 m from ground level at a distance of 2.3 km in the North West direction from the

Chapter-3 Baseline Environmental Status

plant site. This station was selected to assess the air quality levels in the crosswind direction. This location is situated within rural/residential activities.

### AAQ4: CHEEPURUPALLE

The location has been finalized to assess the air quality levels in the Up wind direction to the proposed plant site. The monitoring station is located at a distance of about 7.4 km west of the proposed plant site. The sampler is installed on a residential building at a height of about 4.5 m from ground level. Rural residential activities surround the station.

#### AAQ5: DASARIPETA

The sampling station has been finalized to assess the air quality levels in the crosswind direction to the proposed plant site. The monitoring station is located NNW of the plant site at about 3.7 km. The sampler was installed on top of residential building at a height of about 5.0 m from ground level free from any obstructions. This location is situated in rural/residential activities with village activities.

#### AAQ6: ISLAMPETA

The monitoring station was installed on top of a residential building at a height of 4.5 m from ground level at a distance of 4.3 km in the N direction from the plant site. This station was selected to assess the air quality levels in the crosswind direction. This location is situated within rural/residential activities.

# AAQ7: PITTAVANIPALEM

The location has been finalized to assess the air quality levels in the downwind direction to the proposed plant site. The monitoring station is located at a distance of about 4.2 km North West of the proposed plant site. The sampler is installed on a residential building at a height of about 6.0 m from ground level. Rural residential activities surround the station.

#### AAQ8: KALAPAKA

At this monitoring station the sampler was installed on top of a residential building at a height of 5.0 m from ground level at a distance of 5.3 km in the NW direction from the proposed plant site. This station was selected to assess the air quality levels in the cross wind direction. This location is situated within rural/residential activities.

#### 3.2.5 <u>Selection of Instruments for Air Quality Sampling</u>

Respirable Dust Samplers of Envirotech instruments are being used for monitoring Respirable Particulate Matter (PM10), Respirable fraction (<10 microns), Fine Respirable Particulate Matter (PM2.5), Respirable fraction (<2.5 microns), and gaseous pollutants like  $SO_2$  and NO2. Gas Chromatography techniques have been used for the estimation of CO.

Chapter-3 Baseline Environmental Status

### 3.2.6 Sampling and Analytical Techniques

#### 1] <u>Fine Respirable Particulate matter (PM2.5) and Respirable Particulate matter</u> (PM10)

Fine Respirable Particulate Matter – FRPM (PM2.5) and particles below 10  $\mu$  (PM10), which are more likely Respirable (Respirable Particulate matter – RPM). RPM Present in ambient air is measured by Gravemetric method by using Respirable Dust Sampler with a cyclone attachment over a period of 24 hours by sucking known quantity of air through Glass micro fibre filter paper and PM2.5 by Teflon filter paper. Respirable Dust (<10 $\mu$ ) is computed by measuring weight of collected matter in known volume of air sampled (BIS:5182 part IV, 1973; ASTM D-4096 -91).

# 2] <u>Sulphur Dioxide</u>

The most commonly used method for measuring atmospheric  $SO_2$  is based on colorimetry and is known as modified West - Gaeke method. In this method  $SO_2$  from a measured quantity of air is absorbed in a solution of sodium tetrachloromercurate to form a stable and non-volatile dichlorosulphitomercurate complex. This is then reacted with formaldehyde and bleached pararosaniline, yielding magenta - coloured pararosaniline methyl sulfonic acid. The colour intensity of this acid is detected photometrically at 560 nm (A.P.H.A and BIS: 5182 Part-II, 1969).

# 3] <u>Nitrogen Dioxide</u>

Concentration of nitrogen dioxide is estimated in ambient air by using Jacob and Hochheiser method. Nitrogen dioxide are collected by bubbling air through a sodium hydroxide solution to form a stable solution of sodium nitrite. The nitrite ion produced during sampling is determined colorimetrically by reacting the exposed absorbing reagent with phosphoric acid, sulfanilamide, and NEDA (1-naphthyl ethylenediamine dihydrochloride) at 540 nm (BIS: 5182 Part-VI, 1975).

# 4] <u>Carbon Monoxide</u>

A sample of the air containing carbon monoxide is adsorbed on Charcoal plugged into a glass tube. The adsorbed charcoal is eluted using the solvent, which in turn is projected into the gas chromatograph where it is carried from one end of the column to the other. During its movement, the constituents of the sample undergo distribution at different rates and ultimately get separated from one another. The separated constituents emerge from the end of the column one after the other and are detected by suitable means whose response is related to the amount of a specific component leaving the column [CO- IS: 5182 (Part-X)].

The details of the methods used for monitoring studies are presented in **Table-3.3.** 

Chapter-3 Baseline Environmental Status

TABLE-3.3 TECHNIQUES USED FOR AMBIENT AIR QUALITY MONITORING

Sr.	Parameter	Method of Mesuarement
No.		
1	Fine Respirable Particulate Matter	Respirable Dust Sampler (Gravimetric method)
2	Respirable Particulate Matter	Respirable Dust Sampler (Gravimetric method)
3	Sulphur Dioxide	Improved West and Gaeke method
4	Nitrogen Oxide	Modified Jacob & Hochheiser method
5	Carbon Monoxide	NDIR (Non Dispersive Infrared Spectroscopy)
6	Ammonia (NH₃)	Indophenol Blue method
7	Ozone (O <sub>3</sub> )	Spectrophotometric method
8	Benzene ( $C_6H_6$ )	Gas Chromatography
9	Benzo(a)pyrene	Solvent extraction followed by GC MS
10	Lead (Pb)	AAS / ICP-MS method
11	Arsenic (As)	AAS / ICP-MS method
12	Nickel (Ni)	AAS / ICP-MS method

#### 3.2.7 Presentation of Primary Data

# a) Observations of Primary Data (April 2023 - September 2023)

Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ1) Palavalasa village

The maximum concentration for PM2.5 is recorded as 53.1  $\mu$ g/m<sup>3</sup> with minimum concentration as 30.6  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 52.2  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 86.7  $\mu$ g/m<sup>3</sup> with minimum concentration as 51.1  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 83.6  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 14.9  $\mu$ g/m<sup>3</sup> with minimum concentration as 9.3  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 14.6  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 20.5  $\mu g/m3$  with minimum concentration as 11.2  $\mu g/m^3$ . The 98th percentile values are observed as 20.4  $\mu g/m^3$  respectively.

The maximum CO concentration is recorded as 321  $\mu$ g/m3 with minimum concentration as 161  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 307  $\mu$ g/m<sup>3</sup> respectively.

Chapter-3 Baseline Environmental Status

The maximum  $O_3$  concentration is recorded as 12.1 µg/m3 with minimum concentration as 4.2 µg/m<sup>3</sup>. The 98th percentile values are observed as 10.3 µg/m<sup>3</sup> respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ2) Appikonda village

The maximum concentration for PM2.5 is recorded as 53.7  $\mu$ g/m<sup>3</sup> with minimum concentration at 37.8  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 52.6  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 80.1  $\mu$ g/m<sup>3</sup> with minimum concentration as 57.8  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 78.9  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 12.8  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.9  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 12.5  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 19.9  $\mu$ g/m<sup>3</sup> with minimum concentration as 11.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 19.1  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 295  $\mu$ g/m3 with minimum concentration as 154  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 2801  $\mu$ g/m<sup>3</sup> respectively.

The maximum  $O_3$  concentration is recorded as 12.1 µg/m3 with minimum concentration as 4.2 µg/m<sup>3</sup>. The 98th percentile values are observed as 10.3 µg/m<sup>3</sup> respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ3) Devada villag5

The maximum concentration for PM2.5 is recorded as 52.7  $\mu$ g/m<sup>3</sup> with minimum concentration as 35.4  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 52.2  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 77.2  $\mu$ g/m<sup>3</sup> with minimum concentration as 51.2  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 76.3  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 12.1  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 12.1  $\mu$ g/m<sup>3</sup> respectively.

Chapter-3 Baseline Environmental Status

The maximum NO<sub>2</sub> concentration is recorded as 17.1  $\mu$ g/m<sup>3</sup> with minimum concentration as 10.7  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 16.6  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 273  $\mu g/m3$  with minimum concentration as 138  $\mu g/m^3$ . The 98th percentile values are observed as 270  $\mu g/m^3$  respectively.

The maximum  $O_3$  concentration is recorded as 9.2  $\mu$ g/m3 with minimum concentration as 3.8  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 8.7  $\mu$ g/m<sup>3</sup> respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ4) Cheepurupalle village

The maximum concentration for PM2.5 is recorded as 54.9  $\mu$ g/m<sup>3</sup> with minimum concentration as 32.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 54.6  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 84.4  $\mu$ g/m<sup>3</sup> with minimum concentration as 45.8  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 83.5  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 14.9  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.8  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 13.5  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 21.2  $\mu$ g/m<sup>3</sup> with minimum concentration as 11.1  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 19.4  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 321  $\mu$ g/m3 with minimum concentration as 143  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 305  $\mu$ g/m<sup>3</sup> respectively.

The maximum  $O_3$  concentration is recorded as 12.1 µg/m3 with minimum concentration as 4.4 µg/m<sup>3</sup>. The 98th percentile values are observed as 11.1µg/m<sup>3</sup> respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ5) Dasaripeta village

The maximum concentration for PM2.5 is recorded as 51.3  $\mu$ g/m<sup>3</sup> with minimum concentration as 33.6  $\mu$ g /m<sup>3</sup>. The 98th percentile values are observed as 51.3  $\mu$ g/m<sup>3</sup> respectively.

Chapter-3 Baseline Environmental Status

The maximum concentration for PM10 is recorded as 81.3  $\mu$ g/m<sup>3</sup> with minimum concentration as 56.2  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 80.3  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 14.0  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.4  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 13.8  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 17.7  $\mu$ g/m<sup>3</sup> with minimum concentration as 11.1  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 17.0  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 285  $\mu g/m3$  with minimum concentration as 155  $\mu g/m^3.$  The 98th percentile values are observed as 283  $\mu g/m^3$  respectivel

The maximum  $O_3$  concentration is recorded as 9.5  $\mu g/m3$  with minimum concentration as 4.3  $\mu g/m^3$ . The 98th percentile values are observed as 8.3  $\mu g/m^3$  respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

### AAQ6) Islampeta village

The maximum concentration for PM2.5 is recorded as 50.2  $\mu$ g/m<sup>3</sup> with minimum concentration as 30.4  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 49.2  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 80.4  $\mu$ g/m<sup>3</sup> with minimum concentration as 54.6  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 78.2  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 12.1  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.3  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 11.9  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 15.5  $\mu$ g/m<sup>3</sup> with minimum concentration as 10.0  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 15.3  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 256  $\mu g/m3$  with minimum concentration as 135  $\mu g/m^3$ . The 98th percentile values are observed as 250  $\mu g/m^3$  respectively.

The maximum  $O_3$  concentration is recorded as 10.3 µg/m3 with minimum concentration as 3.8 µg/m<sup>3</sup>. The 98th percentile values are observed as 9.3 µg/m<sup>3</sup> respectively.

Chapter-3 Baseline Environmental Status

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

# AAQ7) Pittavanipalem village

The maximum concentration for PM2.5 is recorded as 55.8  $\mu$ g/m<sup>3</sup> with minimum concentration as 36.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 54.9  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 83.2  $\mu$ g/m<sup>3</sup> with minimum concentration as 55.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 82.5  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 12.4  $\mu$ g/m<sup>3</sup> with minimum concentration as 7.4  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 12.3  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 16.4  $\mu$ g/m<sup>3</sup> with minimum concentration as 10.5  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 15.8  $\mu$ g/m<sup>3</sup> respectively.

The maximum CO concentration is recorded as 260  $\mu$ g/m3 with minimum concentration as 134  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 258  $\mu$ g/m<sup>3</sup> respectively.

The maximum  $O_3$  concentration is recorded as 10.1  $\mu g/m3$  with minimum concentration as 4.4  $\mu g/m^3$ . The 98th percentile values are observed as 9.8  $\mu g/m^3$  respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

#### AAQ8) Kalapaka village

The maximum concentration for PM2.5 is recorded as 51.3  $\mu$ g/m<sup>3</sup> with minimum concentration as 32.6  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 50.8  $\mu$ g/m<sup>3</sup> respectively.

The maximum concentration for PM10 is recorded as 80.3  $\mu$ g/m<sup>3</sup> with minimum concentration as 49.3  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 79.4  $\mu$ g/m<sup>3</sup> respectively.

The maximum SO<sub>2</sub> concentration is recorded as 12.9  $\mu$ g/m<sup>3</sup> with minimum concentration as 8.3  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 14.1  $\mu$ g/m<sup>3</sup> respectively.

The maximum NO<sub>2</sub> concentration is recorded as 16.0  $\mu$ g/m<sup>3</sup> with minimum concentration as 11.6  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 16.0  $\mu$ g/m<sup>3</sup> respectively.

Chapter-3 Baseline Environmental Status

The maximum CO concentration is recorded as 254  $\mu$ g/m3 with minimum concentration as 154  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 251  $\mu$ g/m<sup>3</sup> respectively.

The maximum  $O_3$  concentration is recorded as 9.4  $\mu$ g/m3 with minimum concentration as 4.3  $\mu$ g/m<sup>3</sup>. The 98th percentile values are observed as 8.5  $\mu$ g/m<sup>3</sup> respectively.

The concentration of NH3, Pb, As, Ni, B(a)P and C6H6 values are well within the detectable limits.

#### 3.2.8 Regional Scenario

The ambient air quality survey was carried out for at eight locations in the 10 Km radial distance. The monitoring was carried out for **April - September 2023**. Fine Respirable Particulate Matter (PM2.5), Respirable Particulate Matter (PM10), Sulphur dioxide (SO<sub>2</sub>), Nitrogen dioxide (NO<sub>2</sub>) and Carbon monoxide (CO), Ammonia (NH<sub>3</sub>), Ozone (O<sub>3</sub>), Benzene (C<sub>6</sub>H<sub>6</sub>) and metals like Benzo(a)pyrene, Lead (Pb), Arsenic (As) and Nickel (Ni). The results of monitoring carried out during study period are presented in **Annexure-II** for **April 2023 - September 2023**.

Various statistical parameters like Maximum, Minimum, Average and 98<sup>th</sup> percentile have been computed from the observed raw data for all sampling stations. The ambient air quality Summary of concentrations of different parameters (PM2.5, PM10, SO<sub>2</sub>, NO<sub>2</sub>, CO, NH3, O3, C6H6, B(a)P, As, Ni and Pb is presented in **Tables 3.4 and 3.5** 

The AAQ levels observed at all the sampling locations were within the limits specified by CPCB for Industrial/Mixed use and Residential/Rural use.

# TABLE - 3.4SUMMARY OF AMBIENT AIR QUALITY DATA (APRIL - SEPTEMBER 2023)

Location			PM2	2.5			PN	110		<b>SO</b> <sub>2</sub>			
Code	Location	Min	Max	Avg	98% Tile	Min	Max	Avg	98% tile	Min	Max	Avg	98% tile
AAQ1	Palavalasa village	30.6	53.1	45.0	52.8	51.1	86.7	72.3	83.6	9.3	14.9	12.0	14.6
AAQ2	Appikonda village	37.8	53.7	46.2	52.6	57.8	80.1	67.5	78.9	8.9	12.8	11.0	12.5
AAQ3	Devada village	35.4	52.7	43.6	52.2	51.2	77.2	65.1	76.3	8.5	12.1	10.4	12.1
AAQ4	Cheepurupalle village	32.5	54.9	46.3	54.6	45.8	84.4	66.6	83.5	8.8	14.9	11.2	13.5
AAQ5	Dasaripeta village	33.6	51.3	44.8	51.3	56.2	81.3	69.4	80.3	8.4	14.0	11.1	13.8
AAQ6	Islampeta village	30.4	50.2	41.0	49.2	54.6	80.4	65.7	78.7	8.3	12.1	10.3	11.9
AAQ7	Pittavanipalem village	36.5	55.8	47.1	54.9	55.5	83.2	71.8	82.5	7.4	12.4	10.6	12.3
AAQ8	Kalapaka village	32.6	51.5	42.6	50.8	49.3	80.3	65.5	79.4	8.3	12.9	10.7	12.5

Location			NC	)2			C	0		03			
Code	Location	Min	Мах	Avg	98% Tile	Min	Max	Avg	98% tile	Min	Max	Avg	98% Tile
AAQ1	Palavalasa village	11.2	20.5	14.9	20.4	161	321	234	307	4.2	12.1	7.2	10.3
AAQ2	Appikonda village	11.5	19.9	14.2	19.1	154	295	229	280	4.8	11.5	7.4	11.2
AAQ3	Devada village	10.7	17.1	13.4	16.6	138	273	220	270	3.8	9.2	6.3	8.7
AAQ4	Cheepurupalle village	11.1	21.2	14.8	19.4	143	321	244	305	4.4	12.1	7.5	11.1
AAQ5	Dasaripeta village	11.1	17.7	13.7	17.0	155	285	221	283	4.3	9.5	6.4	8.3
AAQ6	Islampeta village	10.0	15.5	12.9	15.3	135	256	209	250	3.8	10.3	6.3	9.3
AAQ7	Pittavanipalem village	10.5	16.4	13.4	15.8	134	260	205	258	4.4	10.1	6.8	9.8
AAQ8	Kalapaka village	11.6	16.0	13.6	16.0	154	254	208	251	4.3	9.4	6.4	8.5

\*Note: (Concentrations are expressed in  $\mu g / m^3$ )

Chapter-3 Baseline Environmental Status

# TABLE - 3.5SUMMARY OF AMBIENT AIR QUALITY DATA (APRIL - SEPTEMBER 2023)

Location			NF	3			Ρ	b		As				
Code	Location	Min	Max	Avg	98% tile	Min	Max	Avg	98% tile	Min	Max	Avg	98% tile	
AAQ1	Palavalasa village	<20	<20	<20	<20	<0.001	<0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ2	Appikonda village	<20	<20	<20	<20	< 0.001	< 0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ3	Devada village	<20	<20	<20	<20	< 0.001	< 0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ4	Cheepurupalle village	<20	<20	<20	<20	< 0.001	< 0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ5	Dasaripeta village	<20	<20	<20	<20	< 0.001	< 0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ6	Islampeta village	<20	<20	<20	<20	< 0.001	<0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ7	Pittavanipalem village	<20	<20	<20	<20	<0.001	<0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	
AAQ8	Kalapaka village	<20	<20	<20	<20	<0.001	<0.001	< 0.001	< 0.001	<1.0	<1.0	<1.0	<1.0	

Location			N	li			В(	a)P		С6Н6			
Code	Location	Min	Max	Avg	98% tile	Min	Max	Avg	98% Tile	Min	Max	Avg	98% tile
AAQ1	Palavalasa village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ2	Appikonda village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ3	Devada village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ4	Cheepurupalle village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ5	Dasaripeta village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ6	Islampeta village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ7	Pittavanipalem village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0
AAQ8	Kalapaka village	<1.0	<1.0	<1.0	<1.0	< 0.1	< 0.1	< 0.1	<0.1	1.0	1.0	1.0	1.0

\*Note: (Concentrations are expressed in  $\mu g / m^3$  except As, Ni and B(a)p are ng  $/ m^3$ )

Chapter-3 Baseline Environmental Status

1 21

... .

#### 3.3 Fugitive Dust Emission Monitoring

Fugitive dust emission monitoring has been carried out eight hours monitoring during the **April 2023–September 2023**. The monitoring has been carried out in five locations. The analysis results of fugitive dust monitoring are represented in **Table-3.6**.

#### TABLE-3.6 FUGITIVE DUST MONITORING RESULTS

					All Val	ues are in $(\mu g$	<u>////*/</u>
Sr.No	Location Name	April 2023	May 2023	June 2023	July 2023	August 2023	Sep 2023
	Sampling Date	19.04-23	17.05.23	28.06.23	19.07.23	16.08.23	21.09.23
1	Plant Main gate	107.3	113.5	101.4	95.3	108.6	95.3
2	Power Plant service building	166.4	136.7	122.5	107.8	124.2	106.3
3	Coal handling plant	182.2	161.8	178.4	152.3	137.2	128.8
4	Work shop building	158.2	132.4	128.5	112.6	103.4	119.2
5	Ash handling plant	217.3	187.2	195.0	163.4	144.0	153.6

# 3.4 Ambient Noise Quality

Eight locations were monitored for ambient noise levels within the 10-km radius of the Thermal power plant and three locations for Inside the Plant. The monitoring will be carried out every month and details of presented in **Table-3.7** and are shown in **Figure-3.3**.

#### TABLE-3.7 AMBIENT NOISE MONITORING LOCATIONS

Sampling Code	Name of the Location	Direction w.r.t to Plant
N1	Palavalasa village	Ν
N2	Appikonda village	NE
N3	Devada village	NW
N4	Cheepurapalli village	W
N5	Dasaripeta village	NNW
N6	Islampeta village	Ν
N7	Pittavanipalem village	NW
N8	Kalapaka village	NW
	Inside the Plant Area	
N9	Near HNPCL Office	-
N10	Near Boiler Area	-
N11	Near Power Mech Stores	-

Sound Pressure Level (SPL) measurements were measured by noise meter at all the above locations. Noise level monitoring was carried continuously for 24-hours with one hour interval. During each hour parameters like  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ ,  $L_{eq}$ ,  $L_{day}$  and  $L_{night}$  were directly computed by the instrument based on the sound pressure levels. The day noise levels have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am.

Chapter-3 Baseline Environmental Status

#### 3.4.1 Noise Quality

Noise levels were measured in 8 villages and 1 inside the plant area for 24 hours and 2 locations in plant site for source noise levels on monthly basis and the measured noise levels in day time and night time from April to September 2022 are given below in **Table-3.8 and 3.9.** The noise levels are well within the CPCB norms for Rural Residential zones.

#### <u>TABLE-3.8</u> <u>AMBIENT NOISE LEVEL MONITORING RESULTS</u> <u>(April 2023 TO September 2023)</u>

S.No	Sources	A  20	April 2023		May 2023		June 2023		July 2023		August 2023		September 2023	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
1	Palavalasa	51.5	43.2	52.3	42.6	53.0	43.3	51.6	42.2	52.4	43.1	53.0	42.6	
2	Appikonda	50.8	41.4	49.7	41.8	50.3	40.6	52.8	41.3	50.8	42.5	49.5	41.6	
3	Devada	52.4	42.0	50.2	43.0	48.3	41.8	50.0	40.4	49.5	41.6	51.1	40.7	
4	Cheepurupalle	52.7	41.5	51.7	42.5	50.8	42.2	52.6	43.0	51.7	42.6	52.3	41.7	
5	Dasaripeta	50.8	40.7	49.5	40.7	50.3	41.5	51.3	40.7	50.3	41.8	49.6	42.0	
6	Islampeta	52.3	42.2	51.4	43.0	49.8	39.8	52.0	42.1	49.6	40.7	48.4	41.5	
7	Pittavanipalem	51.4	41.3	52.7	42.4	51.1	41.9	50.2	41.6	51.1	42.5	50.7	40.4	
8	Kalapaka	50.7	42.4	51.8	41.6	52.4	42.0	51.8	40.6	52.0	41.8	51.5	42.3	
C	CPCB Limits	55	45	55	45	55	45	55	45	55	45	55	45	

#### TABLE-3.9 NOISE LEVEL MONITORING RESULTS INSIDE THE PLANT

S.No	Sources	April 2023		May 2023		June 2023		July 2023		August 2023		September 2023	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
1	Near Plant	60.5	53.3	58.3	50.9	56.4	50.3	58.2	51.8	56.8	49.8	54.3	47.5
(	CPCB Limits	75	75	70	75	70	75	70	75	70	75	70	70
2	Near Boiler area	8	7.2	85	5.8	87	7.5	83	3.7	84	1.2	83	.6
3	<b>3</b> Near Turbine area 86.6		87.4		86.6		84.1		83.8		82.9		
CPCB Limits		ç	90	9	0	90		90		90		90	

Chapter-3 Baseline Environmental Status



#### FIGURE-3.3 NOISE MONITORING LOCATIONS

VIMTA Labs Limited, Hyderabad

Chapter-3 Baseline Environmental Status

#### 3.5 WATER QUALITY

Water quality of ground water samples is collected to assess the quality of water with in the 10Km radius. Water samples were collected from six Ground water locations and four Surface water locations.

These samples were taken as grab samples and preservation and transportation of the samples are done as per the standard sampling procedures and analyzed in laboratory. The details of the sampling locations are given below in **TABLE-3.10** and shown in **Figure-3.4** 

Sampling	Name of the Location	Direction w.r.t to Plant
Code		
I	Ground Water Samples	
GW1	Devada village	NW
GW2	Islampeta village	Ν
GW3	Velama Appikonda village	NNE
GW4	Dasaripeta village	NNW
GW5	Palavalasa village	Ν
GW6	Rajiv Nagar	NE
GW7	Gouruvanipalem village	Ν
III	Creek Water Samples	
SW1	At Vade cheepurapalli	WSW
II	Surface water Samples (Marine Water)	
SW2	Appikonda beach	ENE
SW3	Tikavanipalem beach	SW
III	Waste Water Samples	
SW4	ETP Outlet	_
SW5	Outfall water at diffusion point	SE

#### TABLE-3.10 WATER QUALITY SAMPLING LOCATIONS

The details of the Water Quality Analysis of (April 2023 to September 2023) are given below in Table-3.11 to Table-3.19.

Chapter-3 Baseline Environmental Status



#### FIGURE-3.4 WATER SAMPLING LOCATIONS

Chapter-3 Baseline Environmental Status

# TABLE-3.11 GROUND WATER QUALITY

	Davamatava	11	CW1 Devede village									
Sr.N	Parameters	Unit			GWI - Dev	ada village			per 15:10500			
0.			April 23	May 23	June 23	July 23	Aug 23	Sep 23	13.10500			
			13.04.23	16.05.23	14.6.23	14.07.23	17.08.23	21.09.23				
1	pH	-	7.07	7.13	7.42	7.65	7.43	7.62	6.5 - 8.5 (NR)			
2	Colour	Hazen	2	2	2	1	1	1	5(15)			
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeable			
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeabla			
5	Conductivity	µS/cm	1589	1607	1563	1472	1287	1366	\$			
6	Turbidity	NTU	1	1	1	1	1	1	1(5)			
7	TDS	mg/l	988	997	987	914	248	861	500(2000)			
8	Total Hardness as CaCO <sub>3</sub>	mg/l	552	548.8	495	463	405	435	200(600)			
9	Total Alkalinity	mg/l	413	423.4	412.3	389.2	345.8	354.6	200(600)			
10	Calcium as Ca	mg/l	89.5	91.3	83.4	78.7	67.3	71.4	75(200)			
11	Magnesium as Mg	mg/l	79.8	77.9	69.7	64.8	57.7	62.5	30(100)			
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)			
13	Boron	mg/l	0.06	0.04	0.06	0.04	0.06	0.03	0.5(1)			
14	Chlorides as Cl	mg/l	187.4	173.2	168.7	159.7	138.6	145.2	250(1000)			
15	Sulphates as SO <sub>4</sub>	mg/l	102.0	92.3	83.4	71.3	59.8	71.5	200(400)			
16	Fluorides as F	mg/l	1.0	1.2	0.9	0.7	0.5	0.3	1.0(1.5)			
17	Nitrates as NO <sub>3</sub>	mg/l	4.1	45.2	51.8	56.3	47.8	59.2	45(NR)			
18	Sodium as Na	mg/l	109.0	115.4	128.3	122.4	106.8	110.7	\$			
19	Potassium as K	mg/l	4.2	3.8	5.8	5.2	4.6	5.1	\$			
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)			
21	Cyanides	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	< 0.02	0.05 (NR)			
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)			
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)			
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)			
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)			
26	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05 (1.5)			
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)			
28	Manganese as Mn	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.1 (0.3)			
29	Iron as Fe	mg/l	0.17	0.12	0.10	0.08	0.13	0.17	0.3(NR)			
30	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)			
31	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01(NR)			
32	Zinc as Zn	mg/l	0.45	0.37	0.28	0.33	0.42	0.32	5(15)			
33	Aluminum as Al	mg/l	0.02	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03(0.2)			
34	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001(NR)			
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent			
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent			
37	Total Coliforms	MPN/100	<2	<2	<2	<2	<2	<2	10			

Note: \$ - Limits not specified;

NR - No Relaxation

Chapter-3 Baseline Environmental Status

<u>TABLE-3.12</u>
<b>GROUND WATER QUALITY</b>

Sr N	Parameters	Unit			l imits as ner				
0.			April 23	May 23	June 23	July 23	August 23	Sep 23	IS:10500
			13.04.23	16.05.23	14.6.23	14.07.23	17.08.23	21.9.23	
1	pН	-	6.99	7.31	7.55	7.32	7.55	747	6.5 - 8.5 (NR)
2	Colour	Hazen	1	1	1	1	1	1	5(15)
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agree
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agree
5	Conductivity	µS/cm	936	977	1088	1164	1092	1184	\$
6	Turbidity	NTU	1	1	1	1	1	1	1(5)
7	TDS	mg/l	565	609	668	735	689	758	500(2000)
8	Total Hardness as CaCO <sub>3</sub>	mg/l	265	287.9	325	352	328	363	200(600)
9	Total Alkalinity	mg/l	203	192.3	222.8	242.1	236.2	251.5	200(600)
10	Calcium as Ca	mg/l	48.2	50.8	57.3	61.8	59.2	63.9	75(200)
11	Magnesium as Mg	mg/l	35.2	39.1	44.2	48.2	43.8	49.4	30(100)
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)
13	Boron	mg/l	0.08	0.07	0.03	0.05	0.04	0.07	0.5(1)
14	Chlorides as Cl	mg/l	121.4	128.4	147.9	153.4	146.7	157.9	250(1000)
15	Sulphates as SO <sub>4</sub>	mg/l	53.0	77.6	69.2	76.6	63.4	69.1	200(400)
16	Fluorides as F	mg/l	0.7	1.3	1.1	0.9	0.7	0.4	1.0(1.5)
17	Nitrates as NO <sub>3</sub>	mg/l	43.2	38.5	45.8	51.4	43.2	54.9	45(NR)
18	Sodium as Na	mg/l	91.6	89.4	96.7	101.3	96.4	101.2	\$
19	Potassium as K	mg/l	2.2	5.1	6.3	7.1	6.3	6.8	\$
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)
21	Cyanides	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05 (NR)
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
23	Mineral Oil	mg/l	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)
26	Copper as Cu	mg/l	< 0.01	<0.01	< 0.01	<0.01	<0.01	< 0.01	0.05 (1.5)
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)
28	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1 (0.3)
29	Iron as Fe	mg/l	0.14	0.14	0.17	0.11	0.18	0.18	0.3(NR)
30	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)
31	Selenium as Se	mg/l	< 0.01	<0.01	< 0.01	<0.01	<0.01	< 0.01	0.01(NR)
32	Zinc as Zn	mg/l	0.33	0.040	0.35	0.22	0.35	0.38	5(15)
33	Aluminum as Al	mg/l	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03(0.2)
34	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	0.001(NR)
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/10 0	<2	<2	<2	<2	<2	<2	10

Note: \$ - Limits not specified;

NR - No Relaxation

Chapter-3 Baseline Environmental Status

# TABLE-3.13 GROUND WATER QUALITY

Sr N	Parameters	Unit	GW3 – Velama Appikonda village									
0.			April 23	May 23	June 23	July 23	August 23	Sep 23	per IS:10500			
			13.04.23	16.05.23	14.06.23	14.07.23	17.08.23	21.09.23				
1	рН	-	7.18	7.05	7.31	7.82	7.61	7.54	6.5 - 8.5 (NR)			
2	Colour	Hazen	3	2	2	2	3	2	5(15)			
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agree			
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agree			
5	Conductivity	µS/cm	1722	1681	1805	1918	1823	1609	\$			
6	Turbidity	NTU	2	2	2	2	2	2	1(5)			
7	TDS	mg/l	1069	1044	1139	1229	1167	1046	500(2000)			
8	Total Hardness as CaCO <sub>3</sub>	mg/l	411	423.6	492	542	513	450	200(600)			
9	Total Alkalinity	mg/l	388	367.4	390.4	399.3	384.4	362.7	200(600)			
10	Calcium as Ca	mg/l	78.4	75.1	92.5	101.2	96.5	80.3	75(200)			
11	Magnesium as Mg	mg/l	52.4	57.3	63.5	70.4	66.2	55.8	30(100)			
12	Free Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)			
13	Boron	mg/l	0.04	0.02	0.04	0.05	0.04	0.03	0.5(1)			
14	Chlorides as Cl	mg/l	197.4	188.3	198.2	209.2	199.3	182.4	250(1000)			
15	Sulphates as SO4	mg/l	144.3	160.7	178.6	198.7	187.6	140.7	200(400)			
16	Fluorides as F	mg/l	1.0	0.7	0.9	1.1	0.9	0.5	1.0(1.5)			
17	Nitrates as NO3	mg/l	50.2	46.2	54.7	67.3	59.3	45.3	45(NR)			
18	Sodium as Na	mg/l	193.2	180.7	175.4	180.2	175.2	165.5	\$			
19	Potassium as K	mg/l	22.6	19.5	22.6	19.2	13.4	11.2	\$			
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)			
21	Cyanides	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05 (NR)			
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)			
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)			
24	Cadmium as Cd	mg/l	<0.001	< 0.001	< 0.001	<0.001	<0.001	< 0.001	0.003 (NR)			
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)			
26	Copper as Cu	mg/l	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05 (1.5)			
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)			
28	Manganese as Mn	mg/l	<0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	0.1 (0.3)			
29	Iron as Fe	mg/l	0.19	0.15	0.13	0.16	0.11	0.13	0.3(NR)			
30	Chromium as Cr+6	mg/l	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)			
31	Selenium as Se	mg/l	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01(NR)			
32	Zinc as Zn	mg/l	0.42	0.36	0.41	0.35	0.28	0.32	5(15)			
33	Aluminum as Al	mg/l	< 0.01	<0.01	< 0.01	< 0.01	<0.01	<0.01	0.03(0.2)			
34	Mercury as Hg	mg/l	<0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.001(NR)			
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent			
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent			
37	Total Coliforms	MPN/10 0	<2	<2	<2	<2	<2	<2	10			

Note: \$ - Limits not specified; NR - No Relaxation

Chapter-3 Baseline Environmental Status

# TABLE-3.14 GROUND WATER QUALITY

Sr.No	Parameters	Unit		GV		Limits as per IS:10500			
•			April 23	May 23	June 23	July 23	August 23	Mar 23	
			13.04.23	16.05.23	14.06.23	14.07.23	17.08.23	21.09.23	
1	pH	-	7.22	7.45	7.62	7.55	7.34	7.81	6.5 – 8.5 (NR)
2	Colour	Hazen	2	2	1	2	1	1	5(15)
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreé
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agree
5	Conductivity	µS/cm	1437	1504	1577	1472	1264	1077	\$
6	Turbidity	NTU	1	2	1	2	1	2	1(5)
7	TDS	mg/l	908	951	1006	916	784	690	500(2000)
8	Total Hardness as CaCO <sub>3</sub>	mg/l	471	444.4	470	446	361	294	200(600)
9	Total Alkalinity	mg/l	375	381.5	374.2	354.5	323.5	290.4	200(600)
10	Calcium as Ca	mg/l	66.1	63.7	68.2	55.5	46.8	41.1	75(200)
11	Magnesium as Mg	mg/l	74.3	69.3	72.8	74.8	59.4	46.5	30(100)
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)
13	Boron	mg/l	0.02	0.05	0.03	0.02	0.06	0.04	0.5(1)
14	Chlorides as Cl	mg/l	144.7	138.6	164.1	154.1	126.4	99.6	250(1000)
15	Sulphates as SO <sub>4</sub>	mg/l	97.5	127.8	143.5	128.3	103.5	85.3	200(400)
16	Fluorides as F	mg/l	0.9	0.6	1.0	0.8	0.6	0.8	1.0(1.5)
17	Nitrates as NO <sub>3</sub>	mg/l	40.7	47.5	38.1	35.2	25.7	20.7	45(NR)
18	Sodium as Na	mg/l	110.5	138.0	141.5	127.5	117.11	106.8	\$
19	Potassium as K	mg/l	5.8	6.4	8.3	9.5	12.5	9.7	\$
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)
21	Cyanides	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05 (NR)
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)
26	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	0.05 (1.5)
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)
28	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1 (0.3)
29	Iron as Fe	mg/l	0.21	0.18	0.15	0.12	0.09	0.07	0.3(NR)
30	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)
31	Selenium as Se	mg/l	<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	0.01(NR)
32	Zinc as Zn	mg/l	0.38	0.28	0.25	0.31	0.37	0.29	5(15)
33	Aluminum as Al	mg/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03(0.2)
34	Mercury as Hg	mg/l	< 0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	0.001(NR)
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/10 0	<2	<2	<2	<2	<2	<2	10

Note: \$ - Limits not specified;

NR - No Relaxation

Chapter-3 Baseline Environmental Status

Sr.N	Parameters	Unit		G	W5 – Palav	alasa villag	e		Limits as per IS:10500
0.			April 23	May 23	June 23	July 23	August 23	Sep 23	10110000
			13.04.23	16.05.23	14.6.23	14.07.23	17.08.23	21.9.23	
1	рН	-	7.25	7.30	7.50	7.40	7.66	7.41	6.5 – 8.5 (NR)
2	Colour	Hazen	3	2	3	4	3	2	5(15)
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeable
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeable
5	Conductivity	µS/cm	6022	6218	6627	5933	8790	5904	\$
6	Turbidity	NTU	1	2	2	2	3	2	1(5)
7	TDS	mg/l	3968	3982	4311	3781	5890	3780	500(2000)
8	Total Hardness as CaCO <sub>3</sub>	mg/l	1052	917.5	1079	912	861	910	200(600)
9	Total Alkalinity	mg/l	470	466.2	482.4	405.6	381.2	421.6	200(600)
10	Calcium as Ca	mg/l	147.2	150.7	180.4	154.8	148.7	152.3	75(200)
11	Magnesium as Mg	mg/l	166.5	131.4	152.8	127.7	120.7	128.6	30(100)
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)
13	Boron	mg/l	0.07	0.04	0.05	0.04	0.05	0.03	0.5(1)
14	Chlorides as Cl	mg/l	1554.5	1611	1721.3	1594.5	1571.8	1579.6	250(1000)
15	Sulphates as SO4	mg/l	286.4	303.2	335.4	253.8	248.4	263.8	200(400)
16	Fluorides as F	mg/l	1.8	1.2	1.6	1.4	1.1	0.9	1.0(1.5)
17	Nitrates as NO3	mg/l	42.6	49.1	61.4	48.3	36.3	29.4	45(NR)
18	Sodium as Na	mg/l	892.3	998.3	1012.2	932.7	921.6	924.3	\$
19	Potassium as K	mg/l	13.0	16.3	25.8	20.4	23.6	25.3	\$
20	Phenolic Compounds	mg/l	<0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.01	0.001(0.002)
21	Cyanides	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05 (NR)
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)
24	Cadmium as Cd	mg/l	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)
26	Copper as Cu	mg/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.05 (1.5)
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)
28	Manganese as Mn	mg/l	<0.001	< 0.001	0.02	< 0.001	<0.001	< 0.001	0.1 (0.3)
29	Iron as Fe	mg/l	0.23	0.22	0.18	0.15	0.18	0.12	0.3(NR)
30	Chromium as Cr+6	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)
31	Selenium as Se	mg/l	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01(NR)
32	Zinc as Zn	mg/l	0.51	0.46	0.55	0.45	0.36	0.40	5(15)
33	Aluminum as Al	mg/l	0.05	0.03	0.01	0.01	0.03	0.01	0.03(0.2)
34	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	0.001(NR)
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/100	<2	<2	<2	<2	<2	<2	10

# TABLE-3.15 GROUND WATER QUALITY

Note: \$ - Limits not specified;

NR - No Relaxation

Chapter-3 Baseline Environmental Status

# TABLE-3.16 GROUND WATER QUALITY

Sr.N o.	Parameters	Unit			Limits as per IS:10500				
_			April 23	May 23	June 23	July 23	August 23	Mar 23	
-			13.04.23	16.05.23	14.06.23	14.07.23	17.08.23	21.09.23	
1	рН	-	7.31	7.59	7.43	7.66	7.48	7.58	6.5 - 8.5 (NR)
2	Colour	Hazen	1	2	2	2	3	3	5(15)
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeable
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agree	Agreeable
5	Conductivity	µS/cm	2370	2205	2381	2581	2718	2541	\$
6	Turbidity	NTU	1	1	2	2	2	3	1(5)
7	TDS	mg/l	1474	1368	1503	1604	1741	1628	500(2000)
8	Total Hardness as CaCO <sub>3</sub>	mg/l	402	373.0	412	456	507	442	200(600)
9	Total Alkalinity	mg/l	457	427.6	453.7	487.2	486.3	456.3	200(600)
10	Calcium as Ca	mg/l	57.3	51.6	55.8	65.3	73.2	61.2	75(200)
11	Magnesium as Mg	mg/l	63.0	59.3	66.3	71.2	78.8	70.3	30(100)
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)
13	Boron	mg/l	0.02	0.03	0.06	0.04	0.04	0.02	0.5(1)
14	Chlorides as Cl	mg/l	322.3	302.7	327.4	355.4	361.6	342.2	250(1000)
15	Sulphates as SO <sub>4</sub>	mg/l	227.4	206.1	220.7	241.4	293.7	274.4	200(400)
16	Fluorides as F	mg/l	1.7	1.5	1.3	1.2	1.5	1.1	1.0(1.5)
17	Nitrates as NO <sub>3</sub>	mg/l	38.7	33.7	49.2	56.4	64.2	53.4	45(NR)
18	Sodium as Na	mg/l	353.2	331.0	351.1	373.2	384.2	374.7	\$
19	Potassium as K	mg/l	11.0	9.7	11.2	17.8	12.8	10.6	\$
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)
21	Cyanides	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05 (NR)
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	0.5 (NR)
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)
26	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05 (1.5)
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)
28	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	0.1 (0.3)
29	Iron as Fe	mg/l	0.21	0.15	0.12	0.09	0.13	0.11	0.3(NR)
30	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)
31	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01(NR)
32	Zinc as Zn	mg/l	0.37	0.41	0.34	0.32	0.42	0.28	5(15)
33	Aluminum as Al	mg/l	0.01	< 0.01	0.03	0.03	0.01	< 0.01	0.03(0.2)
34	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001(NR)
35	Pdes	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/10 0	<2	<2	<2	<2	<2	<2	10

Note: \$ - Limits not specified;

NR - No Relaxation

Chapter-3 Baseline Environmental Status

# TABLE-3.17 GROUND WATER QUALITY

SrNo	Parameters	Unit		l imits as ner					
			April 23	May 23	June 23	July 23	August 23	Mar 23	IS:10500
			13.04.23	16.05.23	14.06.23	14.07.23	17.08.23	21.09.23	
1	pН	-	7.85	7.63	7.72	7.51	7.36	7.62	6.5 - 8.5 (NR)
2	Colour	Hazen	2	3	2	3	2	2	5(15)
3	Taste	-	Agree	Agree	Agree	Agree	Agree	Agreeable	Agreeable
4	Odour	-	Agree	Agree	Agree	Agree	Agree	Agreeable	Agreeable
5	Conductivity	µS/cm	3840	3912	4153	4528	4225	4370	\$
6	Turbidity	NTU	1	1	3	2	3	3	1(5)
7	TDS	mg/l	2449	2388	2661	2856	2789	2886	500(2000)
8	Total Hardness as CaCO <sub>3</sub>	mg/l	579	577.7	682	829	738	782	200(600)
9	Total Alkalinity	mg/l	512	526.3	556.3	589.7	542.4	558.1	200(600)
10	Calcium as Ca	mg/l	63.2	76.2	95.1	111.0	98.6	105.3	75(200)
11	Magnesium as Mg	mg/l	102.3	94.1	108.1	134.2	119.6	126.1	30(100)
12	Residual Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2(1)
13	Boron	mg/l	0.05	0.06	0.03	0.02	0.03	0.0	0.5(1)
14	Chlorides as Cl	mg/l	783.2	810.6	859.6	936.8	902.3	928.3	250(1000)
15	Sulphates as SO4	mg/l	246.3	229.1	243.3	284.6	241.5	261.7	200(400)
16	Fluorides as F	mg/l	1.3	1.1	1.0	1.4	1.3	1.0	1.0(1.5)
17	Nitrates as NO3	mg/l	39.4	46.6	59.3	62.6	49.8	51.7	45(NR)
18	Sodium as Na	mg/l	603.2	622	628.5	645.8	616.8	629.4	\$
19	Potassium as K	mg/l	23.0	19.5	21.4	22.1	25.3	26.8	\$
20	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(0.002)
21	Cyanides	mg/l	<0.02	< 0.02	<0.02	< 0.02	<0.02	<0.02	0.05 (NR)
22	Anionic Detergents	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
23	Mineral Oil	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5 (NR)
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003 (NR)
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (0.05)
26	Copper as Cu	mg/l	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05 (1.5)
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01 (NR)
28	Manganese as Mn	mg/l	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.1 (0.3)
29	Iron as Fe	mg/l	0.16	0.20	0.18	0.16	0.15	0.16	0.3(NR)
30	Chromium as Cr+6	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05(NR)
31	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01(NR)
32	Zinc as Zn	mg/l	0.45	0.52	0.43	0.38	0.40	0.36	5(15)
33	Aluminum as Al	mg/l	0.03	0.05	0.02	0.02	0.02	< 0.01	0.03(0.2)
34	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001(NR)
35	Pesticides	μg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliforms	MPN/10 0	<2	<2	<2	<2	<2	<2	10

Note: \$ - Limits not specified; NR - No Relaxation

Chapter-3 Baseline Environmental Status

S. No.	Parameter	Units	Apr	il 23	Мау	y 23	Jun	e 23	July	23	Aug	ust 23	Se	p 23
			SW2	SW3										
			13.4.23	13.4.23	16.5.23	16.5.23	14.6.23	14.6.23	14.7.23	14.7.23	17.8.23	17.8.23	21.9.23	21.9.23
1	pН	-	7.96	8.11	8.05	7.92	7.96	8.07	7.83	7.97	7.93	8.03	8.12	8.07
2	Color	Hazen	4	6	5	4	6	5	5	7	6	5	5	7
3	Conductivity	□S/cm	55200	56400	56100	54200	55700	53800	54200	55100	53810	54020	55830	53680
4	Total Dissolved Solids	mg/l	40850	41750	41510	39580	40660	39810	40100	41320	39820	40520	41310	39720
5	DO	mg/l	4.9	5.2	5.1	5.0	5.0	5.3	5.3	5.1	5.1	5.2	5.3	5.0
6	BOD	mg/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
7	COD	mg/l	102	118	121	114	118	126	121	115	108	118	114	121
8	Total Hardness as CaCO <sub>3</sub>	mg/l	3293.9	3782.5	3311.2	3673.9	3208	3549	3009	3844	2989	3365	3261	3247
9	Total Alkalinity as CaCO <sub>3</sub>	mg/l	313.4	498.3	365.5	442.5	321.4	428.3	292.4	452.3	265.3	427.7	398.5	402.3
10	Calcium as Ca <sup>+2</sup>	mg/l	423.4	483.7	417.5	462.3	398.3	438.5	355.3	473.6	384.7	402.5	424.3	384.6
11	Magnesium as Mg <sup>+2</sup>	mg/l	543.2	625.3	551.0	611.9	537.6	596.2	515.4	646.4	492.8	573.4	532.4	555.5
12	Chlorides as Cl	mg/l	18022	18092.3	18254.0	17734.5	18423.4	17620.1	17968.6	18056.4	17580	17774.4	17921.4	17644.0
13	Residual free Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
14	Phosphates PO <sub>4</sub>	mg/l	4.3	2.1	2.9	3.7	3.5	4.2	5.3	3.8	4.2	5.0	6.4	4.7
15	Sulphates as SO <sub>4</sub>	mg/l	1702.3	1899.2	1811.5	1540.3	1432.5	1478.9	1358.2	1503.4	1736.5	1425.8	2035.7	1324.2
16	Fluorides as F	mg/l	1.1	1.6	0.9	1.0	1.2	0.9	1.3	1.1	1.8	1.6	1.6	1.2
17	Nitrates as NO <sub>3</sub>	mg/l	15.3	21.8	20.4	17.5	29.5	25.3	23.4	32.3	33.4	24.3	37.2	45.2
18	Sodium as Na <sup>+</sup>	mg/l	11083	11145.5	11273.2	10695.4	11240.5	10655.5	10995.5	10810.2	10897	10785.3	11228.6	10754.3
19	Potassium as K	mg/l	162.3	142.7	177.4	126.6	153.2	135.8	138.7	153.4	168.3	147.2	190.4	159.3
20	Total Boron as B	mg/l	0.07	0.04	0.04	0.05	0.02	0.03	0.05	0.02	0.03	0.04	0.05	0.03
21	Cyanides	mg/l	<0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	<0.02	<0.02	< 0.02	<0.02
22	Phenol compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
23	Oil and Grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
26	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
28	Iron as Fe	mg/l	0.16	0.13	0.12	0.10	0.14	0.15	0.17	0.14	0.14	0.19	0.18	0.14
29	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

#### TABLE-3.18 SURFACE WATER OUALITY (MARINE WATER SAMPLES) FROM APRIL 2023 TO SEPTEMBER 2023

VIMTA Labs Limited, Hyderabad

Compliance Report to Environmental Clearance of M/s Hinduja National Power Corporation Limited vide Letter	Chapter-3
No: J-13011/11/90-IA-II(T) dated 3 <sup>rd</sup> September, 1996 and F. No: 11-58/2011-IA-III dated 3 <sup>rd</sup> January, 2014,	Baseline
17/19 <sup>th</sup> March, 2015 and CTO No: APPCB/VSP/19/HO/CTO/2016 dated 21 <sup>st</sup> March, 2023	Environmental Status

S. No.	Parameter	Units	April 23		May 23		June 23		July 23		August 23		Sep 23	
			SW2	SW3	SW2	SW3	SW2	SW3	SW2	SW3	SW2	SW3	SW2	SW3
			13.4.23	13.4.23	16.5.23	16.5.23	14.6.23	14.6.23	14.7.23	14.7.23	17.8.23	17.8.23	21.9.23	21.9.23
31	Zinc as Zn	mg/l	0.35	0.26	0.42	0.33	0.33	0.38	0.38	0.29	0.42	0.31	0.37	0.31
32	Aluminium as Al	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
33	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

SW2- Appikonda beach(marine); SW3-Tikkavanipalem beach(marine);



Chapter-3 Data Analysis

### TABLE-3.19 MARINE WATER SAMPLES RESULTS ( INTAKE WATER)

Sr. No.	Parameter	Units			SW	4		
	Sampling Date		13.4.23	17.5.23	14.6.23	14.7.23	17.8.23	21.9.23
1	рН	-	7.75	7.84	7.92	7.88	7.92	8.01
2	Color	Hazen	4	6	5	7	5	6
3	Conductivity	□S/cm	54600	55600	54400	54700	53930	56020
4	Total Dissolved Solids	mg/l	40410	41150	39710	40470	39910	40890
5	DO	mg/l	5.1	5.4	5.2	5.4	5.2	5.4
6	BOD	mg/l	<3	<3	<3	<3	<3	<3
7	COD	mg/l	112	108	122	118	124	117
8	Total Hardness as CaCO <sub>3</sub>	mg/l	3477.4	3418	3138	3235	349.2	3273
9	Total Alkalinity as CaCO <sub>3</sub>	mg/l	355.4	328.4	342.7	367.8	1563.2	420.2
10	Calcium as Ca <sup>+2</sup>	mg/l	391.3	407.2	344.8	362.7	346.8	373.8
11	Magnesium as Mg <sup>+2</sup>	mg/l	607.3	583.2	553.1	565.8	524.5	568.3
12	Chlorides as Cl	mg/l	17723.2	18103.4	17860.7	17920.8	17689.7	18042.5
13	Residual free Chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
14	Phosphates PO <sub>4</sub>	mg/l	3.1	4.4	3.1	5.7	3.9	5.1
15	Sulphates as SO <sub>4</sub>	mg/l	1792.3	1801.7	1542.3	1587.6	1563.2	1978.3
16	Fluorides as F	mg/l	0.8	0.6	1.0	1.4	1.7	1.4
17	Nitrates as NO <sub>3</sub>	mg/l	16.5	24.1	21.7	27.7	30.5	40.6
18	Sodium as Na <sup>+</sup>	mg/l	10868.6	11123.6	10987.3	11010.4	10940.7	11290.5
19	Potassium as K	mg/l	138.5	148.2	128.9	132.2	113.5	142.1
20	Total Boron as B	mg/l	0.06	0.03	0.06	0.08	0.05	0.03
21	Cyanides as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
22	Phenolic compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
23	Oil and Grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
25	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
26	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
27	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
28	Iron as Fe	mg/l	0.16	0.11	0.13	0.15	0.13	0.17
29	Total Chromium (as Cr)	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31	Zinc as Zn	mg/l	0.27	0.35	0.28	0.36	0.27	0.36
32	Aluminium as Al	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
33	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
34	Sulphide as H <sub>2</sub> S	mg/l	<0.2	<0.2	<0.2	<0.2	< 0.2	<0.2
35	Bromide as Br	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
36	Iodides as I	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1

Sampling Location Name

SW4- Intake sea water;



Chapter-3 Data Analysis

#### TABLE-3.20 SURFACE WATER QUALITY (CREEK WATER SAMPLES) FROM APRIL 2023 TO SEPTEMBER 2023

S.No	Parameters	Units	Apr 23	May 23	Jun 23	July 23	Aug 23	Sep 23
			13.04.23	16.5.23	14.6.23	14.7.23	17.8.23	21.09.23
1	рН	-	7.87	7.67	7.83	7.65	7.88	8.01
2	Suspended solids	mg/l	22	28	33	39	43	6
3	Conductivity	μS/cm	15500	12810	8738	10827	8950	56020
4	TDS	mg/l	10670	8845	5943	7476	6360	40890
5	DO	mg/l	5.3	5.0	5.2	5.0	5.2	5.4
6	BOD	mg/l	<3	<3	<3	<3	<3	<3
7	Turbidity	NTU	27	33	27	34	28	117
8	Salinity	Ppt	9	7.8	5.2	6.0	5.0	3273
9	Total Alkalinity as CaCO <sub>3</sub>	mg/l	138.2	112.6	109.8	284.6	238.6	420.2
10	Calcium as Ca	mg/l	172.3	180.8	128.7	178.5	124.7	373.8
11	Magnesium as Mg	mg/l	213.1	163.7	154.7	228.6	169.8	568.3
12	Chlorides as Cl	mg/l	5237.3	4337.4	2896	3358.7	2814.5	18042.5
13	Phosphates as PO <sub>4</sub>	mg/l	3.8	4.5	3.4	6.2	4.9	<0.2
14	Sulphates as SO <sub>4</sub>	mg/l	177.3	139.3	121.2	310.5	216.8	5.1
15	Fluorides as F	mg/l	1.7	1.3	1.1	1.5	1.9	1978.3
16	Nitrates as NO <sub>3</sub>	mg/l	13.4	19.6	38.2	68.7	42.6	1.4
17	Sodium as Na	mg/l	2929	2437.0	1548.7	1824.3	1574.3	40.6
18	Potassium as K	mg/l	56.3	41.6	32.7	46.3	32.8	11290.5
19	Phenolic Compounds	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	142.1
20	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
21	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.02
22	Iron as Fe	mg/l	0.20	0.17	0.19	0.23	0.19	< 0.001
23	Chromium as Cr <sup>+6</sup>	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<1.0
24	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001

Creek water in Mud flat area at Vade cheepurapalli.



> Chapter-3 Data Analysis

### 3.6 Soil Quality

Soil Samples were collected from eight locations around the plant site area, out of which, three locations (S1 to S3) are monthly and the remaining five locations (S4 to S8) are quarterly samples. The soil quality is given below in **Table-3.21** and **Table-3.25**.

S. No	Parameters	Unit		<b>S</b> 1	– Palavalas	sa Village		
			April 23	May 23	June 23	July 23	Aug 23	Sep 23
			13.4.23	16.5.23	14.6.23	14.7.23	17.8.23	21.9.23
1	Toxturo		Sandy	Sandy	Sandy	Sandy	Sandy	Sandy
T	Texture		Clay	Clay	Clay	Clay	Clay	Clay
а	Sand	%	52	50	54	50	53	50
b	Silt	%	10	11	12	14	12	14
С	Clay	%	38	39	34	36	35	36
2	Bulk Density	g/cc	1.24	1.28	1.22	1.31	1.24	1.29
3	pH (1:5 Aq.Extraction)		7.98	7.84	7.67	7.82	7.56	7.37
4	Conductivity (1:5 Aq.Extraction)	μS/cm	418	384	410	397	412	454
5	Cation Exchange Capacity	(meq/100gm)	23.06	24.16	22.24	25.21	21.75	24.22
6	Exchangeable Calcium	(meq/100gm)	14.84	16.27	14.48	16.33	14.8	16.3
7	Exchangeable Magnesium	(meq/100gm)	7.64	7.32	7.13	8.24	6.3	7.1
8	Exchangeable Potassium	(meq/100gm)	0.29	0.31	0.35	0.32	0.37	0.41
9	Exchangeable Sodium	(meq/100gm)	0.28	0.26	0.28	0.32	0.34	0.39
10	Sodium Absorption Ratio (SAR)		0.14	0.11	0.12	0.13	0.15	0.18
11	Available Nitrogen as N	Kg/ha	81.5	76.4	79.6	101.0	89.8	93.4
12	Available Phosphorous as P	Kg/ha	58.5	47.5	53.5	54.7	94.6	98.7
13	Available Potassium as K	Kg/ha	257.9	234.7	272.2	256.5	266.0	272
14	Organic Carbon	%	0.39	0.31	0.37	0.46	0.45	0.51
15	Organic Matter	%	0.67	0.53	0.64	0.80	0.77	0.89
16	Water Soluble Chlorides as Cl	mg/kg	61.7	73.5	67.2	58.6	64.5	69.6
17	Water Soluble Sulphates as SO4	mg/kg	32.3	41.7	38.2	43.5	36.2	42.3
18	Aluminium	%	0.78	0.82	0.96	0.84	0.91	1.05
19	Total Iron	%	0.97	1.06	1.12	1.28	1.36	1.47
20	Manganese	mg/kg	418	524	498	369	378	384
21	Boron	mg/kg	21.5	26.8	19.7	21.7	19.6	21.6
22	Zinc	ma/ka	47.2	37.4	28.5	25.6	32.3	39.3

#### TABLE-3.21 SOIL QUALITY RESULTS



Chapter-3 Data Analysis

# TABLE-3.22 SOIL QUALITY RESULTS

S. No	Parameters	Unit			S2 –Appik	onda Villag	е	
			April 23	May 23	June 23	July 23	Aug 23	Sep 23
			13.4.23	16.5.23	14.6.23	14.7.23	17.8.23	21.9.23
1	Texture		Clay	Clay	Clay	Clay	Clay	Clay
а	Sand	%	24	22	25	21	23	32
b	Silt	%	19	16	19	17	19	16
С	Clay	%	57	62	56	62	58	52
2	Bulk Density	g/cc	1.15	1.17	1.19	1.24	1.16	1.21
3	pH (1:5 Aq.Extraction)		7.43	7.36	7.41	7.65	7.68	7.42
4	Conductivity (1:5 Aq.Extraction)	μS/cm	652	597	628	592	604	612
5	Cation Exchange Capacity	(meq/100gm)	30.70	31.56	28.40	31.80	29.48	28.11
6	Exchangeable Calcium	(meq/100gm)	20.31	18.41	18.46	20.13	19.9	17.8
7	Exchangeable Magnesium	(meq/100gm)	9.46	12.11	8.96	10.53	8.5	9.2
8	Exchangeable Potassium	(meq/100gm)	0.48	0.47	0.51	0.59	0.54	0.59
9	Exchangeable Sodium	(meq/100gm)	0.45	0.58	0.46	0.56	0.46	0.52
10	Sodium Absorption Ratio (SAR)		0.17	0.21	0.18	0.20	0.17	0.13
11	Available Nitrogen as N	Kg/ha	138.3	121.3	111.9	135.0	115.4	121.3
12	Available Phosphorous as P	Kg/ha	71.9	68.2	86.7	90.3	120.1	126.4
13	Available Potassium as K	Kg/ha	331.0	312.8	366.3	439.0	359.8	347.2
14	Organic Carbon	%	0.72	0.65	0.56	0.65	0.63	0.71
15	Organic Matter	%	1.24	1.12	0.97	1.12	1.08	1.24
16	Water Soluble Chlorides as Cl	mg/kg	116.4	135.6	129.6	134.7	123.1	131.4
17	Water Soluble Sulphates as SO4	mg/kg	43.6	52.4	46.4	51.3	49.4	52.7
18	Aluminium	%	0.96	1.02	1.24	1.19	1.26	1.32
19	Total Iron	%	1.54	1.63	1.87	2.13	2.11	2.24
20	Manganese	mg/kg	562	628	564	497	515	522
21	Boron	mg/kg	35.8	42.3	36.7	32.4	27.5	32.2
22	Zinc	mg/kg	62.3	58.7	43.2	39.6	43.7	51.7



Chapter-3 Data Analysis

# TABLE-3.23 SOIL QUALITY RESULTS

S. No	Parameters	Unit		:	S3 –Devada	Village		
			April 23	May 23	June 23	July 23	Aug 23	Sep 23
			13.4.23	16.5.23	14.6.23	14.7.23	17.8.23	21.9.23
1	Toyturo		Sandy Clay	Sandy	Sandy	Sandy	Sandy	Sandy
L	Texture		Salluy Clay	Clay	Clay	Clay	Clay	Clay
а	Sand	%	49	48	51	53	48	52
b	Silt	%	12	17	13	12	14	18
С	Clay	%	39	35	36	35	38	30
2	Bulk Density	g/cc	1.27	1.23	1.29	1.36	1.27	1.32
3	pH (1:5 Aq.Extraction)		7.64	7.58	7.74	7.53	7.44	7.59
4	Conductivity (1:5	uS/cm						
4	Aq.Extraction)	μογοιτί	395	363	384	368	382	400
5	Cation Exchange Capacity	(meq/100gm)	20.92	22.49	20.86	23.69	22.09	24.01
6	Exchangeable Calcium	(meq/100gm)	13.73	14.31	13.66	15.79	16.3	17.6
7	Exchangeable Magnesium	(meq/100gm)	6.53	7.60	6.63	7.28	5.1	5.8
8	Exchangeable Potassium	(meq/100gm)	0.34	0.30	0.32	0.35	0.34	0.38
9	Exchangeable Sodium	(meq/100gm)	0.31	0.28	0.26	0.28	0.31	0.22
10	Sodium Absorption Ratio (SAR)		0.12	0.15	0.11	0.12	0.14	0.19
11	Available Nitrogen as N	Kg/ha	92.0	84.6	93.2	118.6	78.0	84.7
12	Available Phosphorous as P	Kg/ha	47.9	38.5	62.6	66.0	88.6	91.5
13	Available Potassium as K	Kg/ha	224.6	211.2	251.3	283.7	244.6	251.8
14	Organic Carbon	%	0.41	0.37	0.43	0.52	0.39	0.44
15	Organic Matter	%	0.71	0.63	0.75	0.90	0.67	0.77
16	Water Soluble Chlorides as Cl	mg/kg	76.9	82.4	74.2	81.3	76.2	84.4
17	Water Soluble Sulphates as SO4	mg/kg	27.5	34.3	28.7	32.4	30.8	35.8
18	Aluminium	%	0.62	0.76	0.65	0.78	0.82	0.97
19	Total Iron	%	1.05	1.14	1.08	1.15	1.05	1.12
20	Manganese	mg/kg	397	416	396	324	347	353
21	Boron	mg/kg	32.6	34.9	23.8	26.5	24.3	29.7
22	Zinc	mg/kg	39.5	41.6	37.2	33.4	29.8	34.4



Chapter-3 Data Analysis

# **TABLE-3.24** SOIL QUALITY RESULTS (QUARTERLY)

[							
S. No	Parameters	Unit	S4	S5	S6	S7	<b>S8</b>
	Sampling date		14.6.23	14.6.23	14.6.23	14.06.23	14.06.23
1	Texture		Sandy	clay	sandy clay	clay	Sandy
Α	Sand	%	64	18	49	23	68
В	Silt	%	19	21	13	19	11
С	Clay	%	17	61	38	58	21
2	Bulk Density	g/cc	1.30	1.20	1.32	1.25	1.29
3	pH (1:5 Aq.Extraction)		7.32	7.45	7.29	7.53	7.18
4	Conductivity (1:5 Aq.Extraction)	μS/cm	356	407	328	373	334
5	Cation Exchange Capacity	(meq/100gm)	24.31	28.40	27.46	29.16	25.02
6	Exchangeable Calcium	(meq/100gm)	16.23	17.84	15.98	16.84	15.475
7	Exchangeable Magnesium	(meq/100gm)	7.29	9.63	10.82	11.30	8.82
8	Exchangeable Potassium	(meq/100gm)	0.37	0.42	0.30	0.47	0.32
9	Exchangeable Sodium	(meq/100gm)	0.43	0.51	0.37	0.55	0.40
10	Sodium Absorption Ratio (SAR)		0.18	0.19	0.14	0.21	0.16
11	Available Nitrogen as N	Kg/ha	77.8	80.9	62.7	81.0	58.1
12	Available Phosphorous as P	Kg/ha	68.2	72.1	53.3	74.5	56.8
13	Available Potassium as K	Kg/ha	293.2	301.9	238.2	357.5	252.3
14	Organic Carbon	%	0.36	0.40	0.28	0.39	0.27
15	Organic Matter	%	0.62	0.70	0.49	0.67	0.46
16	Water Soluble Chlorides as Cl	mg/kg	82.3	126.4	112.5	133.3	96.8
17	Water Soluble Sulphates as SO4	mg/kg	33.5	41.6	38.6	62.4	43.2
18	Aluminium	%	0.68	1.43	1.19	1.54	0.78
19	Total Iron	%	0.82	1.85	1.74	1.98	1.24
20	Manganese	mg/kg	354	425	398	457	342
21	Boron	mg/kg	14.3	24.5	18.7	28.5	21.4
22	Zinc	mg/kg	21.6	35.8	29.4	46.8	38.2

<u>Soil Sampling Locations</u> S4- Islampeta village

S5- Namidoddi village

S6- Palikiladoddi village

S7- Dasaripeta village

S8- 8<sup>th</sup> feet road (Near Islampet village)



г

Compliance Report to Environmental Clearance of M/s Hinduja National Power Corporation Limited vide Letter No: J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> September, 1996 and F. No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014, 17/19<sup>th</sup> March, 2015 and CFO No: APPCB/VSP19/HO/CTO/2020 dated 21st March, 2023

Chapter-3 Data Analysis

# **TABLE-3.25** SOIL QUALITY RESULTS (QUARTERLY)

S. No	Parameters	Unit	<b>S</b> 4	S5	<b>S6</b>	<b>S7</b>	<b>S8</b>
			18.03.23	18.03.23	18.03.23	18.03.23	18.03.23
1	Texture		Sandy	clay	sandy clay	clay	Sandy
Α	Sand	%	68	21	47	24	66
В	Silt	%	14	17	16	13	12
С	Clay	%	18	62	37	63	22
2	Bulk Density	g/cc	1.26	1.12	1.34	1.19	1.29
3	pH (1:5 Aq.Extraction)		7.54	7.49	7.53	7.35	7.68
4	Conductivity (1:5 Aq.Extraction)	μS/cm	342	397	457	411	342
5	Cation Exchange Capacity	(meq/100gm)	27.31	30.44	41.08	43.86	47.73
6	Exchangeable Calcium	(meq/100gm)	18.39	18.2	20.5	23.5	21.7
7	Exchangeable Magnesium	(meq/100gm)	8.21	11.3	19.73	19.2	25.3
8	Exchangeable Potassium	(meq/100gm)	0.33	0.41	0.37	0.52	0.4
9	Exchangeable Sodium	(meq/100gm)	0.38	0.53	0.48	0.64	0.33
10	Sodium Absorption Ratio (SAR)		0.15	0.22	0.14	0.22	0.1
11	Available Nitrogen as N	Kg/ha	63.8	65.6	54.7	69.8	53.8
12	Available Phosphorous as P	Kg/ha	39.7	49.5	38.9	48.7	39.7
13	Available Potassium as K	Kg/ha	249.5	238.7	224.6	267.8	205.5
14	Organic Carbon	%	0.35	0.71	0.68	0.58	0.48
15	Organic Matter	%	0.60	1.22	1.17	1.00	0.84
16	Water Soluble Chlorides as Cl	mg/kg	76.8	118.7	89.8	134.5	745
17	Water Soluble Sulphates as SO4	mg/kg	35.4	52.6	43.4	73.6	89.6
18	Aluminium	%	0.73	1.54	1.28	1.69	0.69
19	Total Iron	%	0.97	1.97	1.82	2.15	1.05
20	Manganese	mg/kg	316	384	478	424	312
21	Boron	mg/kg	12.5	27.5	15.9	32.6	23.5
22	Zinc	mg/kg	25.6	43.2	31.4	37.5	46.8

Soil Sampling Locations

S4- Islampeta village ,S5- Namidoddi village, S6- Palikiladoddi village S7- Dasaripeta village, S8- 8<sup>th</sup> feet road (Near Islampet village)

<u>TABLE-3.26</u>	
SOIL QUALITY OF INTER-TIDAL F	REGION

Sr.N o	Parameters	Unit	Sediment Sample							
			Post Monsoo	n Season	Winter S	Season				
	Sampling date		19.04.23 17.05.23		14.06.23	14.07.23				
1	Texture		Sandy Loam	Sandy Loam Sandy		Sandy				
				Loam		Loam				
а	Sand	%	54	49	53	57				
b	Silt	%	35 37		32	29				
С	Clay	%	11	14	15	14				
2	Phosphorous as P	mg/kg	27.5	25.1	21.7	26.3				
3	Chromium as Cr	mg/kg	12.3	17.8	15.5	12.9				
4	Nickel as Ni	mg/kg	18.7	22.0	18.7	22.1				
5	Cadmium as Cd	mg/kg	<1.0	<1.0	<1.0	<1.0				
6	Lead as Pb	mg/kg	4.1	6.2	8.0	6.2				
7	Mercury as Hg	mg/kg	<1.0 <1.0		<1.0	<1.0				
8	Total Petroleum hvdrocarbons (TPH)	%	<0.01	<0.01	<0.01	<0.01				



> *Chapter-3 Data Analysis*

#### TABLE-3.27 SOIL QUALITY OF INTER-TIDAL REGION

Sr.No	Parameters	Unit	Sedim	ent Sample
			Winter Season	Post-Monsoon Season
	Sampling date		16.08.23	21.09.23
1	Texture		Sandy Loam	Sandy Loam
а	Sand	%	55	51
b	Silt	%	27	30
С	Clay	%	18	19
2	Phosphorous as P	mg/kg	22.7	21.7
3	Chromium as Cr	mg/kg	15.1	19.6
4	Nickel as Ni	mg/kg	19.7	14.5
5	Cadmium as Cd	mg/kg	<1.0	<1.0
6	Lead as Pb	mg/kg	4.4	2.8
7	Mercury as Hg	mg/kg	<1.0	<1.0
8	Total Petroleum hydrocarbons (TPH)	%	<0.01	<0.01

# 3.7 Waste Water Quality

# 3.7.1 Effluent Treatment Plant and Outfall water at diffusion point water Quality

There are one ETP water inside plant and two Outfall water at diffusion point these sample were collected and these were as per analyzed as per the standards to know the quality of water. The Summary of analyzed parameters results is given in **Table-3.28** and **Table-3.26**.

					-	1			
Sr.no	Parameters	Unit	April 23	мау 23	June 23	July 23	Aug23	Sep 23	standards
			19.04.23	17.5.23	15.6.23	15.07.23	16.8.23	121.09.23	
1	Ph	-	7.25	7.05	7.34	7.62	7.88	7.38	6.50-8.50
2	Total Suspended Solids (at 103—105° C)	mg/l	46.1	51.2	62.1	54.9	60.3	61	100 mg/l
3	Oil and Grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	20 mg/l
4	Free chlorine	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5 mg/l
5	Phosphate as PO4	mg/l	3.05	5.11	7.02	9.5	7.43	6.83	20 mg/l
6	Chromium (Total)	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2 mg/l
7	Copper (Total)	mg/l	0.57	0.46	0.52	0.41	0.35	0.57	1 mg/l
8	Iron	mg/l	0.13	0.16	0.12	0.16	0.12	0.07	1 mg/l
9	Zinc	mg/l	0.35	0.41	0.35	0.28	0.37	0.34	1 mg/l

#### TABLE-3.28 ETP OUTLET ANALYSIS RESULT AT PLANT SITE



Chapter-3 Data Analysis

### TABLE-3.29 OUTFALL WATER QUALITY AT DIFFUSION POINT

Sr No	Parameters	Unit	Outfall water at diffusion point							
			Surface	Bottom	Surface	Bottom	Surface	Bottom		
			area	area	area	area	area	area		
			April 2	2023	May	2023	June	2023		
	Sampling Date		19.04.2	2023	19.05	.2023	15.06.2023			
1	pН	-	7.96	8.12	8.03	7.91	8.04	7.84		
2	Temperature	°C	31.5	32.2	33.1	36.9	33.2	36.2		
3	Salinity	mg/l	29	30	30	33	28.3	30.5		
4	DO	mg/l	5.0	5.2	5.3	5.0	4.9	5.3		
5	BOD	mg/l	<3	<3	<3	<3	<3	<3		
6	Dissolved	mg/l	2.1	3.6	4.3	6.7	2.8	5.9		
	Phosphate									
7	Ammonia	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
8	Total Petroleum hydrocarbons	%	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		

# TABLE-3.30 OUTFALL WATER QUALITY AT DIFFUSION POINT

Sr No	Parameters	Unit		Outfall water at diffusion point								
			Surface	Bottom	Surface	Bottom	Surface	Bottom				
			area	area	area	area	area	area				
			July	2023	Augus	t 2023	Septeml	per 2023				
	Sampling Date		15.07	.2023	16.08	.2023	21.09.23					
1	рН	-	7.88	8.02	7.93	8.32	8.14	8.04				
2	Temperature	°C	32.8	31.7	36.5	35.7	32.3	35.3				
3	Salinity	mg/l	29	30	33	30.7	31.3	34.4				
4	DO	mg/l	5.6	5.3	5.0	4.9	5.1	4.9				
5	BOD	mg/l	<3	<3	<3	<3	<3	<3				
6	Dissolved	mg/l	5.2	7.6	10.5	5.8	9.4	13.5				
	Phosphate											
7	Ammonia	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01				
8	Total Petroleum hydrocarbons	%	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001				


Compliance Report to Environmental Clearance of M/s Hinduja National Power Corporation Limited vide Letter No: J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> September, 1996 and F. No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014, 17/19<sup>th</sup> March, 2015 and CFO No: APPCB/VSP19/HO/CTO/2020 dated 21<sup>st</sup>March, 2023

> Chapter-3 Data Analysis

#### 3.8 Stack Emission Monitoring

The power plant has stack of height 275.0-m, which is the major source of air pollution. The stack emission monitoring for Unit–I and Unit-II has been carried out and results are given in **Table-3.31 to 3.34** 

#### TABLE-3.31 STACK EMISSION MONITORING

Sr. No.	Parameters	UOM	Unit-I	Unit-II	Unit-I	Methods of Testing
	Sampling date		20.04.23	10.04.23	19.05.23	
1	Capacity	MW	520	520	520	-
2	Stack Height	М	275	275	275	-
3	Stack diameter	М	6.8	6.8	6.8	-
4	Cross sectional area of the duct	m²	36.33	36.33	36.33	-
5	Flue gas Temperature	°C	113	106	122	-
6	Velocity of the flue gas	m/s	22.23	22.11	22.08	IS: 11255(P-3) 2008
7	Gas volumetric flow rate	Nm³/s	582.73	590.66	533.43	IS: 11255(P-3) 2008
8	Particulate Matter	mg/Nm <sup>3</sup>	27.55	30.12	27.4	IS: 11255(P-1) 2009
9	Sulphur dioxide	mg/Nm <sup>3</sup>	706	732	722	IS: 11255(P-2) 2012
10	Oxides of Nitrogen	mg/Nm <sup>3</sup>	403	381	396	IS: 11255(P-7) 1985
11	Mercury	mg/Nm <sup>3</sup>	0.012	0.009	0.010	USEPA 29

#### TABLE-3.32 STACK EMISSION MONITORING

Sr. No.	Parameters	UOM	Unit-II	Unit-I	Unit-II	Methods of Testing
	Sampling date		19.05.23	28.06.23	28.06.23	
1	Capacity	MW	520	520	520	-
2	Stack Height	М	275	275	275	-
3	Stack diameter	m	6.8	6.8	6.8	-
4	Cross sectional area of the duct	m²	36.33	36.33	36.33	-
5	Flue gas Temperature	°C	119	113	117	-
6	Velocity of the flue gas	m/s	22.21	22.15	22.05	IS: 11255(P-3) 2008
7	Gas volumetric flow rate	Nm³/s	569.18	606.92	529.47	IS: 11255(P-3) 2008
8	Particulate Matter	mg/Nm <sup>3</sup>	28.6	31.3	35.6	IS: 11255(P-1) 2009
9	Sulphur dioxide	mg/Nm <sup>3</sup>	752	804	793	IS: 11255(P-2) 2012
10	Oxides of Nitrogen	mg/Nm <sup>3</sup>	415	410	381	IS: 11255(P-7) 1985
11	Mercury	mg/Nm <sup>3</sup>	0.014	0.013	0.015	USEPA 29

TABLE-3.33



Compliance Report to Environmental Clearance of M/s Hinduja National Power Corporation Limited vide Letter No: J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> September, 1996 and F. No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014, 17/19<sup>th</sup> March, 2015 and CFO No: APPCB/VSP19/HO/CTO/2020 dated 21<sup>st</sup>March, 2023

> Chapter-3 Data Analysis

## STACK EMISSION MONITORING

Sr. No.	Parameters	UOM	Unit-I	Unit-II	Unit-I	Methods of Testing
	Sampling date		19.07.23	19.07.23	31.08.23	
1	Capacity	MW	520	520	520	-
2	Stack Height	m	275	275	275	-
3	Stack diameter	m	6.8	6.8	6.8	-
4	Cross sectional area of the duct	m²	36.33	36.33	36.33	-
5	Flue gas Temperature	°C	119	121	133	-
6	Velocity of the flue gas	m/s	22.31	22.12	23.77	IS: 11255(P-3) 2008
7	Gas volumetric flow rate	Nm³/s	567.12	587.5	630.12	IS: 11255(P-3) 2008
8	Particulate Matter	mg/Nm <sup>3</sup>	29.6	32.7	27.8	IS: 11255(P-1) 2009
9	Sulphur dioxide	mg/Nm <sup>3</sup>	789	738	741	IS: 11255(P-2) 2012
10	Oxides of Nitrogen	mg/Nm <sup>3</sup>	395	408	402	IS: 11255(P-7) 1985
11	Mercury	mg/Nm <sup>3</sup>	0.010	0.013	0.010	USEPA 29

#### TABLE-3.34 STACK EMISSION MONITORING RESULTS

Sr. No.	Parameters	UOM	Unit-II	Unit-I	Unit II	Methods of Testing
	Sampling date		31.08.2023	30.09.23	30.09.23	
1	Capacity	MW	520	520	520	-
2	Stack Height	m	275	275	275	-
3	Stack diameter	m	6.8	6.8	6.8	-
4	Cross sectional area of the duct	m <sup>2</sup>	36.33	36.33	36.33	-
5	Flue gas Temperature	°C	129	126	124	-
6	Velocity of the flue gas	m/s	22.72	21.14	21.48	IS: 11255(P-3) 2008
7	Gas volumetric flow rate	Nm³/s	611.76	518.59	512.09	IS: 11255(P-3) 2008
8	Particulate Matter	mg/Nm <sup>3</sup>	29.6	32.8	34.3	IS: 11255(P-1) 2009
9	Sulphur dioxide	mg/Nm <sup>3</sup>	773	760	796	IS: 11255(P-2) 2012
10	Oxides of Nitrogen	mg/Nm <sup>3</sup>	382	392	411	IS: 11255(P-7) 1985
11	Mercury	mg/Nm <sup>3</sup>	0.009	0.010	0.007	USEPA 29

#### 3.9 Pizeo wells Monitoring

Pizeo wells Monitoring of ground water has been carried out for 6 locations around the plant site and the Pizeo wells water level monitoring are given in **Table-3.35**.

#### TABLE-3.35 PIZEO WELLS MONITORING FOR GROUND WATER

Sr.No.	Location Name	Depth of Water levels (m					
		14.06.2023	20.09.2023				
1	Appikonda village	2.86	2.27				
2	Palavalasa village	3.91	2.88				
3	Velama Appikonda village	4.21	3.60				
4	Gouruvanipalem village	3.55	2.69				
5	Islampet village	4.04	3.51				
6	Dasaripeta villa	3.25	2.69				

#### 3.10 Sewage Treatment Plant Outlet Water Quality (STP)



Compliance Report to Environmental Clearance of M/s Hinduja National Power Corporation Limited vide Letter No: J-13011/11/90-IA-II(T) dated 3<sup>rd</sup> September, 1996 and F. No: 11-58/2011-IA-III dated 3<sup>rd</sup> January, 2014, 17/19<sup>th</sup> March, 2015 and CFO No: APPCB/VSP19/HO/CTO/2020 dated 21<sup>st</sup>March, 2023

> *Chapter-3 Data Analysis*

Two Sewage water samples are collected one is from Plant site and other is Colony and analyzed for various parameters. The survey analytical results are given in **Table-3.36**.

#### TABLE-3.36 SEWAGE OUTLET WATER QUALITY (April 2023 TO September 2023)

Sr. No	Parameter	UOM	April 23	May 23	June 23	July 23	Aug 23	Sep 23
	Sampling date		19.04.23	17.5.23	15.6.23	18.7.23	16.8.23	21.9.23
1	pН	-	7.83	7.56	7.41	7.82	7.63	7.52
2	Oil & Grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3	Total Dissolved Solids	mg/l	572	541	493	524	492	525
4	Total Suspended Solids	mg/l	33.5	28.2	32.5	27.2	32.3	27.6
5	Bio Chemical Oxygen Demand for 3 day 27°C	mg/l	16	13	15	12	15	17
6	Fecal Coliform (FC) MPN/100ml	MPN/10 0ml	340	415	460	388	432	520

Annexure-I Ambient Air Quality Levels

	-			AA	Q1 - Pa	avalasa	village		-		-		
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> 2	NO <sub>2</sub>	со	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	03.04.2023	52.6	83.4	11.8	18.3	296	8.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	04.04.2023	50.7	80.8	14.6	19.6	255	10.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	13.04.2023	48.2	74.3	13.1	20.4	281	10.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	14.04.2023	44.8	71.1	12.5	18.2	321	9.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	17.04.2023	52.7	86.7	14.0	16.3	199	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	18.04.2023	50.4	81.1	13.3	20.5	265	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	27.04.2023	47.4	76.2	13.0	18.6	277	12.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	28.04.2023	52.8	76.8	12.0	17.3	260	9.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	02.05.2023	45.2	79.3	13.6	16.2	277	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	03.05.2023	49.3	/5.6	11.6	14.4	241	8.6	<20	<1.0	<1.0	<1.0	<0.01	<0.01
11	11.05.2023	53.1	83.5	14.9	16.3	268	9.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	12.05.2023	4/.2	/4.2	11.4	15.5	307	/./	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
13	15.05.2023	45.1	79.4	13.1	16.1	186	9.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
14	16.05.2023	46.1	82.1	12.2	17.8	251	6.2	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
15	25.05.2023	20.3	72.1	10.0	10.0	204	7.4	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
10	20.05.2023	40.Z	79.9	10.9	14.0	240	7.3	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
1/	29.05.2023	JI.0 46.2	02.0	12.0	17.1	201	0.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	08 06 2023	40.5	70.0	11.5	12.2	227	0.Z 5.7	<20	<1.0	<1.0	<1.0		< 0.01
20	00.00.2023	42.9	73.2	10.3	12.6	233	77	<20	<1.0	<1.0	<1.0	<0.01	<0.01
20	12.06.2023	45.1	77.2	13.6	1/ 2	210	8.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
21	13.06.2023	51.8	80.8	12.0	13.1	243	6.8	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
22	22.06.2023	42.7	75.8	11.8	15.7	161	8.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	23.06.2023	45.8	79.7	10.9	16.6	226	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	26.06.2023	48.5	68.3	12.6	14.9	239	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	27.06.2023	46.4	73.2	11.0	13.8	172	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
27	03.07.2023	47.2	72.6	11.3	14.1	264	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
28	04.07.2023	44.3	69.8	13.1	15.6	178	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	14.07.2023	49.7	72.7	12.9	13.9	284	7.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	15.07.2023	48.6	75.3	12.6	15.7	277	9.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
31	27.07.2023	41.3	71.2	13.8	14.6	204	6.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	28.07.2023	42.4	70.3	10.3	13.3	192	6.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
33	01.08.2023	43.6	68.8	10.5	13.7	247	5.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
34	02.08.2023	40.5	67.5	12.4	14.8	161	4.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
35	11.08.2023	43.2	70.4	11.6	12.6	254	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
36	12.08.2023	45.3	72.8	11.9	14.1	261	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	14.08.2023	42.2	68.9	13.3	12.4	187	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
38	16.08.2023	40.6	71.3	9.6	13.5	175	5.2	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
39	24.08.2023	47.2	66.2	12.8	14.1	168	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	25.08.2023	42.8	70.8	9.4	13.1	211	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	28.08.2023	43.1	69.4	11.1	14.4	223	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	29.08.2023	41.8	/1.6	10.9	12.7	236	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	07.09.2023	34.4	55.8	9.3	11.5	205	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	08.09.2023	30.6	53.5	10.6	12.7	225	6.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	12.09.2023	3/.3	51.1	10.7	12.2	103	4.2	<20	<1.0	<1.0	<1.0	<0.01	<0.01
40	12.09.2023	32.4	54.0 65.4	12.1	14.3	204	4.9	<20	<1.0	<1.0	<1.0	<0.01	<0.01
4/	22.09.2023	44.0	60 /	12.1	14.2	220	75	<20	<1.0	<1.0	<1.0		
40	25.09.2023	36 5	57 /	10.4	12.1	210	5.1	~20	<1.0	<1.0	<1.0		
50	26.09.2023	31.3	59.7	11 3	11 7	173	45	<20	<10	<1.0	<1.0	<0.01	<0.01
Minir	num value	30.6	51.1	9.3	11.7	161	4.2	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maxi	mum value	53.1	86.7	14.9	20.5	321	12.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Aver	age value	45.0	72.3	12.0	14.9	234	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
98th	Percentile	52.8	83.6	14.6	20.4	307	10.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01

				AAQ	2 - Appil	konda vil	lage						
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> 2	NO <sub>2</sub>	со	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	06.04.2023	50.1	71.8	12.1	17.2	257	9.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	07.04.2023	45.3	69.0	9.8	19.9	246	9.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	10.04.2023	49.3	70.4	12.2	16.9	251	11.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	11.04.2023	51.6	80.1	10.3	15.5	278	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	20.04.2023	53.7	75.2	11.3	18.4	266	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	21.04.2023	48.2	69.4	11.5	19.1	295	6.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	24.04.2023	41.3	72.4	11.7	17.8	280	11.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	25.04.2023	52.2	78.9	10.3	15.4	268	7.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	04.05.2023	46.9	67.2	10.8	15.1	231	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	05.05.2023	48.6	/2.6	11.3	13./	258	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	08.05.2023	52.6	65.4	12.2	14.8	234	10.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
12	19.05.2023	47.3	70.0	12.5	10.4	2/5	8.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
13	18.05.2023	50.5	70.8	10.0	14.Z	249	0./	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
14	19.05.2023	51.5 45.6	73.0	10.4	10.5	257	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	22.03.2023	43.0	09.0	10.4	14.0	203	9.0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
17	01.06.2023		63.5	11.0	14.0	260	83	<20	<1.0	< 1.0	<1.0		
18	02.06.2023	45.5	67.8	10.4	12.7	237	7.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
19	05.06.2023	48.2	63.5	94	12.7	198	9.4	< 20	<1.0	<1.0	<1.0	< 0.01	< 0.01
20	06.06.2023	50.8	70.9	10.8	14.3	207	77	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	15.06.2023	44.2	74.3	10.2	12.5	265	9.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
22	16.06.2023	49.4	70.7	9.7	14.7	205	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	19.06.2023	43.8	66.2	11.4	13.9	231	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	20.06.2023	46.6	71.3	10.7	15.5	252	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	29.06.2023	49.8	69.4	11.3	15.3	226	5.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	30.06.2023	42.6	71.8	12.1	13.5	202	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
27	06.07.2023	46.8	66.2	12.8	14.3	226	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
28	07.07.2023	48.9	64.4	11.9	13.1	219	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	11.07.2023	46.3	71.4	10.2	14.0	251	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	12.07.2023	47.3	67.5	11.2	13.4	234	6.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
31	20.07.2023	44.7	65.4	12.1	13.6	247	8.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	21.07.2023	43.6	66.7	12.4	13.9	191	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
33	04.08.2023	44.2	63.6	11.9	12.5	185	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
34	05.08.2023	47.5	61.8	11.2	13.7	201	6.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
35	07.08.2023	43.5	68.7	9.5	13.2	233	5./	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	08.08.2023	45.9	64.9	10.5	12.1	216	<b>6.1</b>	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
3/	10.08.2023	43.3	64.1	9.8	13.2	105	7.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	21 08 2023	40.2	63.4	12.1	11.9	105	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	21.00.2023	42.7	65.6	11.7	12.0	222	6.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
41	01 09 2023	41.2	59.6	12.3	13.5	207	6.2	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
42	02 09 2023	39.8	58.6	10.4	13.1	188	55	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	04.09.2023	40.7	57.8	8.9	12.6	194	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	05.09.2023	37.8	61.7	9.7	11.7	211	6.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	14.09.2023	42.8	64.7	10.9	12.1	205	6.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
46	15.09.2023	45.2	60.9	11.3	13.3	221	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
47	19.09.2023	44.8	65.2	11.7	14.3	166	6.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
48	20.09.2023	38.8	58.1	10.6	11.5	154	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
49	28.09.2023	40.1	62.3	9.4	11.6	206	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
50	29.09.2023	43.1	60.1	10.2	12.3	215	6.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Minin	num value	37.8	57.8	8.9	11.5	154	4.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maxii	mum value	53.7	80.1	12.8	19.9	295	11.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Aver	age value	46.2	67.5	11.0	14.2	229	7.4	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
98th	Percentile	52.6	78.9	12.5	19.1	280	11.2	<20	<1.0	<1.0	<1.0	<0.01	<0.01

	-		-	A	AQ3 - D	evada vi	llage		-	-	-		
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> ₂	NO <sub>2</sub>	со	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	06.04.2023	47.9	77.2	10.6	16.0	261	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	07.04.2023	51.2	65.1	9.5	13.3	240	8.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	10.04.2023	47.3	63.3	11.8	16.6	270	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	11.04.2023	38.8	65.7	9.8	15.8	248	8.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	20.04.2023	52.2	76.3	11.8	17.1	261	8.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	21.04.2023	50.3	70.5	8.7	15.0	264	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	24.04.2023	42.6	74.2	11.5	16.1	273	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	25.04.2023	52.7	64.9	12.1	15.3	254	8.1	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
9	04.05.2023	50.3	69.4	9.3	13.9	244	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	05.05.2023	43.5	67.3	11.0	10.7	252	7.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	08.05.2023	39.2	75.1	10.5	14.5	253	6.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	09.05.2023	42.1	69.3	11.3	13.2	260	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
13	18.05.2023	49.0	72.5	9.6	13.5	245	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
14	19.05.2023	48.8	75.5	10.2	14.1	236	8.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	22.05.2023	39.4	66.3	9.8	12.8	256	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
16	23.05.2023	47.5	70.4	11.1	14.3	266	9.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
1/	01.06.2023	45.2	/1.5	11.4	14.2	216	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
18	02.06.2023	40.8	68.6	10.1	13.2	224	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
19	05.06.2023	42.6	63.4	9.6	12.6	246	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
20	06.06.2023	38.6	/0.9	10.9	14.1	232	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	15.06.2023	45.2	67.4	11.5	13.8	254	5.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
22	16.06.2023	47.6	64.3	9.5	12.4	211	7.6	<20	<1.0	<1.0	<1.0	<0.01	<0.01
23	19.06.2023	48.3	/2.4	10.4	13.6	228	4.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
24	20.06.2023	43.8	67.5	9.8	12.7	241	7.9	<20	<1.0	<1.0	<1.0	<0.01	<0.01
25	29.06.2023	46.4	68.3	10.8	15.4	226	5.1	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
20	30.06.2023	45.9	66.2	11.4	14.0	231	0.0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
27	00.07.2023	40.1 20.6	64.9	10.2	13.2	105	0.0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
20	11 07 2023	J0.0 4E 0	62.2	9.0	12.4	216	7.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	12 07 2023	45.0	60.8	10.3	12.6	210	5.4	<20	<1.0	<1.0	<1.0		< 0.01
31	20.07.2023	42.6	63.6	12.1	12.0	230	5.7	<20	<1.0	<1.0	<1.0	<0.01	<0.01
32	20.07.2023	42.0	61.3	10.6	12.0	101	6.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
32	04 08 2023	43.3	62.8	11 1	12.5	205	5.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
34	05.08.2023	37.5	63.5	9.2	13.1	170	6.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
35	07.08.2023	45.2	60.4	10.5	12.8	196	49	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
36	08 08 2023	43.3	58.6	9.7	11.8	221	55	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	18.08.2023	41.5	61.8	11.4	12.4	213	7.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
38	19.08.2023	43.0	59.5	10.1	13.3	172	4.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
39	21.08.2023	39.7	60.7	9.9	12.2	168	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	22.08.2023	41.4	62.1	11.7	13.0	211	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	01.09.2023	41.2	60.2	10.4	13.2	181	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	02.09.2023	35.4	59.1	8.5	11.5	154	5.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	04.09.2023	37.3	57.8	11.2	13.7	145	4.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	05.09.2023	41.2	55.4	9.1	11.1	138	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	14.09.2023	43.2	60.8	10.7	13.0	213	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
46	15.09.2023	40.9	62.3	10.9	12.6	208	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
47	19.09.2023	42.5	61.5	9.6	11.8	186	5.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
48	20.09.2023	38.7	51.2	8.8	10.9	161	3.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
49	28.09.2023	40.1	57.7	9.3	11.6	201	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
50	29.09.2023	38.3	60.8	10.5	12.7	188	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Minir	num value	35.4	51.2	8.5	10.7	138	3.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maxi	mum value	52.7	77.2	12.1	17.1	273	9.2	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Aver	age value	43.6	65.1	10.4	13.4	220	6.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
98th	Percentile	52.2	76.3	12.1	16.6	270	8.7	<20	<1.0	<1.0	<1.0	<0.01	<0.01

				AAQ	-4 Chee	purupall	e village	e					
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> <sub>2</sub>	NO <sub>2</sub>	со	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	06.04.2023	49.0	68.2	13.4	18.3	283	9.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	07.04.2023	51.5	78.3	14.9	21.2	299	11.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	10.04.2023	49.2	70.4	9.3	18.1	321	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	11.04.2023	54.9	72.8	12.0	19.4	305	10.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	20.04.2023	48.2	83.5	11.3	14.5	290	9.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	21.04.2023	54.6	66.3	12.0	18.9	262	12.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	24.04.2023	51.0	73.2	11.5	16.1	233	10.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	25.04.2023	52.2	84.4	10.4	17.2	301	8.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	04.05.2023	45.8	65.4	12.1	16.2	266	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	05.05.2023	49.5	61.4	13.2	18.6	303	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	08.05.2023	47.6	67.6	10.6	15.3	304	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	09.05.2023	52.6	59.7	13.5	16.8	298	8.1	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
13	18.05.2023	51.7	77.4	10.0	13.4	273	7.7	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
14	19.05.2023	53.7	69.9	13.5	16.3	305	9.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	22.05.2023	52.4	82.2	10.8	12.4	216	8.9	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
16	23.05.2023	47.4	67.5	11.9	14.6	294	9.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
17	01.06.2023	50.8	56.5	10.8	14.4	248	6.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
18	02.06.2023	45.2	62.3	12.5	16.5	276	7.7	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
19	05.06.2023	42.1	68.6	10.7	13.2	236	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
20	06.06.2023	48.7	74.3	12.8	17.2	292	9.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	15.06.2023	45.7	79.3	11.4	14.2	254	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
22	16.06.2023	50.8	65.4	11.2	13.3	283	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	19.06.2023	48.3	58.5	12.1	15.3	202	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	20.06.2023	51.5	72.3	10.5	14.4	272	8.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	29.06.2023	45.8	63.1	10.2	14.0	208	4.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	30.06.2023	45.2	74.3	9.8	13.8	218	6.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
27	06.07.2023	47.9	58.3	11.3	13.5	230	5./	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
28	07.07.2023	43.4	59.4	11.9	15.6	257	/.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	11.07.2023	48.6	64.3	10.1	16.4	217	8./	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	12.07.2023	45.2	/5.4	12.3	14.7	275	6.6	<20	<1.0	<1.0	<1.0	<0.01	<0.01
31	20.07.2023	44.3	66.8	10.8	13.3	246	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	21.07.2023	40.5	51.1	10.1	12.4	204	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
33	04.08.2023	45.8	54.0	10.6	14.0	101	0.3 E.C	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	03.08.2023	41.0	50.0	0.2	14.0	101	0.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
26	07.08.2023	47.0	65.7	9.5	1/ 1	199	6.0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
30	18 08 2023	45.7	64.2	10.0	17.5	230	5.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	10.00.2023	41.0	73.5	0.0	11.5	220	73	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
30	21.08.2023	43.5	69.8	11.0	14.4	240	7.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01
40	22.08.2023	46.5	70.6	10.7	13.2	154	6.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	01 09 2023	42.6	70.0	12.3	14.5	231	5.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	02.09.2023	32.5	50.6	9.8	12.1	165	49	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	04.09.2023	34.8	45.8	10.1	12.1	183	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	05.09.2023	36.4	52.3	9.3	11.6	176	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	14.09.2023	44.7	63.5	10.2	13.6	212	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
46	15.09.2023	43.4	70.4	11.5	14.3	230	7.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
47	19.09.2023	40.3	64.4	10.3	13.8	224	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
48	20.09.2023	35.4	59.3	8.8	11.1	143	5.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
49	28.09.2023	46.2	60.1	12.1	14.5	210	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
50	29.09.2023	42.7	68.7	11.6	15.2	226	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Mini	mum value	32.5	45.8	8.8	11.1	143	4.4	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maxii	num value	54.9	84.4	14.9	21.2	321	12.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Aver	age value	46.3	66.6	11.2	14.8	244	7.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01
98th	Percentile	54.6	83.5	13.5	19.4	305	11.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01

				Α/	Q-5 Das	saripeta	village						
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> 2	NO <sub>2</sub>	со	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	03.04.2023	51.3	76.1	11.5	16.7	261	5.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	04.04.2023	46.9	65.8	13.5	15.6	283	9.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	13.04.2023	47.2	75.8	11.3	15.2	285	8.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	14.04.2023	47.2	76.5	14.0	17.7	224	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	17.04.2023	50.7	81.3	10.0	15.6	267	6.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	18.04.2023	51.3	77.2	10.8	14.0	248	6.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	27.04.2023	49.2	75.2	11.5	17.0	266	7.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	28.04.2023	50.6	66.9	10.4	16.7	259	8.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	02.05.2023	49.6	72.0	13.3	14.1	248	6.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	03.05.2023	49.3	68.9	12.4	12.9	269	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	11.05.2023	44.1	/1./	10.5	12.6	251	6.9	<20	<1.0	<1.0	<1.0	<0.01	<0.01
12	12.05.2023	49.6	79.6	12.9	12.0	210	5.6	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
13	16.05.2023	48.0	//.2	11.8	11.2	254	8.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
14	25 05 2023	50.Z	80.3	9./	11.3	234	4.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	25.05.2023	40.1	71.1	0.2	12.2	200	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
17	20.03.2023	40.0	67.2	9.5	16.2	243	0.0 E 0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
10	29.03.2023	4J.Z	7/3	12.5	14.0	201	7.6	<20	<1.0	<1.0	<1.0		< 0.01
10	08.06.2023	45.2	67.3	10.7	13.3	235	5.7	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
20	00.00.2023	48.1	71 5	13.1	1/ 7	2/5	6.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
20	12.06.2023	45.3	64.3	10.3	13.2	273	73	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
21	13.06.2023	43.4	74 5	13.8	14.4	235	49	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	22.06.2023	49.8	77 3	12.1	13.3	197	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	23.06.2023	47.1	69.6	10.7	14 1	210	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	26.06.2023	45.2	76.4	11.9	13.3	229	53	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	27.06.2023	49.8	72.6	10.1	12.7	194	8.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
27	03.07.2023	44.3	65.3	11.8	12.4	221	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
28	04.07.2023	46.5	68.6	12.4	13.5	230	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	14.07.2023	47.8	74.6	9.4	14.3	212	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	15.07.2023	42.3	71.6	13.3	15.2	220	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
31	27.07.2023	44.7	67.9	11.4	12.8	182	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	28.07.2023	45.5	66.7	9.6	13.3	195	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
33	01.08.2023	40.2	62.8	10.6	13.3	207	6.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
34	02.08.2023	44.7	66.3	11.4	12.6	216	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
35	11.08.2023	43.3	70.2	8.5	13.4	198	6.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
36	12.08.2023	40.5	69.3	12.4	14.2	245	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	14.08.2023	39.7	65.6	10.5	13.0	168	5.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
38	16.08.2023	43.7	64.4	8.7	12.4	181	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
39	24.08.2023	36.2	67.8	9.3	12.5	165	5.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	25.08.2023	42.4	63.8	12.6	11.1	176	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	28.08.2023	38.6	69.2	9.9	13.2	224	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	29.08.2023	45.3	67.1	11.7	12.8	155	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	07.09.2023	38.4	56.2	9.2	12.6	193	4.7	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
44	08.09.2023	35.7	59.6	8.4	11.9	1/4	5.1	<20	<1.0	<1.0	<1.0	<0.01	<0.01
45	12.00.2022	33.0	5/.5	9./	11.1	10/	4.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
40	12.09.2023	30./	60.7	9.4	127	001 221	<u> </u>	<20	<1.0	<1.0	<1.0	<0.01	<0.01
47	22.03.2023	42.7	66 1	11 7	1/ 5	201	6.8	<20	<1.0	<1.0	<1.0	<0.01	
40	25.09.2023	3/ /	58.2	Q /	11 0	176	1.0	~20	<1.0	<1.0	<1.0	<0.01	
50	25.05.2023	36.6	60.6	5.4 11 5	14.2	161	5.6	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Minir	num value	33.6	56.2	8.4	11 1	155	4.3	<20	<1.0	<10	<1.0	<0.01	<0.01
Mayi	mum value	51.3	81.3	14.0	17.7	285	9.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Aver	age value	44.8	69.4	11.1	13.7	221	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
98th	Percentile	51.3	80.3	13.8	17.0	283	8.3	<20	<1.0	<1.0	<1.0	< 0.01	<0.01

				Α	AQ-6 Isl	ampeta v	/illage						
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> <sub>2</sub>	NO <sub>2</sub>	СО	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	03.04.2023	45.1	71.0	10.9	15.0	244	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	04.04.2023	48.2	64.3	9.6	12.7	211	10.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	13.04.2023	38.9	70.9	12.1	15.3	237	9.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	14.04.2023	45.4	66.2	11.8	13.2	256	7.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	17.04.2023	50.2	78.7	10.1	12.8	242	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	18.04.2023	46.2	80.4	11.9	14.0	250	7.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	27.04.2023	40.3	67.3	11.4	15.5	227	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	28.04.2023	48.2	75.3	9.6	12.7	222	6.1	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
9	02.05.2023	42.0	66.9	11.3	12.4	226	6.1	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
10	03.05.2023	45.2	67.4	8.5	10.0	197	8.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	11.05.2023	43.2	65.8	11.8	14.3	224	7.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	12.05.2023	47.8	69.3	10.4	10.5	242	5.4	<20	<1.0	<1.0	<1.0	< 0.01	<0.01
13	15.05.2023	49.2	74.6	9.6	13.3	229	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
14	16.05.2023	39.5	75.2	10.8	14.1	236	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	25.05.2023	45.8	63.2	9.4	12.9	214	9.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
16	26.05.2023	47.1	78.4	8.5	11.7	208	4.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
17	29.05.2023	46.2	65.3	11.5	13.6	227	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
18	30.05.2023	49.0	54.7	10.7	13.1	237	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
19	08.06.2023	37.8	72.5	9.8	13.1	207	4.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
20	09.06.2023	40.8	65.2	11.1	12.7	219	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	12.06.2023	42.4	62.3	10.9	13.3	221	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
22	13.06.2023	39.0	74.6	10.3	14.2	234	4.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	22.06.2023	45.3	65.7	11.5	14.0	210	8.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	23.06.2023	43.2	70.9	10.1	13.9	217	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	26.06.2023	44.2	54.6	10.5	12.4	195	3.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	27.06.2023	47.4	65.8	9.7	13.0	189	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2/	03.07.2023	41.4	68.4	10.4	12.2	221	5./	<20	<1.0	<1.0	<1.0	<0.01	<0.01
28	04.07.2023	38.7	61.1	9.8	13.6	197	/.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	14.07.2023	43.8	66.6	11.6	13.8	224	5.3	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
30	15.07.2023	37.3	69.4	10.5	12.7	217	7.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
31	27.07.2023	43.2	51.6	10.7	13.1	193	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	28.07.2023	41.0	70.2	9.0	12.4	200	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	01.06.2023	26.0	03.7 E0 E	0.1	12.0	205	0.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	11 09 2022	40.2	50.5	9.1	11.7	212	3.5	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
36	12.08.2023	40.5	66.8	0.7	12.1	212	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	1/ 08 2023	37.1	57.8	10.0	12.1	177	6.0	<20	<1.0	<1.0	<1.0	<0.01	<0.01
39	16.08.2023	30.8	67.6	11.2	14.0	19/	0.0	<20	<1.0	<1.0	<1.0	<0.01	<0.01
30	24.08.2023	35.7	56.4	9.6	11 5	203	6.7	<20	<1.0	<1.0	<1.0	<0.01	<0.01
40	25.08.2023	40.7	65.4	10.4	13.3	188	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	28.08.2023	36.2	64.3	93	12.6	202	71	< 20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	29.08.2023	39.1	61.2	95	11.6	212	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	07 09 2023	32.4	57.8	10.3	11.5	189	51	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	08.09.2023	34.1	55.1	8.3	12.1	165	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	11.09.2023	33.8	56.4	9.9	11.2	135	4.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
46	12.09.2023	30.4	60.2	10.5	11.9	185	5.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
47	22.09.2023	36.1	65.7	11.7	12.6	203	6.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
48	23.09.2023	38.5	63.4	10.8	13.2	194	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
49	25.09.2023	32.9	59.7	8.8	10.8	187	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
50	26.09.2023	30.7	56.7	9.2	12.2	172	4.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Minir	num value	30.4	54.6	8.3	10.0	135	3.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maxi	num value	50.2	80.4	12.1	15.5	256	10.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Aver	age value	41.0	65.7	10.3	12.9	209	6.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
98th	Percentile	49.2	78.7	11.9	15.3	250	9.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01

AAQ-7 Pittavanipalem village													
Sr.No	Monitoring Date	PM2.5	PM10	<b>SO</b> ₂	NO2	СО	<b>O</b> 3	NH₃	Pb	As	Ni	Вар	C6H6
1	06.04.2023	51.3	78.2	9.7	13.2	251	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	07.04.2023	46.2	80.4	8.9	15.8	230	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	10.04.2023	52.6	77.9	10.6	13.5	247	8.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	11.04.2023	48.3	73.8	9.5	12.5	258	9.8	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
5	20.04.2023	43.4	82.3	10.8	12.7	241	4.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	21.04.2023	50.9	79.4	11.8	15.2	260	9.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	24.04.2023	52.5	81.7	10.9	13.7	249	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	25.04.2023	54.9	77.3	11.4	16.4	236	8.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	04.05.2023	47.2	68.4	7.4	10.5	234	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	05.05.2023	52.5	/6.5	9.2	11./	231	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	08.05.2023	49.6	83.2	10.6	12.8	219	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	09.05.2023	53.9	/3.5	11.5	14.7	208	8.6	<20	<1.0	<1.0	<1.0	<0.01	<0.01
13	18.05.2023	50.2	80.7	7.8	11./	224	5.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01
14	19.05.2023	53./	//.9	10.3	13.2	233	8.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
15	22.05.2023	52.4	02.5	7.9	12.0	220	4.0	<20	<1.0	<1.0	<1.0	<0.01	<0.01
10	23.05.2023	50.8	77.0	10.9	13.0	237	6.8	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
19	02.06.2023	47.5	62.5	10.7	12.2	200	0.0	<20	<1.0	<1.0	<1.0	<0.01	<0.01
10	02.00.2023	51 3	78.6	11.2	12.5	103	5.7	<20	<1.0	<1.0	<1.0	<0.01	<0.01
20	06.06.2023	11.3	80.7	9.7	15.0	226	9.7	<20	<1.0	<1.0	<1.0	<0.01	<0.01
20	15.06.2023	48.3	76.1	117	13.0	198	4.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	16.06.2023	51.8	68.3	10.9	13.9	207	77	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	19.06.2023	45.2	77.9	85	14.6	197	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	20.06.2023	50.8	75.4	9.6	12.9	211	8.9	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
25	29.06.2023	45.3	66.4	11.4	14.2	208	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	30.06.2023	51.2	73.2	10.3	13.5	195	5.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
27	06.07.2023	46.2	69.8	9.4	13.6	191	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
28	07.07.2023	50.3	60.3	11.2	14.4	207	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	11.07.2023	49.7	75.9	10.5	12.7	180	5.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
30	12.07.2023	43.6	77.1	10.6	14.1	211	8.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
31	20.07.2023	49.2	73.4	12.4	13.6	179	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
32	21.07.2023	45.5	64.7	10.3	14.1	191	7.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
33	04.08.2023	42.6	65.4	11.3	13.2	174	6.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
34	05.08.2023	48.4	57.9	10.5	13.7	190	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
35	07.08.2023	45.2	73.5	12.1	14.1	163	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
36	08.08.2023	41.7	71.3	9.9	13.2	224	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	18.08.2023	45.8	69.2	11.7	12.7	162	4.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
38	19.08.2023	43.6	62.3	10.7	13.0	174	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
39	21.08.2023	39.4	67.8	12.0	14.0	186	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	22.08.2023	44.5	70.3	11.3	12.1	206	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	01.09.2023	44.7	68.2	10.7	14.2	201	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	02.09.2023	38.7	55.5	9.7	11./	134	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	04.09.2023	36.5	61.6	11.5	12.3	149	4.4	<20	<1.0	<1.0	<1.0	<0.01	<0.01
44	14.00.2022	39.8	59.3	12.2	12.0	100	5.9	<20	<1.0	<1.0	<1.0	<0.01	<0.01
45	15.00.2022	43.9	00.J	11.0	12 1	192	0.0	<20	<1.0	<1.0	<1.0	<0.01	<0.01
40	10 00 2022	42.7	65 /	11 /	1/ /	180	7.5	<20	<1.0	<1.0	<1.0		
48	20.09.2023	37.2	55.6	0 Q	11 5	157	4.8	<20	<1.0	<1.0	<1.0	<0.01	
49	28.09.2023	43.4	67.2	10.3	13.8	211	6.7	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
50	29 09 2023	41 9	70.4	11 7	12.6	184	7.0	<20	<10	<10	<10	<0.01	< 0.01
Minir	num value	36.5	55.5	7.4	10.5	134	4.4	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
Maxi	mum value	55.8	83.2	12.4	16.4	260	10.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Average value		47.1	71.8	10.6	13.4	205	6.8	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
98th Percentile		54.9	82.5	12.3	15.8	258	9.8	<20	<1.0	<1.0	<1.0	<0.01	<0.01

AAQ-8 Kalapaka village													
Sr.No	Monitoring Date	PM2.5	PM10	SO <sub>2</sub>	NO2	со	<b>O</b> 3	NH <sub>3</sub>	Pb	As	Ni	Вар	С6Н6
1	03.04.2023	45.2	68.3	12.9	16.0	214	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
2	04.04.2023	48.4	74.3	11.6	15.3	235	8.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
3	13.04.2023	39.3	66.5	10.5	16.0	228	9.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
4	14.04.2023	49.4	65.9	12.3	14.3	254	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
5	17.04.2023	46.4	79.4	9.8	15.2	243	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
6	18.04.2023	49.0	80.3	11.7	13.3	251	7.4	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
7	27.04.2023	47.2	66.7	11.6	15.8	249	7.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
8	28.04.2023	51.5	76.4	10.2	14.8	227	6.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
9	02.05.2023	40.8	73.9	10.7	13.4	197	5.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
10	03.05.2023	47.5	65.4	9.7	12.6	221	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
11	11.05.2023	40.1	62.4	12.3	14.8	215	8.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
12	12.05.2023	38.5	74.7	11.2	13.6	240	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
13	15.05.2023	43.3	75.3	10.5	14.0	234	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
14	16.05.2023	48.7	70.1	12.4	14.7	211	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
15	25.05.2023	44.1	77.6	10.9	13.6	236	6.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
16	26.05.2023	46.4	73.2	9.1	12.1	213	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
17	29.05.2023	47.2	75.9	12.5	15.1	229	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
18	30.05.2023	50.8	68.4	11.6	12.9	241	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
19	08.06.2023	39.7	59.6	9.7	12.5	221	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
20	09.06.2023	43.8	56.2	10.1	14.3	203	6.0	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21	12.06.2023	37.2	73.2	11.7	13.5	197	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
22	13.06.2023	43.4	68.4	10.6	12.3	229	6.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
23	22.06.2023	44.9	65.3	11.9	14.6	216	7.6	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
24	23.06.2023	47.5	/5.2	11.8	13.0	231	4.8	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
25	26.06.2023	36.4	/0.8	10.3	13.3	218	5./	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
26	27.06.2023	43.2	67.3	11.2	14.2	184	6.4	<20	<1.0	<1.0	<1.0	<0.01	<0.01
27	03.07.2023	43.2	53.6	10.4	13.6	225	6.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
28	14.07.2023	46.5	59.2	11.2	12.6	215	7.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
29	14.07.2023	40.6	04.3	10.9	14.2	204	0.3 E 7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
21		42.1	61 5	9.0	12.0	200	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
22	27.07.2023	45.0	69.7	10.0	12.0	193	4.0	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
32		4J.J 27.Q	55.7	0.1	12.2	207	5.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
34	01.00.2023	11.6	57.0	9.5	14 5	107	5.5	<20	<1.0	<1.0	<1.0	<0.01	< 0.01
35	11 08 2023	20.2	62.1	11.7	13.0	186	7.2	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
36	12.08.2023	40.7	69.5	89	12.0	190	5.2	< 20	<1.0	<1.0	<1.0	< 0.01	< 0.01
37	14 08 2023	42.2	59.3	10.5	12.4	177	43	< 20	<1.0	<1.0	<1.0	< 0.01	< 0.01
38	16 08 2023	43.9	66.5	9.2	14.0	166	8.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
39	24.08.2023	41.5	63.5	10.6	12.8	174	5.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
40	25.08.2023	39.8	56.3	11.5	13.1	201	6.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
41	28.08.2023	36.5	58.6	10.1	13.6	214	4.7	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
42	07.09.2023	32.6	49.3	8,6	11.7	154	4.9	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
43	08.09.2023	36.3	51.8	10.2	12.6	177	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
44	11.09.2023	37.4	53.4	9.1	12.3	168	6.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
45	12.09.2023	38.9	55.6	8.3	13.1	173	5.1	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
46	22.09.2023	41.5	66.8	11.6	13.8	215	8.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
47	23.09.2023	43.6	63.2	12.1	14.2	188	7.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
48	25.09.2023	35.5	56.3	9.5	11.6	156	5.3	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
49	26.09.2023	33.1	51.7	8.9	12.1	163	6.5	<20	<1.0	<1.0	<1.0	< 0.01	< 0.01
Minimum value		32.6	49.3	8.3	11.6	154	4.3	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Maximum value		51.5	80.3	12.9	16.0	254	9.4	<20	<1.0	<1.0	<1.0	<0.01	<0.01
Average value		42.6	65.5	10.7	13.6	208	6.4	<20	<1.0	<1.0	<1.0	<0.01	<0.01
98th Percentile		50.8	79.4	12.5	16.0	251	8.5	<20	<1.0	<1.0	<1.0	<0.01	<0.01



#### ANNEXURE-II WATER BALANCE DIAGRAM

