

# HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT

Period: October 01, 2024 to March 31, 2025

For



**HALDIA PETROCHEMICALS LIMITED**  
**HALDIA: PURBA MEDINIPUR: WEST BENGAL**



**Monitoring Agency**



Certificate No. :TC-7649



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Accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) in Accordance with the Standard ISO/IEC 17025:2017, Certificate Number TC-7649, Validity 22.03.2023 to 21.03.2025.

Recognised by CPCB, Govt. of India under the Environmental (Protection) Act-1986 up to 16.12.2027 vides F. No. LB/99/7/2021-INST-LAB-HO-CPCB-HO/Pvt./1873 Dated-19th December 2024

Recognised by West Bengal Pollution Control Board (Department of Environment, Govt. of West Bengal) Memo No. 1554-5/WPB-S/99 (Part-VII), Dated-26.06.2024, Validity: 30.06.2025.



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## PREFACE

**Haldia Petrochemicals Limited**, one of the largest petrochemical complexes in India and the only one of its kind in eastern region. The complex produces ethylene, propylene and associated liquid stream products for downstream processing into polymers and chemicals.


The scope of the study includes detailed characterisation of the environment in and around HPL complex covering an area of 10-km radius from the center of the HPL plant for Air, Noise, Effluent etc. Scientific Research Laboratory established an Environmental Laboratory in HPL Plant premises for this purpose. All sampling and testing were performed by following well-established and recognized standard procedures.

Scientific Research Laboratory wishes to place on record its deep appreciation for the trust reposed in Scientific Research Laboratory by Haldia Petrochemicals Limited for carrying out this study. Our heartiest thanks go to Mr. Sanjaya Bhatnagar, EVP & Head Plant and Mr. Praveen Jain, Head HSEF for their kind cooperation & help provided during the course of study.

We also appreciate tireless efforts of Mr. Subandhu Bhattacharya, Sr. Manager – Environment Services & Mr. Saugata Mahindar, DGM -Environment Services without whom it would not have been possible to bring out the final report.

**Note: All tests and analysis mentioned in this report has been performed and reported at Scientific Research Laboratory (Kolkata), an NABL Accredited, WBPCB recognized, ISO 9001:2015 (QMS), ISO 14001:2015 (EMS) and ISO 45001:2018 (OH&SMS) certified Environmental Analytical Laboratory.**

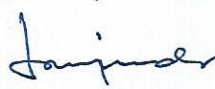
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CHAPTER NO. - 01

# INTRODUCTION

## HALDIA PETROCHEMICALS LIMITED – SATELLITE IMAGE





## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025



### 1.0 INTRODUCTION

#### 1.1 General

Haldia Petrochemicals limited (HPL), Haldia, West Bengal is an integrated Petrochemicals production unit and only petrochemical complex in West Bengal. HPL mainly comprises of Naphtha Cracker Unit (NCU), Pyrolysis Gasoline Hydrogenation unit (PGHU), Py-gas Desulfurisation (PGDS), Butene-1, Benzene Extraction Unit (BEU), Butadiene Extraction Unit (BDEU). The down stream units comprise of Linear Low Density Poly Ethylene (LLDPE), High Density Poly Ethylene (HDPE) and Poly Propylene (PP).

HPL is located at about 58 nautical miles by waterways and 130 Km by roadways from Calcutta and lies in the Haldia Industrial area. Haldia is in Purba Medinipur district, West Bengal between at latitudes  $21^{\circ} 56' 10''$  (N) and longitude  $88^{\circ} 5' 47''$  (E). The site lies adjacent to the road linking SH 4 and NH 41. Nearest railway, station is Durgachak on the Panskura – Haldia branch line of SE railway.

A comprehensive Environmental Impact Assessment Studies for the Haldia Petrochemicals Complex was carried out in 1991. Due to the rapid urbanisation and industrialisation, the environmental scenario of this area has changed in many respects. HPL started commercial production from the month of August 2001. HPL has entrusted Scientific Research Laboratory, Kolkata, the job of Environmental Data Generation in respect of air, water, noise and solid waste after commissioning of their petrochemical complex at Haldia.

#### 1.2 Study Area

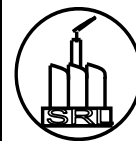
Keeping in view the nature and size of the complex, the various guidelines available, past experience and the original EIA report, it was decided to cover an area of 10 km. radius for the purpose of ambient air monitoring from the center of the plant. Study area covers 196 villages. Field data collection are restricted within the 10 km. radius of the plant center.

#### 1.3 Objective of The Study

The purpose of the present study is to assess the effect of industrial activity on the environment at Haldia. The availability of resources in this area is the result of the interaction between the physical occurrence and the amount of requirement and economic means of their exploitation. Haldia is one of the most industrialized zones in the Bank of Hoogly River. Ambient air quality with respect to  $PM_{2.5}$ ,  $PM_{10}$ ,  $SO_2$ ,  $NO_x$ , CO, Benzene, B(a)P, As, Ni, Pb,  $NH_3$  &  $O_3$  has been monitored to evaluate the environmental conditions in and around the complex.



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The Environmental Data Generation work has been undertaken by Laboratory of **Scientific Research Laboratory, Kolkata** for the following:

- Evaluation of present environmental status through comprehensive analysis of various environmental parameters.
- Predict the probable impact on the various environmental factors due to the HPL operation.
- Analysis of the predicted impact vis-à-vis the regulatory environmental standards.
- Assessments of efficacy in process and pollution control systems.

#### **1.4 Contents of the Report**

Environmental monitoring for generation of data on meteorology, ambient air and effluent were carried out for the months of **October 2024 to March 2025**. This report contains the data of meteorology during the ambient air monitoring, analysis report of ambient air quality, work zone monitoring results, stack monitoring data, ambient Noise monitoring report, LDAR and effluent analysis report with respect to MoEF & CC and WBPCB parameter specified for Petrochemical industries and HPL respectively.

#### **1.5 Location of the Site**

Haldia Petrochemicals complex is in the industrial area of Haldia, which is developed by Haldia Development Authority. Haldia is situated at latitudes  $21^{\circ} 56' 10''$  (N) and longitude  $88^{\circ} 5' 47''$  (E) on the confluence of Hoogly and Haldi river in Purba Medinipur district, West Bengal. It is about 58 nautical miles by waterways and 130 km. by roadways from Calcutta. The area is well connected with roads, waterways and railways.

The site is flat and plain, typical of the Ganges's of the delta region. Up to the late 1960s, what is now Haldia was a very rural area. There was small set up of the Calcutta port from sand Heads and back. This was called the "Anchorage Camp" and was near the mouth of the Haldi River. With adequate favorable infrastructure such as roads, railways, waterways, port and power, Haldia has now become a major industrial township in west Bengal, after Durgapur – Asansol region. Haldia planning area is governed by Haldia Notified Area and is bounded by Hooghly, Haldi and Hijli river tidal canal. The total area of Haldia Notified Area is about 326.85 sq. km.

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**1.6 Major details of industries, which are contributing to pollution load in Haldia, its distance and location with respect to HPL Complex, are as follows:**

Sl. No.	Name of the Industry	Distance from HPL complex	Direction with respect to HPL
1	Adani Wilmer Ltd.	1.0 km	North- West
2	Dhunseri Petrochem & Tea Ltd.	1.0 km	North-East
3	DPM Net Pvt. Ltd.	1.5Km	North
4	Exide Industries Ltd.	2.6 km	East
5	Emani Biotech Ltd.	2.0 km	East
6	Ennore Coke Private Ltd.	4.0 km	East ,North-East
7	Electrosteel Casting Ltd.	0.8 Km	North
8	Gokul Refoils & Solvent Ltd.	2.0 km	North- West
9	Greenways Shipping Agencies Pvt. Ltd.	3.5 km	North- West
10	Hindustan Unilever Ltd.	3.5 km	East
11	Hooghly Met Coke & Power Company	1.7 Km	South
12	Indian Oil Corporation Ltd., Haldia Refinery	3.6 km	South
13	IOC Petronas Ltd.	0.6 km	North
14	KoPT/Haldia Dock Complex	4.5 km	South
15	Lalbaba Seamless Tubes Pvt. Ltd.	1.5 km	North- West
16	MCC PTA India Corp. Private Limited	4.0 km	East ,North-East
17	M/S West Bengal Waste Management Ltd.	2.5 Km	North-East
18	Manaksia Ltd.	4.2km	East ,North-East
19	Marcus Oils Chemical Pvt. Ltd.	0.5 km	North
20	Ruchi Soya Industries Limited	0.5 km	South
21	Reliance Petroleum Ltd.	1.0 km	North
22	R.D.B. Rasayans Ltd.	0.5 km	East
23	SWAL Corporation Ltd.	2.5 km	East
24	Shamon Ispat Ltd.	2.3 km	North- West
25	Shree Renuka Sugars Ltd.	1.5 Km	South- West
26	Sanjana Cryogenic Storages Ltd.	3.5 km	East
27	Tata Chemicals Ltd.	3.0 km	East
28	URAL India Ltd.	2.5 Km	West





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## Industrial map





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### **1.7 Site Environmental Monitoring**

Site Environmental monitoring was carried out for six months (**October 2024 to March 2025**) through out the year comprising of two seasons as per MOEF & CC guidelines such as Sumer & Monsoon season in respect of

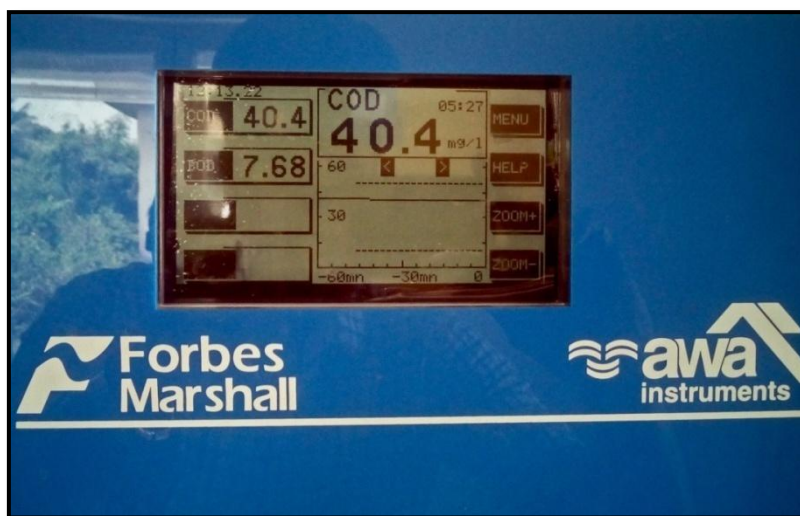
- Effluent Quality
- Stack Emission
- Meteorology
- Ambient Air Quality
- Work Zone Air Quality
- Ambient Noise Quality
- Leak Detection And Repair (LDAR) Program

CHAPTER NO. – 02

# EFFLUENT QUALITY

## Online Treated Effluent Monitoring System

### Online BOD & COD analyser



### Online TSS analyser







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## **2.0 EFFLUENT QUALITY**

HPL generates liquid waste water from Naphtha Cracker Unit, Butadiene Extraction Unit, Pyrolysis Gasoline Hydrogenation Unit, Benzene Extraction Unit, HDPE, LLDPE, PP, Cooling Tower, DM Water Plant, utilities and off site buildings. The waste-water generated requires suitable treatment before disposal and a comprehensive waste water management system comprising of collection, treatment, and disposal facilities are provided.

The treatment facilities are divided into two distinct sections, namely, pre- treatment section inside battery limits (ISBL) of the respective units and final treatments in Waste Water Treatment Plant (WWTP)

### **ISBL Treatment is provided for the following streams**

- Spent caustic stream from Naphtha Cracker Units (NCU)
- Neutralization / free oil removal in NCU.
- Polyethylene Plants/Polypropylene Plant ISBL units for removal of Polymers and oil.
- Neutralization for Demineralisation of water plant

### **WWTP has been broadly designed for following treatment systems**

- Oil Recovery System
- Contaminated Rain Water Treatment System
- Sanitary Sewer Treatment System
- Biological Treatment System
- Slop Oil Collection System
- Sludge Handling System
- Final Discharge System

## **2.1 PRETREATMENT FACILITIES**

### **Spent Caustic from Cracker Unit**

Spent caustic stream emerging from cracker unit are highly alkaline and contains high oxygen demand. In the spent caustic treatment plant,  $\text{Na}_2\text{S}$  is converted to sodium thiosulphate by oxidation process. After this treatment the stream is sent to WWTP.

### **Polyethylene Plants/ Poly Propylene Plant**

Wash water and effluent streams from process contain trace hydrocarbon and polymers, which are collected in ISBL and then sent to WWTP after oil skimming and removal.

## **2.2 DETAILS OF WASTEWATER TREATMENT PLANT**

The treatment facilities are designed for treating process water for reduction of free and emulsified oil, sulphide, phenol, thiosulphate, total suspended solids (TSS), bio-chemical oxygen demand (BOD), chemical oxygen demand (COD) and the contaminated rain water for removal of oil and suspended solids. The treated effluents from WWTP are meeting the discharge standards stipulated by West Bengal Pollution Control Board.

The wastewater treatment plant consists of Physical, Chemical and Biological treatment facilities for removal of oil, suspended solids and biodegradable organic.

### **Treatment Scheme of WWTP**

**The physical and chemical treatment scheme consists of the following units:**

- Bar Screen and Grit Chamber
- Tilted Plate Interceptor (TPI)
- Equalization Tank
- pH Adjustment Tank
- Flash Mixing Tank
- Flocculation Tank
- Dissolved Air Flotation System

**The biological treatment scheme consists of following units:**

- Aeration tank
- Secondary Clarifier

**The slop oil handling facility consists of the following units:**

- Oil Skimmer
- Slop Oil Tank
- Wet slop oil sump

**The sludge, handling facility consists of the following units:**

- Chemical & Oily Sludge Sump
- Bio-Sludge Sump
- Thickener
- Thickened Sludge Sump
- Centrifuge



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**The treatment scheme for treating contaminated rainwater during wet weather flow consists the following units:**

- Wet Weather Flow (WWF) Receiving sump
- Screen Chamber
- Grit Chamber
- Surge Pond
- Contaminated Rain Water (CRW) Transfer Sump
- TPI

**WWTP has been broadly designed for following treatment systems:**

**Oil Removal / Recovery system**

Pretreated effluent streams from various units are routed to TPI Separators for removal of free oil and suspended solids. The free oil removed from the TPI Separators, is being collected in the wet slop oil sump. The oily sludge from the bottom of TPI separators is routed to the chemical and oily sludge sump. Then the effluent from TPI units is routed (by gravity) to the equalization tank for equalization of flow and modulation of characteristics. Floating oil skimmer is provided to remove the free-oil layer formed in equalization tank. This free oil is being routed to the wet slop oil sump.

HDPE process effluent is directly received to the equalization tank for equalization of flow and its characteristics. An additional facility has been provided at the inlet of equalization tank for pH neutralization. When the equalization tank effluents will be pumped to the pH Adjustment tank where the pH of the effluent is maintained in-between 7.0 to 8.0 by dosing  $H_2SO_4$  or Caustic solution. After achieving the desired level of the pH, the effluent is routed to Flash Mixing Tank where alum solution is added as a coagulant. It requires hydrogen peroxide solution dosing which ensures the low load of sulphides in effluent. The effluent is then routed to Flocculation Tank where addition of de-oiling Polyelectrolyte helps in breaking the oil – water emulsion and formation of alum flocks.

The effluent from flocculation tank is routed to the dissolved air floatation (DAF) tank. Oil skimmer skims off the oily scum generated in the floating tank top. Sludge settled at the bottom of the tank will be removed on periodically. The oily scum and the bottom sludge are routed to the chemical and oily sludge sump and a provision is also made to route the oily scum to wet slop through wet slop oil sump. Finally, DAF effluent is routed to the aeration tank for biological treatment.



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### **Contaminated Rain Water Treatment System**

During wet weather, the contaminated rainwater streams of HPL complex will be received in the surge pond. Floating oil skimmer is provided to remove the free oil layer formed in the surge pond and routed to the wet slop oil sump. Provision is made to send the wastewater from the surge pond to TPI separator as and when required.

Effluent in surge pond is received after passing through Bar Screen & Grit Chamber. The effluent can be routed to equalization tank for processing after passing through TPI-02. If effluent quality is fit for disposal, it can be routed to guard pond via TPI-02.

### **Sanitary Sewer Treatment System**

A dedicated underground sanitary sewer network is provided for entire HPL complex including the captive power plant of HPL Co-generation Ltd. and Nitrogen Plant of M/s Praxair India Pvt. Ltd. Sanitary effluent after collection in various suitable pits, is pumped to Bar screening chambers and then the grit chamber for physical removal of scum and suspended solids. Finally, sewer effluent is pumped to Aeration tank of WWTP for Biological Treatment along with other process effluents.

### **Biological Treatment System**

An integrated biological treatment system has been adopted by HPL for reducing the biodegradable organic content of the effluents. The effluent from the DAF tank is routed to aeration tank operating in extended aeration mode for removal of biodegradable organic matter, resulting in reduction of BOD & COD. Aeration conditions are maintained in the tank by entrainment of the atmospheric air with the help of surface aerators.

The nutrients i.e. urea solution & DAP solution are dosed at the inlet of aeration tank to provide nitrogen, phosphorus for micro organisms. The overflow from the aeration tank will contain a high concentration of microorganisms. A secondary clarifier helps in separating the microorganism from the liquid streams from the bottom sludge and the over flow is the treated effluent. Then aeration tank effluent is routed under gravity to the clarifier. The clarifier is provided with a sludge scraper, which moves slowly to scrap the bio-solids, which settle at the bottom. The collected sludge is routed to the bio-sludge sump (activated sludge sump).





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Bio – sludge sump flow is divided into two streams, one is routed to aeration tank and the other going to a sludge thickener. The excess sludge is sent to the thickened sludge sump and the balance stream is recycled back to the aeration tank to maintain the range. The overflow from the clarifier is the treated effluent, which is routed to the guard pond. Two Guard ponds (effluent holding capacity of approx. 8,180 m<sup>3</sup>) are provided to take care of all types of functional eventualities of the Waste Water Treatment Plant (WWTP). If the effluent does not meet the norms, it can be routed to equalization tank via surge pond for re-processing.

Co-generation power plant, cooling tower, nitrogen plant and DM water plant effluent are being collected in Cooling Tower Blow Down (CTBD) and DM waste pond. CTBD and DM waste pond overflow which is totally free of any organics or oil is routed to treated effluent sump along with treated effluent from guard pond for final disposal through a channel.

Effluent from LLDPE, PP, BDEU and PGHU units are received in receiving sump tank from where overflow of the tank is routed to bar screen, grit chamber, surge pond, respectively. Finally, effluent goes to TPI separator for further treatment and there is provision for pumping the effluent directly to the guard pond if effluent quality remains up to the desired level.

### **Slop Oil Collection System**

The slop oil is collected in wet slop oil tank from various units e.g. TPI separators (I and II), equalization tank, floatation tank and surge ponds. Then slop oil is pumped to slop oil tank. The dry slop oil retained in the tank after decantation of water will be disposed as low grade fuel to external agencies. The decanted water from slop oil tank bottom will be routed to receiving sump by gravity.

### **Sludge Handling System**

The oily sludge from the TPI separator and DAF tank are collected in chemical and oily sludge sump from, where it is routed to sludge thickener. The under flow of the sludge thickener is routed to the thickened sludge sump from where it is pumped to the centrifuge. Dewatering Polyelectrolyte is being dosed in centrifuge to achieved better sludge consistency. Periodically sludge will be collected from centrifuge and is shifted to secure on site storage pit. Latter on the accumulated bio-sludge will be incinerated in incinerator.

## **2.3 TREATED EFFLUENT QUALITY CHECK**

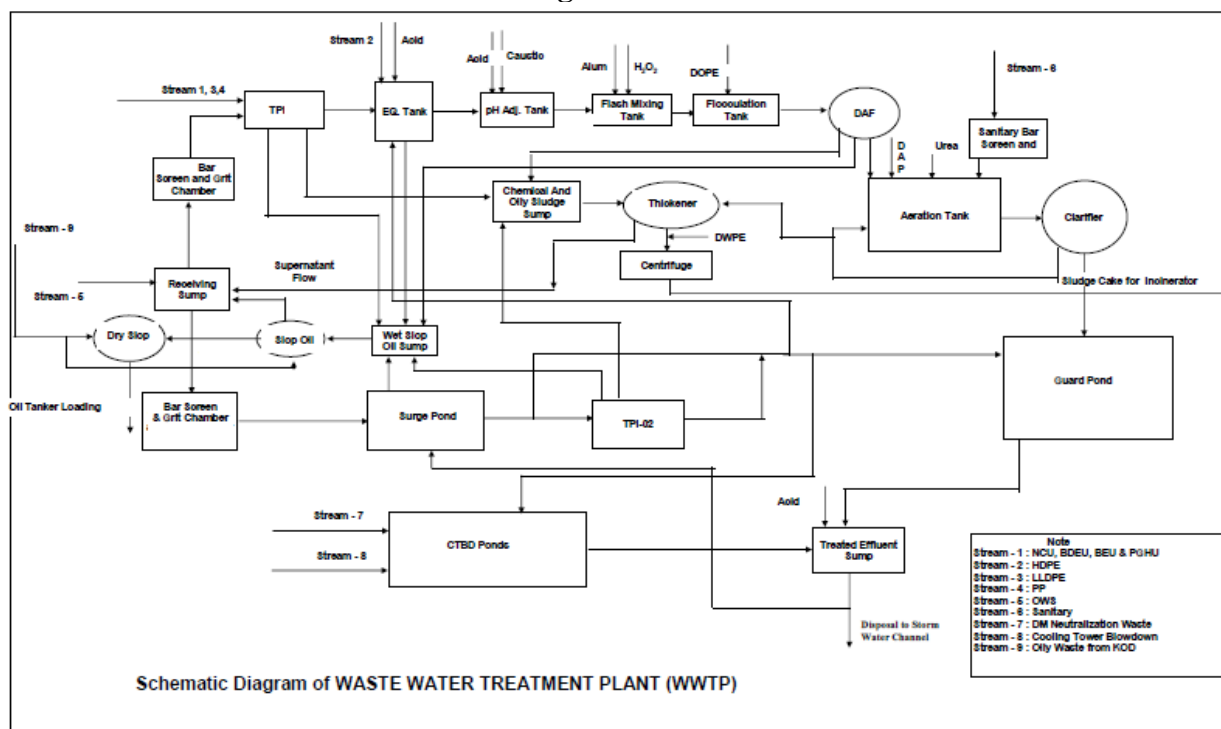
**SCIENTIFIC RESEARCH LABORATORY** has established an Environmental Laboratory inside HPL in WWTP Laboratory as a third independent party to check the quality of effluent daily as per specifications of effluent standards.

**ON-LINE EFFLUENT MONITORING SYSTEM** - The On-line effluent monitoring system was installed & successfully commissioned by M/s. Forbes Marshal in Treated Effluent Discharge line for monitoring of flow, pH, TSS, BOD & COD as per the guideline of CPCB. The online data is sent to CPCB/WBPCB server.

## 2.4 FINAL DISCHARGE SYSTEM

The treated effluent from WWTP will be discharged into the river Hooghly through Green Belt Canal and the treated effluent maximum extent possible will be utilized for irrigation of green belt developments. The final out fall effluents confirm that there is immense dilution i.e. nearly 20,000 times adjacent to the green belt Canal and more than 25,000 times at the confluence of river Haldi. Since Hooghly and Haldi rivers are tidal in nature, the buffering capacity of the green belt canal will be ensured to hold the treated effluent discharged (via green belt canal) during the high tide period. The final effluent is meeting the WBPCB (MINAS) standards.

**Flow diagram of WWTP**



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## 2.5 METHODS OF MEASUREMENT

Sl. No.	Parameters	Specification / Standard (method) or technique used	Range of Testing	Methodology
1.	pH	Standard method (APHA)	0.1-14	pH is determined electrometrically using pH meter provided with pH electrode.
2.	TSS	Filtration Standard Method ( APHA)	Min. 0.4 – 1000.0 mg/l	Measured Gravimetrically by filtering through GF/C filter paper.
3.	BOD	BOD Incubator method (APHA)	-	The dissolved oxygen content of the sample with or without dilution is measured before and after incubation at 27°C for 3 days.
4.	COD	Dichromate Reflux Method	-	Sample is refluxed in acid solution with known excess of potassium dichromate. After digestion, the remaining $K_2Cr_2O_7$ is titrated with ferrous ammonium sulphate to determine the amount of $K_2Cr_2O_7$ consumed and the oxidizable organic matter is calculated in terms of oxygen equivalent.
5.	Oil & Grease	Non-dispersive Infrared Analysis Method	0.0-200.0 mg/l	Extracted into Carbon tetrachloride after acidification of the sample and Measured Gravimetrically
6.	Phenol	Chloroform Extraction Method (APHA)	0.001- 0.25mg/l	Steam distilled sample react with 4 – aminoantipyrine in presence of potassium ferricyanide at pH 7.9 and form a coloured antipyrine dye. The dye is extracted from aqueous solution with $CHCl_3$ and the absorbance is measured at 460 nm using a UV –VIS spectrophotometer.
7.	Sulphide	Iodometric Method (APHA)	0.1-10.0 mg/l	Iodometric titration with Sodium thiosulphate solution using starch as an indicator.

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Sl. No.	Parameters	Specifiction / Standard (method) or technique used	Range of Testing	Methodology
8.	Fluoride	SPADNS Method (APHA)	0.0-1.4 mg/l	Sample mixed with Zirconyl - SPADNS solution and the concentration was measured by the UV-VIS recording spectrophotometer
9.	Cyanide	Colorimetric Method (APHA)	0.02-0.2 mg/l	The alkaline distilled of cyanide is measured by pyridine – barbituric acid reagent using an UV –VIS spectrophotometer
10.	Chromium (cr <sup>+6</sup> )	Colorimetric Method (APHA)	0.01-1.0 mg/l	Determined colorimetrically by reaction with di-phenyl carbazide in acidic solution using spectrophotometer
11.	Total Chromium	Colorimetric Method (APHA)	0.01-1.0 mg/l	Sample is oxidized with potassium permanganate and determined colorimetrically by reaction with di-phenyl carbazide in acidic solution spectrophotometer.
12.	Total Iron	Phenanthroline Method (APHA)	0.05-10.0 mg/l	Iron is reduced to ferrous state by Hydroxyl amine hydrochloride and treated with 1,10-phenanthroline at pH 3.2 to 3.3 and measured spectrophotometrically
13.	Total Zinc	Atomic Absorption Spectrophotometric Method (APHA)	0.005-2.0 mg/l	Zinc is determined by atomic absorption spectrophotometer using air-acetylene flame
14.	Total Copper	Atomic Absorption Spectrophotometric Method (APHA)	0.01-10.0 mg/l	Copper is determined by atomic absorption spectrophotometer using air-acetylene flame
15.	Phosphate (as P)	Stannous Chloride Method (APHA)	0.003-1.0 mg/l	Ammonium molybdate reacts with water sample to form Molybdophosphoric acid and reduced by stannous chloride to intensely coloured molybdenum blue and measured spectrophotometrically.



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## 2.6 WATER CONSUMPTION AND EFFLUENT DISCHARGE

Sl. No.	Water Consumption	Average Data of October 2024 to March 2025 (KL/Day)	Conditions as per WBPCB's CTOs (700 KTA Ethylene + Coal Fired Boiler + AdPer Ma (butene – 1 Plant) (KL/Day)
1	Industrial cooling + Boiler feed water + Fire water makeup	38146	49203
2	Domestic purpose	1444	1510
3	Processing where by water gets polluted and the pollutants are easily biodegradable	1790	2000
4	*Total Discharge of Effluent (a+b)	4739	8619.4
	a. Treated Effluent from Guard Pond & Surge Pond	3211	
	b. Effluent from CTBD & DM Regeneration Pond (as diluents)	1528	

\*Total effluent after expansion will be 8625 KL/Day (as per the condition of Environment Clearance dated 20.03.2018)

## 2.7 EFFLUENT QUALITY

**Half Yearly Average Data of WWTP Outlet**  
**Period of Monitoring: October 2024 to March 2025**

Sl. No.	Parameter	Unit	Standards	WWTP Outlet
1.	pH	--	6.5-8.5	7.55
2.	TSS	mg/l	100	17.19
3.	BOD	mg/l	30	9.06
4.	COD	mg/l	250	45.06
5.	Oil & Grease	mg/l	10	<5.0
6.	Phenol	mg/l	1	<0.002
7.	Sulphide	mg/l	2	0.51
8.	Cyanide	mg/l	0.2	<0.02
9.	Fluoride	mg/l	5	0.75
10.	Total Chromium	mg/l	2	<0.05
11.	Chromium (Cr <sup>+6</sup> )	mg/l	0.1	<0.01
12.	Iron as Fe	mg/l	1.0	0.37
13.	Zinc as Zn	mg/l	1.0	0.084
14.	Copper as Cu	mg/l	1.0	<0.05
15.	Phosphate as P	mg/l	5.0	0.39
16.	FRC	mg/l	0.5	<0.1
17.	Temperature	<sup>0</sup> C	Not>10 <sup>0</sup> C higher than intake	28.08

**Note: All values are in mg/l except pH.**

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**Monthly Average Data of WWTP Outlet**

Sl.No.	Parameter	WWTP Outlet					
		Oct'24	Nov'24	Dec'24	Jan'25	Feb'25	Mar'25
1.	pH	7.69	7.59	7.55	7.58	7.40	7.49
2.	TSS	17.25	16.50	16.60	17.80	18.00	17.00
3.	BOD	11.50	9.00	9.40	8.20	9.25	7.00
4.	COD	56.50	44.33	46.80	42.40	45.75	34.60
5.	Oil & Grease	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6.	Phenol	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
7.	Sulfide	<0.5	<0.5	<0.5	0.51	<0.5	0.65
8.	Cyanide	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9.	Fluoride	0.65	0.80	0.79	0.77	0.74	0.75
10.	Total Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
11.	Hexavalent Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
12.	Iron as Fe	<0.1	<0.1	0.40	0.59	0.26	0.24
13.	Zinc as Zn	0.132	0.127	0.119	0.085	0.048	0.034
14.	Copper as Cu	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
15.	Phosphate as P	0.76	0.67	0.41	0.22	0.44	0.14
16.	FRC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
17.	Temperature	31.00	31.50	25.00	24.50	27.00	29.50

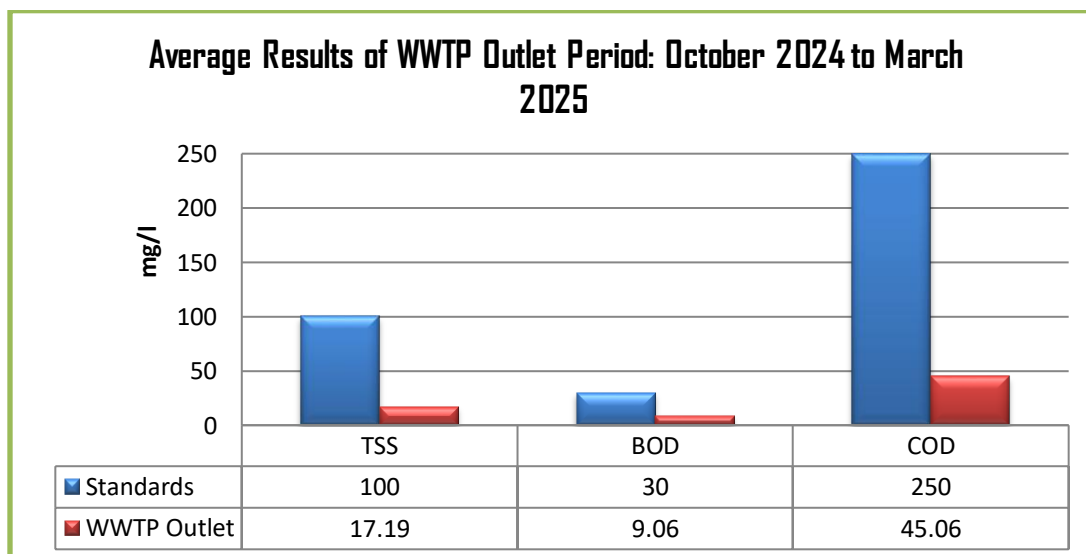
**Note: 1) All values are in mg/l except pH & Temperature.**

**2) Frequency of monitoring**

a) Sl. No. 1 – 11 : Weekly

a) Sl. No. 12 - 17 : Monthly

**Graphical Representation of Effluent**



CHAPTER NO. – 03

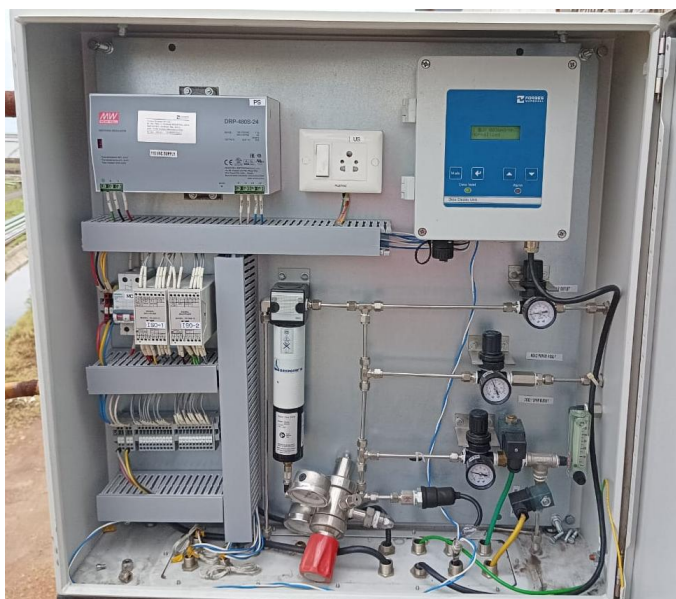
# GASEOUS EMISSION

(STACK MONITORING)

**Online Stack Monitoring System at CPP**  
**Online SO<sub>x</sub>, NO<sub>x</sub> & CO analyser**



**Online Stack Monitoring System at CFB**

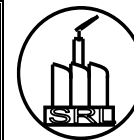


**Online PM analyser (CPP)**





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### **3.0 GASEOUS EMISSION**

<b>GENERAL INFORMATION ABOUT STACK</b>								
Sl. No.	Particulars	CFB	Auxiliary Boiler (2 Nos.)	GT & HRSG (2 Nos.)	PGHU	PGDS	*NCU (9 Nos.)	EDG
1	Stack height from ground level	140.00 mt.	54.3 mt.	45 mt.	33 mt.	30 mt.	40 mt.	17.2 mt.
2	Sampling port from ground level	81.50 mt.	36.5 mt.	30.5 mt.	24.95 mt.	19.70 mt.	--	16.4
3	Stack made by	Concrete	MS	MS	MS	MS	MS	MS
4	Diameter of the stack at sampling point	7.21 m	2.3 m	3.6 m	0.95 m	1.06 m	2.1 m	0.30 m
5	Shape of the stack	Circular	Circular	Circular	Circular	Circular	--	Circular
6	Area of the stack	40.81 m <sup>2</sup>	4.1527 m <sup>2</sup>	10.17 m <sup>2</sup>	0.7091 m <sup>2</sup>	0.883 m <sup>2</sup>	--	0.0707 m <sup>2</sup>
7	Whether stack is attached with permanent ladder & platform	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Type of Fuel	Coal	CBFS, RFG & Naphtha	Naphtha & RFG	RFG	RFG	RFG	HSD
9	Fuel consumption (Rated)	3 x 28.27 t/hr.	7.2 (Naphtha)	9.65(Naphtha)	---	1.44 KTA (0.16T/Hr.)	2F-201 – 1440 & 2F-202 to 2F-209 – 3202 T/Month	800 lt./hr.
10	Capacity (Rated)	3 x 120 TPH	120 TPH	GT-34.5 MW; HRSG-120 TPH SHP & 22 TPH MP	60 TPH	30 TPH	2F-201 – 13.50 & 2F-202 to 2F-209 – 32.00 T/Hrs.	1500 KVA
12	Whether stack is attached with emission control device	Bag Filter, ESP	No	No	No	No	No	NO

\*CPCB Emission Regulations Part-Three for stack is not applicable for NCU. The Licensor did not provide any provision for Iso-Kinetic sampling of flue gas for measurement of PM. However, gas sampling can be done for SO<sub>2</sub>, NO<sub>x</sub> & CO.

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### Emission Standards of Stacks

Unit	Standards	SO <sub>2</sub>	NO <sub>x</sub>	CO	Hg	PM
NCU	MoEF & CC notification 9 <sup>th</sup> November'2012	50	350	150		
PGHU	Standard as per WBPCB					10
PGDS			250	100		05
CPP Stacks	Standard as per WBPCB		100 ppm of 15% excess O <sub>2</sub>			50
CFB	Standard as per CPCB	100	100		0.03	30
EDG						150
All units are expressed as mg/Nm <sup>3</sup> Correction Factor: (a) 3 % O <sub>2</sub> for NCU, PGHU & PGDS, (b) 6% O <sub>2</sub> for CFB						

### Methodology of Stack Sampling & analysis

Sl. No.	Parameters	Specifiction / Standard (method) or technique used	Range of Testing	Methodology
1.	Particulate matter	Emission Regulations, Part – Three, COINDS/18/1984-85 (chapter 2 & 3)	1 mg/m <sup>3</sup> & above	Sampling using stack kit
2.	Nitrogen Oxides	EPA method-7	2-400 mg/m <sup>3</sup>	Absorption in hydrogen peroxide- sulphuric acid solution using EPA flask & spectrophotometric analysis
3.	Sulfur-di-oxide	Emission Regulations, Part – Three, COINDS/18/1984-85 (chapter 4)/EPA method-6	3.4mg-80,000 mg/m <sup>3</sup>	Absorption in hydrogen peroxide solution & titration using Ba-perchlorate
4.	Carbon Monoxide (CO)	IS: 5182 (Part 10): 1999 (First Revision)	0.05 – 200 ppm	Sampling of CO in gas sampling tubes & analysis by Non-dispersive Infrared Absorption Method.
5.	Mercury (Hg)	EPA Method – 29	0.1 µg	Analysis by VGA.



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**Monitoring Frequency**

**Major source of pollutants from various stacks and parameters monitored are as follows:**

Sl. No.	Unit	No. of Stack	Parameters	Frequency of Monitoring
1.	Naphtha Cracker Unit	09	SO <sub>2</sub> , NO <sub>x</sub> , CO	Once in a month
2.	Pyrolysis Gasoline Hydrogenation Unit	01	SO <sub>2</sub> , NO <sub>x</sub> , CO, PM	Once in a month
3.	Py-gas Desulfurisation Unit	01	SO <sub>2</sub> , NO <sub>x</sub> , CO, PM	Once in a month
4.	CFB	01	SO <sub>2</sub> , NO <sub>x</sub> , CO, PM	Once in a month
5.	CPP – Auxiliary Boiler & HRSG	04	SO <sub>2</sub> , NO <sub>x</sub> , CO, PM	Once in a month
6.	CPP – Emergency DG	01	SO <sub>2</sub> , NO <sub>x</sub> , CO, PM	Quarterly

**STACK MONITORING RESULTS**  
**(October 2024 to March 2025)**

**A.Naphtha Cracker Unit (NCU)**

**Half-Yearly Average Results**

Furnace Heater No.	Temp. (°c)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )
2F – 201	147	10.66	17.48
2F – 202	133	12.15	18.30
2F – 203	131	13.03	20.21
2F – 204	150	11.74	20.15
2F – 205	125	14.51	21.12
2F – 206	150	13.45	25.90
2F – 207	127	12.43	21.20
2F – 208	168	15.07	21.65
2F – 209	123	12.10	20.91

**HALDIA PETROCHEMICALS LIMITED**  
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**Stack Monitoring Results – Location Wise**

Sl.No.	Furnace Heater No.	Unit	Month of Monitoring	Temp. (°C)	Results	
					SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )
1	2F-201	NCU	October 24	148	8.90	22.26
2			November 24	149	10.53	16.91
3			December 24	141	10.10	13.73
4			January 25	146	10.24	12.89
5			February 25	149	10.82	21.78
6			March 25	148	9.35	17.31
1	2F-202		October 24	124	10.79	14.98
2			November 24	117	13.81	19.89
3			December 24	195	8.64	17.94
4			January 25	122	14.84	16.58
5			February 25	123	13.90	20.33
6			March 25	120	10.90	20.08
1	2F-203		October 24	116	9.21	21.20
2			November 24	139	14.54	14.84
3			December 24	117	14.53	20.94
4			January 25	150	14.75	17.39
5			February 25	146	17.54	26.57
6			March 25	120	7.58	20.33
1	2F-204		October 24	194	13.14	31.26
2			November 24	141	10.17	10.41
3			December 24	137	11.11	16.97
4			January 25	145	10.57	19.90
5			February 25	144	12.49	16.37
6			March 25	137	12.96	25.96
1	2F-205		October 24	126	14.35	21.29
2			November 24	126	16.03	24.19
3			December 24	120	14.66	15.99
4			January 25	125	14.24	19.33
5			February 25	127	15.76	22.81
6			March 25	127	12.02	23.08
1	2F-206		October 24	128	12.36	29.79
2			November 24	152	15.00	28.92
3			December 24	152	15.51	25.85
4			January 25	162	13.08	19.58
5			February 25	150	9.87	27.04
6			March 25	156	14.88	24.23

**All values are corrected with 3% Oxygen**

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Sl.No.	Furnace Heater No.	Unit	Date of Monitoring	Temp. (°C)	Results	
					SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )
1	2F-207	NCU	November 24	131	8.76	17.30
2			December 24	129	13.63	19.90
3			January 25	124	12.63	22.82
4			February 25	127	17.44	22.67
5			March 25	125	9.70	23.32
1	2F-208		November 24	158	13.92	20.56
2			December 24	169	12.53	20.89
3			January 25	172	15.71	16.01
4			February 25	170	17.97	26.50
5			March 25	173	15.23	24.29
1	2F-209		November 24	116	14.78	13.33
2			December 24	124	10.81	24.43
3			January 25	125	11.30	19.33
4			February 25	122	14.42	20.10
5			March 25	127	9.18	27.38

All values are corrected to 3% Oxygen

**B. Pyrolysis Gasoline Hydrogenation Unit ( PGHU - 4F-101 )**  
**(October 2024 to March 2025)**

**Half-Yearly Average Results**

Furnace Heater No.	Temp. (°C)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
<b>4F - 101</b>	289	25.08	55.85	4.32

**Month Wise Report**

Sl. No.	Furnace Heater No.	Unit	Date Of Monitoring	Temp. (°C)	Results		
					SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
1	4F-101	PGHU	October 24	289	22.45	64.25	4.93
2			November 24	282	22.19	58.30	2.58
3			December 24	290	18.37	44.49	4.04
4			January 25	291	21.36	58.04	4.15
5			February 25	292	27.88	50.97	5.04
6			March 25	289	38.20	59.05	5.18

All values are calculated to 3% O<sub>2</sub> dry basis

**HALDIA PETROCHEMICALS LIMITED**  
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**C. Pyrolysis Gasoline De Sulphurisation Unit ( PGDS - 4F-201 )**  
**(October 2024 to March 2025)**

**Half-Yearly Average Results**

Furnace Heater No.	Temp. (°C)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
<b>4F - 201</b>	320	29.55	56.04	4.28

**Month Wise Report**

Sl. No.	Furnace Heater No.	Unit	Date Of Monitoring	Temp. (°C)	Results		
					SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
1	4F - 201	PGDS	October 24	314	36.02	51.90	4.96
			November 24	315	30.35	64.28	4.81
2				320	20.82	54.12	4.88
			December 24	319	28.84	66.12	4.79
3				320	34.41	61.22	4.82
			January 25	330	30.25	41.45	3.08
4				325	36.73	41.68	3.90
			February 25	328	31.10	55.47	3.96
5				319	25.97	51.63	3.81
6			March 25	314	20.99	72.48	3.76

All values Calculated to 3% O<sub>2</sub> dry basis

**D. Captive Power Plant**  
**(October 2024 to March 2025)**

**Half-Yearly Average Results**

Furnace /Heater Name	Temp. (°C)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
Auxiliary Boiler # 01	146	17.40	26.85	6.49
Auxiliary Boiler # 02	148	12.92	28.99	5.50
GT & HRSG #2	195	16.62	33.73	6.90
Emergency DG	114	14.38	18.94	13.06

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**Month Wise Report**

Sl. No.	Furnace Heater No.	Date Of Monitoring	Temp. (°c)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
1	Auxiliary Boiler # 01	October 24	151	16.92	25.30	5.96
		November 24	149	11.81	22.62	4.11
		December 24	147	16.34	26.22	6.62
		January 25	146	17.96	26.75	6.95
		February 25	141	21.32	32.20	7.19
		March 25	143	20.07	28.02	8.11
2.	Auxiliary Boiler # 02	November 24	148	12.92	28.99	5.50
3.	GT & HRSG #2	October 24	192	13.61	55.40	6.09
		November 24	196	14.44	24.88	6.23
		December 24	192	12.05	25.51	6.44
		January 25	194	14.90	32.00	7.18
		February 25	199	26.30	29.32	7.97
		March 25	195	18.39	35.27	7.46
4.	Emergency DG	November 24	113	15.85	20.56	9.92
		February 25	115	12.90	17.31	16.19

**E. Coal Fired Boiler (CFB)**

**(October 2024 to March 2025)**

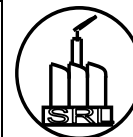
**Half-Yearly Average Results**

Temp. (°c)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )
145	35.54	54.78	17.20

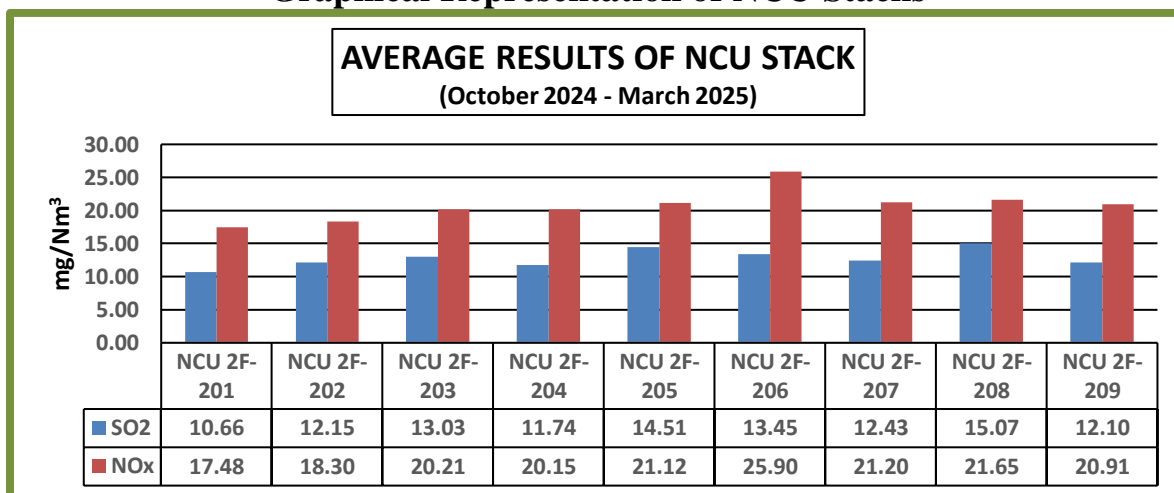
**Month Wise Report**

Sl. No.	Date Of Monitoring	Temp. (°c)	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	PM (mg/Nm <sup>3</sup> )	Hg (mg/Nm <sup>3</sup> )	
						Particulate	Gaseous
1	October 24	146	40.66	67.04	17.08		
2	November 24	145	49.49	75.62	16.23	0.0078	0.0157
3		142	41.15	36.57	21.99		
4	December 24	147	23.22	35.05	13.92		
5		149	27.26	45.21	12.97		
6	January 25	142	19.97	58.51	18.08		
7	February 25	142	42.98	65.68	16.40		
8	March 25	147	39.55	54.55	20.95	0.0177	0.0101

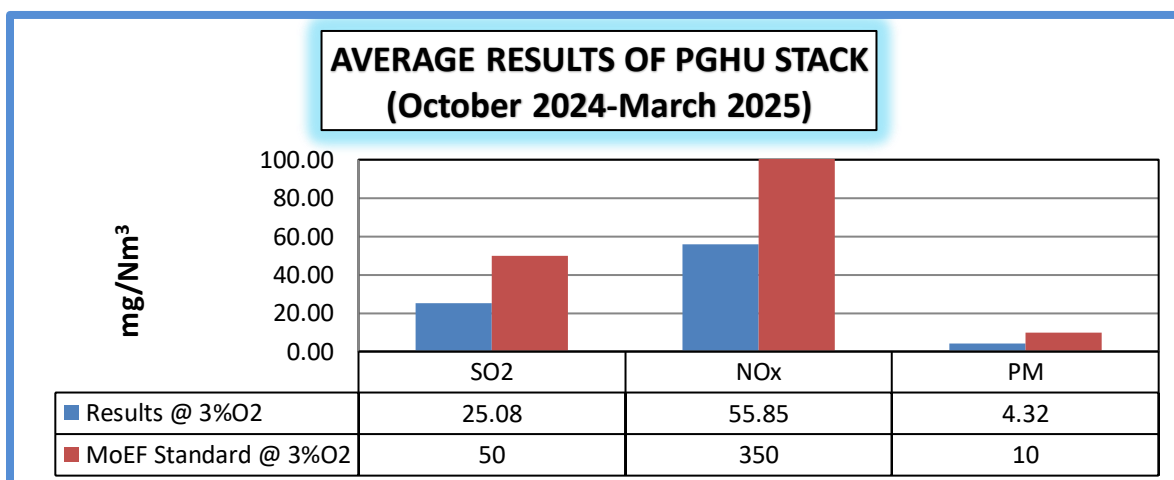
## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025



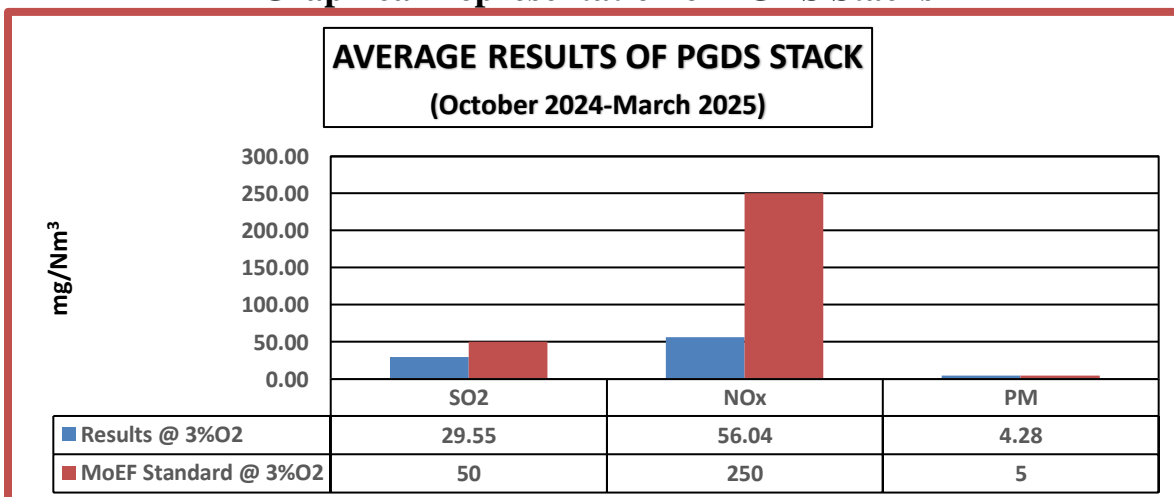
### Graphical Representation of NCU Stacks



### Graphical Representation of PGHU Stacks



### Graphical Representation of PGDS Stacks



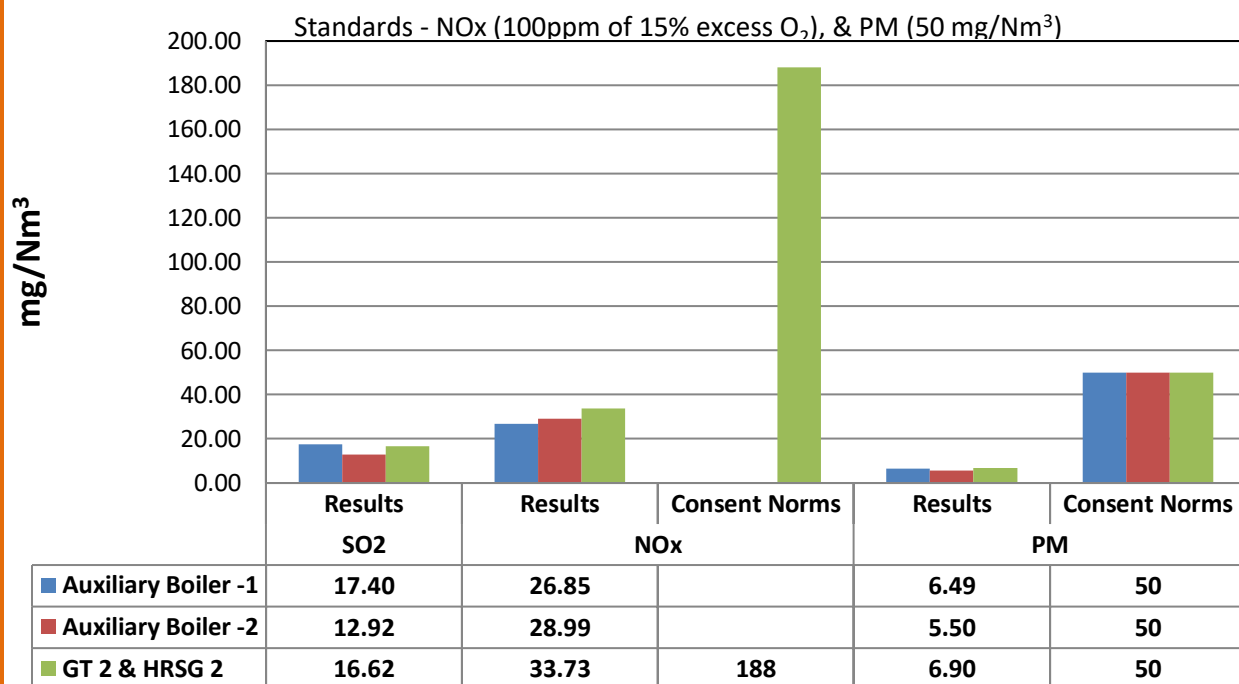


## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025

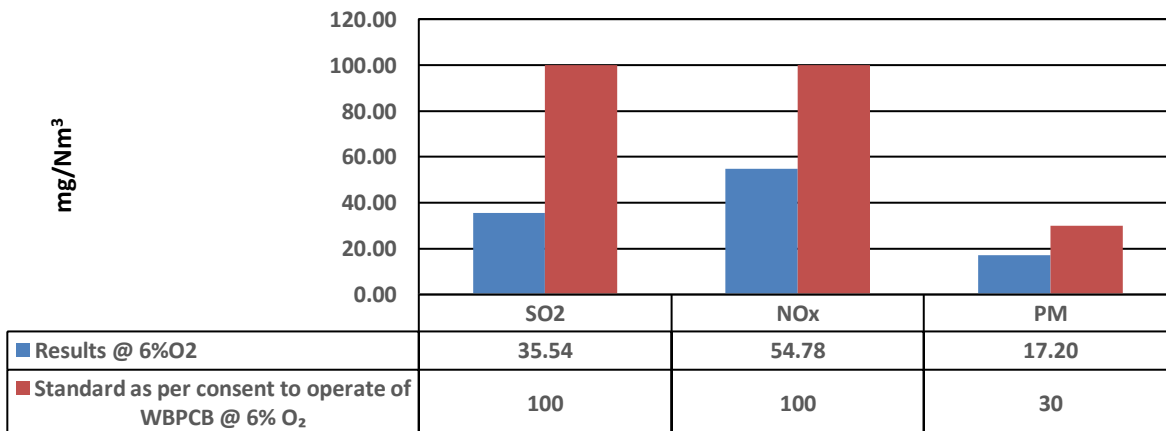


### Graphical Representation of Stacks

#### AVERAGE RESULTS OF CPP STACKS (October 2024- March 2025)



#### AVERAGE RESULTS OF CFB STACK (October 2024-March 2025)



CHAPTER NO. – 04

# METEOROLOGY

**HALDIA PETROCHEMICALS LIMITED**  
**HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT**  
**OCTOBER 2024 – MARCH 2025**



## 4. METEOROLOGY

**The following Meteorological parameters:**

- Temperature (Dry & Wet Bulb),
- Relative Humidity
- Wind Speed And Direction
- Atmospheric Pressure
- Cloud Cover (Visual Inspection)
- Rainfall

**Following instruments are used for conducting meteorological data recording:**

Temperature and relative humidity : Dry & Wet Bulb Thermometer And Sychrometric Chart  
 Wind direction and wind velocity : Wind - Vane And Cup Counter Anemometer  
 Rainfall : Rain Gauge  
 Atmospheric Pressure : Barometer

Wind direction was recorded in all the sixteen directions.

### A. Abstract of monitored meteorological data (Half-Yearly Max. & Min.):

**Location: WWTP (Roof of Environmental Laboratory), HPL Plant**

**Monitoring Period: October 2024 to March 2025**

**Monitoring Frequency: Twice in a week**

Wind Velocity (Km/hr)		Temperature (O <sup>0</sup> C)		RH (%)		Predominant Wind Direction		Rainfall (mm)	Calm (%)	
Max.	Min.	Max.	Min.	Max.	Min.	Day	Night		Day	Night
28.4	0.5	39.0	13.0	96.0	26.0	NNE	NNW	288.10	2.08	0.65

### B. Abstract of monitored meteorological data (Monthly Max. & Min.):

Month	Wind Velocity (Km/hr)		Temperature ( <sup>0</sup> C)		RH (%)		Predominant Wind Direction		Rainfall (mm)	Calm (%)	
	Max.	Min.	Max.	Min.	Max.	Min.	Day	Night	Monthly	Day	Night
October 2024	23.7	0.5	39.0	25.0	96.0	30.0	NNE	N	216.00	7.69	1.89
November 2024	16.4	0.7	31.0	18.5	95.0	57.0	WNW	NNW	2.80	2.17	14.85
December 2024	11.3	1.8	28.5	13.0	91.0	31.0	NNE	NNW	25.20	0.0	0.0
January 2025	14.2	1.8	27.0	15.0	89.0	33.0	NNE	NNW	Nil	0.0	0.0
February 2025	16.5	1.7	32.0	19.0	86.0	26.0	NNE	NE, SSE	22.80	0.0	0.0
March 2025	28.4	1.6	38.0	23.0	88.0	30.0	NNE	ESE	21.30	0.73	0.0

**HALDIA PETROCHEMICALS LIMITED**  
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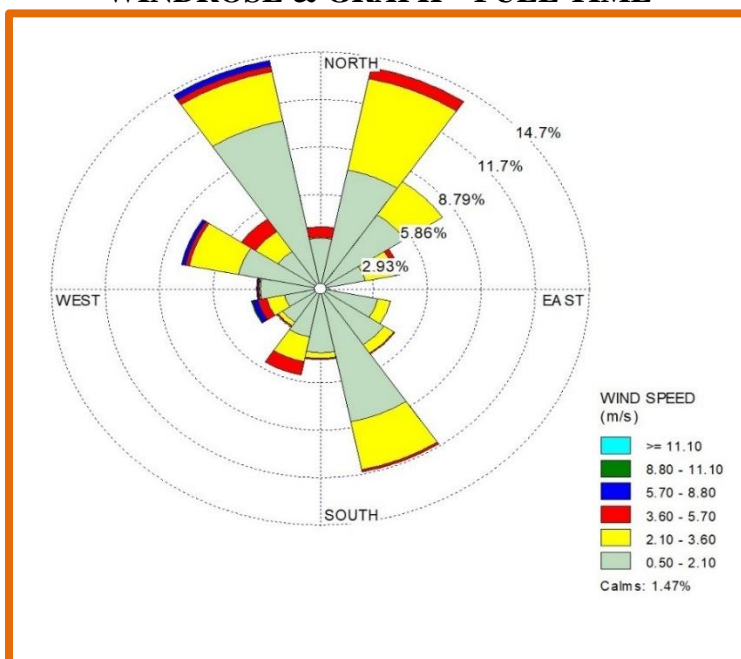
**C. Meteorological Observation:**

**WINDROSE-FREQUENCY TABLE – FULL TIME**

(Period: October 2024 to March 2025)

WIND DIRECTION	VELOCITY (in m/sec) RANGES						SUM%
	0.5<V<=2.1	2.1<V<=3.6	3.6<V<=5.7	5.7<V<=8.8	8.8<V<=11.1	V>=11.1	
N	3.15	0.07	0.63	0.00	0.00	0.00	3.85
NNE	7.57	5.74	0.70	0.00	0.00	0.00	14.01
NE	5.53	2.45	0.00	0.00	0.00	0.00	7.98
ENE	2.52	1.68	0.28	0.00	0.00	0.00	4.48
E	0.49	0.00	0.00	0.00	0.00	0.00	0.49
ESE	3.22	0.70	0.00	0.00	0.00	0.00	3.92
SE	4.20	0.63	0.07	0.00	0.00	0.00	4.90
SSE	8.40	3.01	0.14	0.00	0.00	0.00	11.55
S	3.99	0.35	0.07	0.00	0.00	0.00	4.41
SSW	3.08	1.54	0.84	0.00	0.00	0.00	5.46
SW	2.52	0.28	0.07	0.00	0.00	0.00	2.87
WSW	2.03	0.98	0.49	0.28	0.07	0.00	3.85
W	3.29	0.07	0.07	0.07	0.00	0.00	3.50
WNW	4.55	2.73	0.21	0.21	0.00	0.00	7.70
NW	2.80	1.47	0.91	0.00	0.00	0.00	5.18
NNW	10.57	3.08	0.35	0.35	0.00	0.00	14.36
SUM%	67.93	24.79	4.83	0.91	0.07	0.00	98.53
CALM	(0.00<=V<=0.5)						1.47
							100.00

**WINDROSE & GRAPH – FULL TIME**



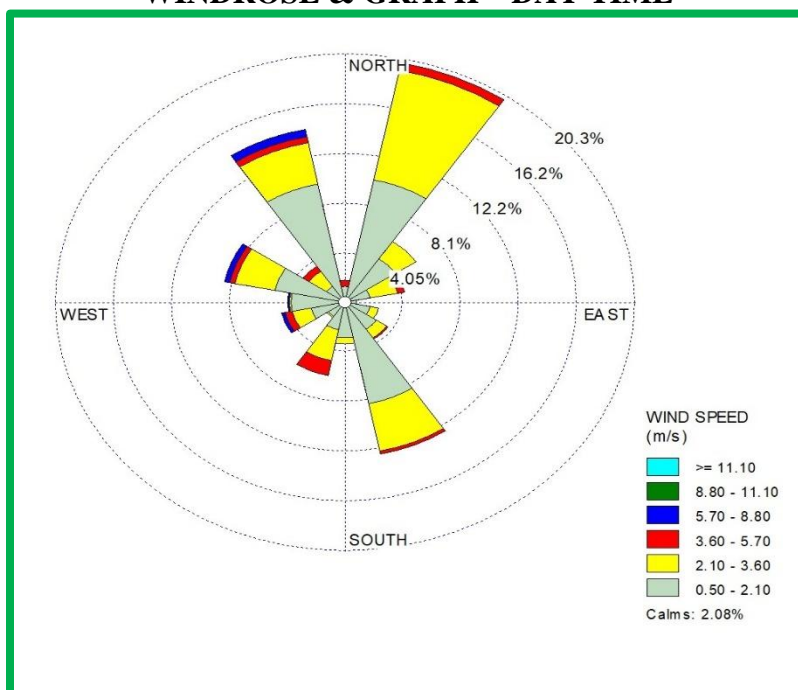
**HALDIA PETROCHEMICALS LIMITED**  
**HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT**  
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**WINDROSE-FREQUENCY TABLE – DAY TIME**

WIND DIRECTION	VELOCITY (in m/sec) RANGES						SUM%
	0.5<V<=2.1	2.1<V<=3.6	3.6<V<=5.7	5.7<V<=8.8	8.8<V<=11.1	V>=11.1	
N	1.35	0.00	0.49	0.00	0.00	0.00	1.84
NNE	10.17	9.07	0.61	0.00	0.00	0.00	19.85
NE	4.29	1.72	0.00	0.00	0.00	0.00	6.01
ENE	1.84	1.96	0.49	0.00	0.00	0.00	4.29
E	0.98	0.00	0.00	0.00	0.00	0.00	0.98
ESE	1.84	0.61	0.00	0.00	0.00	0.00	2.45
SE	2.70	0.86	0.12	0.00	0.00	0.00	3.68
SSE	8.46	3.92	0.25	0.00	0.00	0.00	12.62
S	2.94	0.49	0.00	0.00	0.00	0.00	3.43
SSW	2.33	2.57	1.23	0.00	0.00	0.00	6.13
SW	1.47	0.12	0.00	0.00	0.00	0.00	1.59
WSW	2.45	1.35	0.49	0.25	0.00	0.00	4.53
W	3.80	0.12	0.00	0.12	0.00	0.00	4.05
WNW	5.03	2.82	0.37	0.37	0.00	0.00	8.58
NW	1.59	1.47	0.49	0.00	0.00	0.00	3.55
NNW	9.80	3.43	0.49	0.61	0.00	0.00	14.34
SUM%	61.03	30.52	5.02	1.35	0.00	0.00	97.92
CALM	(0.00<=V<=0.5)						2.08
							100.00

**WINDROSE & GRAPH – DAY TIME**



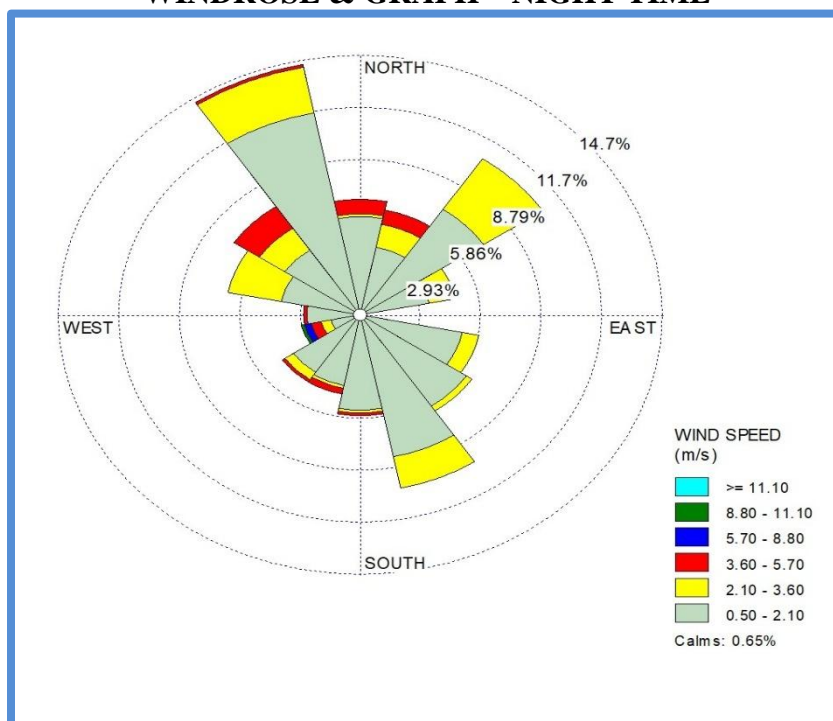
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**WINDROSE-FREQUENCY TABLE – NIGHT TIME**

WIND DIRECTION	VELOCITY (in m/sec) RANGES						SUM%
	0.5<V<=2.1	2.1<V<=3.6	3.6<V<=5.7	5.7<V<=8.8	8.8<V<=11.1	V>=11.1	
N	5.56	0.16	0.82	0.00	0.00	0.00	6.54
NNE	3.92	1.31	0.82	0.00	0.00	0.00	6.05
NE	7.19	3.43	0.00	0.00	0.00	0.00	10.62
ENE	3.43	1.31	0.00	0.00	0.00	0.00	4.74
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESE	5.07	0.82	0.00	0.00	0.00	0.00	5.88
SE	6.21	0.33	0.00	0.00	0.00	0.00	6.54
SSE	8.17	1.80	0.00	0.00	0.00	0.00	9.97
S	5.39	0.16	0.16	0.00	0.00	0.00	5.72
SSW	4.09	0.16	0.33	0.00	0.00	0.00	4.58
SW	3.92	0.49	0.16	0.00	0.00	0.00	4.58
WSW	1.64	0.49	0.49	0.33	0.16	0.00	3.11
W	2.61	0.00	0.16	0.00	0.00	0.00	2.78
WNW	3.92	2.61	0.00	0.00	0.00	0.00	6.54
NW	4.41	1.47	1.47	0.00	0.00	0.00	7.35
NNW	11.60	2.61	0.16	0.00	0.00	0.00	14.38
SUM%	77.13	17.15	4.57	0.33	0.16	0.00	99.35
CALM	(0.00<=V<=0.5)						0.65
							100.00

**WINDROSE & GRAPH – NIGHT TIME**



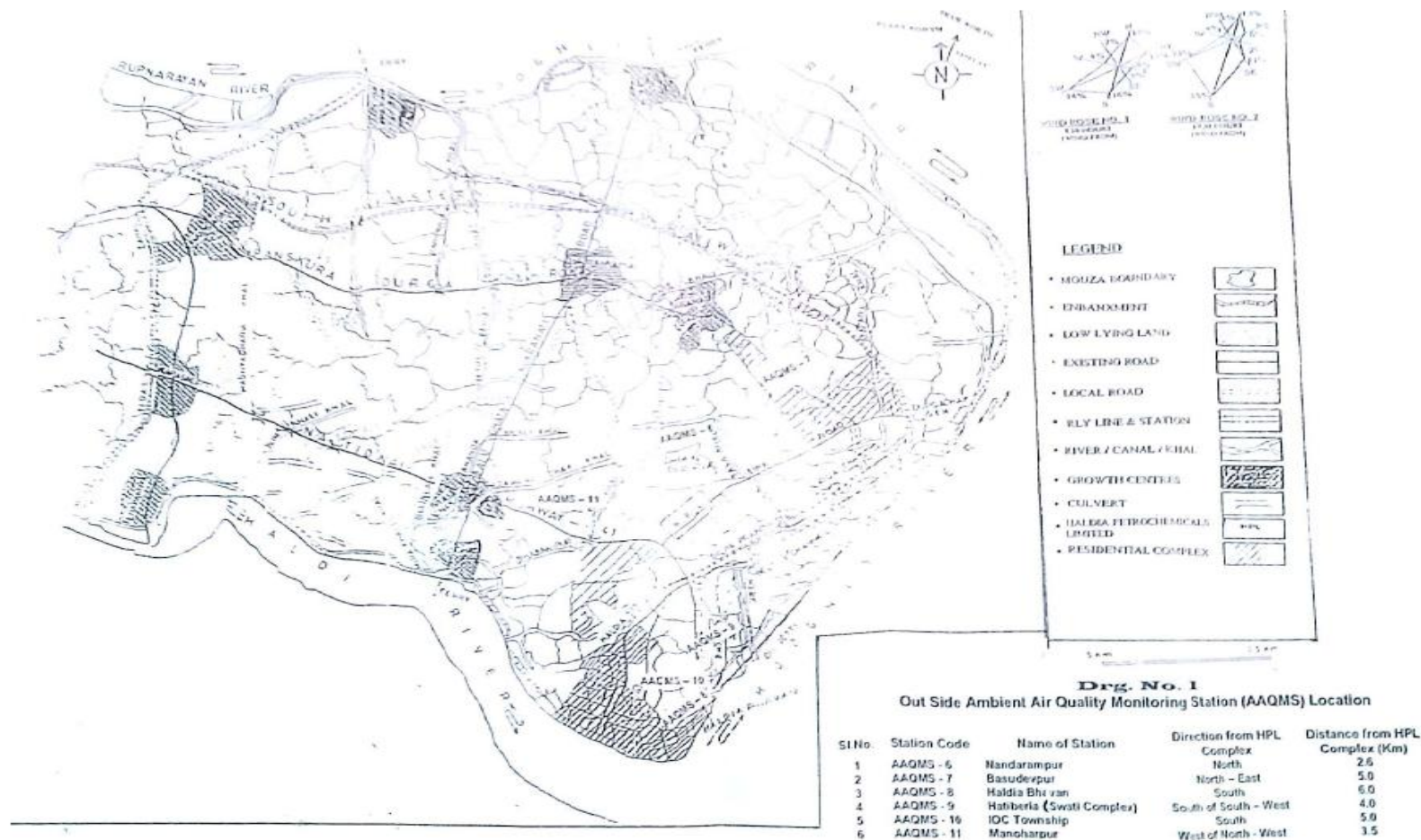


CHAPTER NO. – 05

**AMBIENT AIR  
QUALITY**



## Ambient Air Quality Monitoring stations (AAQMS) Out-side 6 Location



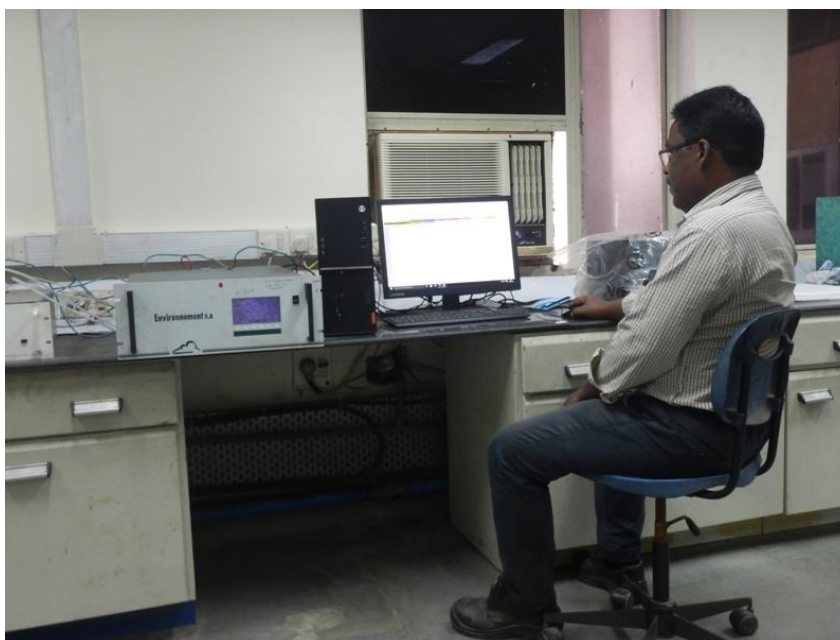
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**On-Line Ambient Air Quality Monitoring Station at South Control Room**



**On-Line Hydrocarbon Analyzer at Central Laboratory**



## Ambient Air Quality Monitoring stations (AAQMS)

### A. In Side Ambient Air Quality Monitoring stations (Five locations):

Sl. No.	Station Code	Station Name	Direction from the center of the plant
1	AAQMS - 1	Central Laboratory	North
2	AAQMS - 2	Gate No. 1	East
3	AAQMS - 3	South Control Room	South
4	AAQMS - 4	PP Ware House	South – West
5	AAQMS - 5	CPP Entry Gate	North - West

### B. Out Side Ambient Air Quality Monitoring stations (Six locations):

Sl. No.	Station Code	Name of Station	Direction from HPL Complex	Distance from HPL Complex (km)
1.	AAQMS – 6	Nandarampur	North	2.6 Km
2.	AAQMS – 7	Basudevpur	North- East	5.0 Km
3.	AAQMS – 8	Haldia Bhavan	South	6.0 Km
4.	AAQMS – 9	Hatiberia (Swati Complex)	South of South-West	4.0 Km
5.	AAQMS – 10	IOC Township	South	5.0 Km
6.	AAQMS – 11	Manaharpur	West of North-West	3.5 Km

### C. Methodology of Ambient Air Sampling & Analysis

Sl. No.	Parameters	Unit	Specification / Standard (method) or technique used	Range of Testing	Methodology
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	IS: 5182(Part 23): 2006	1 µg/m <sup>3</sup> & above	Sampling of PM <sub>10</sub> using Respirable Dust Sampler
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	USEPA 40 CFR Parts 53 & 58	2 µg/m <sup>3</sup> & above	Sampling of PM <sub>2.5</sub> using Ambient Fine Dust Sampler,
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	IS:5182 (Part-2):2006 (First Revision)	4 µg /m <sup>3</sup> & above	Absorption in Na-tetrachloromercurate solution followed by Spectrophotometric analysis
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	IS:5182 (Part-6):2006 (First Revision)	10 µg /m <sup>3</sup> & above	Absorption in sodium hydroxide & Na-arsenite solution followed by Spectrophotometric analysis

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Sl. No.	Parameters	Unit	Specifiction / Standard (method) or technique used	Range of Testing	Methodology
5	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	Methods of air sampling and examination, Third Edition, Edited by James P. Lodge, Method 411.	8.2 µg /m <sup>3</sup> & above	Micro-amounts of O <sub>3</sub> liberate iodine when absorbed in a 1% solution of potassium iodide buffered at pH 6.8(± 0.2). The liberated iodine is determined Spectrophotometrically by measuring the absorption of triiodide ion at 352 nm.
6	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	Method of Air Sampling & examination, Third Edition, Edited by James P. Lodge, Method 401	5 µg /m <sup>3</sup> & above	Ammonia is absorb in dilute H <sub>2</sub> SO <sub>4</sub> & measured colorimetrically by reaction with phenol & alkaline sodium hypochlorite to produce indophenols, a blue dye.
7	Lead (Pb)	µg/m <sup>3</sup>	Method of Air Sampling & examination, Third Edition, Edited by James P. Lodge, Method 303A, 822	0.01 µg /m <sup>3</sup> & above	Lead is determined by Atomic Absorption Spectrophotometer using air-acetylene flame.
8	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	IS: 5182(Part 11): 2006	0.042 µg /m <sup>3</sup> & above	Absorption on activated charcoal, desorption by carbon disulphide & analysis by GC using FID.
9	Arsenic (As)	ng/m <sup>3</sup>	Standard Method-APHA, 20 <sup>th</sup> Edition,	0.14 ng /m <sup>3</sup> & above	Standard Method-APHA, 20 <sup>th</sup> Edition, 1998 by Atomic Absorption Spectrophotometer using vapour generation assembly (VGA)
10	Nickel (Ni)	ng/m <sup>3</sup>	Method of Air Sampling & examination, Third Edition, Edited by James P. Lodge, Method 303A, 822	2.8 ng /m <sup>3</sup> & above	Nickel is determined by Atomic Absorption Spectrophotometer using air-acetylene flame



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Sl. No.	Parameters	Unit	Specification / Standard (method) or technique used	Range of Testing	Methodology
11	Benzo (a) Pyrene (BaP), Particulate phase only	ng/m <sup>3</sup>	IS: 5182(Part 12): 2009	0.11 ng /m <sup>3</sup> & above	Benzo(a)pyrene and other polynuclear hydrocarbons are extracted from the particulate matter using a non-polar solvent cyclohexane, which extracts less extraneous material than a more polar solvent. The extract is concentrated and analyzed by Gas Chromatograph – Mass Spectrometer.
12	Carbon Monoxide (CO)	mg/m <sup>3</sup>	IS: 5182 (Part 10): 1999 (First Revision)	0.01 mg /m <sup>3</sup> & above	Sampling of CO in gas sampling tubes & analysis by NDIR

**D. National Ambient Air Quality Standards**

Sl. No.	Parameters		Time Weighted Average	Ambient air concentration (µg/m³)	
		Unit		Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area
1	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	Annual*	50	20
			24 hours**	80	80
2	Nitrogen Dioxide (NO <sub>2</sub> )		Annual*	40	30
			24 hours**	80	80
3	Particulate Matter (PM <sub>10</sub> )		Annual*	60	60
			24 hours**	100	100
4	Particulate Matter (PM <sub>2.5</sub> )		Annual*	40	40
			24 hours**	60	60
5	Ozone (O <sub>3</sub> )		8 hours**	100	100
			1 hours**	180	180
6	Lead (pb)		Annual*	0.50	0.50
			24 hours**	1.0	1.0
7	Carbon monoxide (CO)	mg/m <sup>3</sup>	8 hours**	02	02
			1 hours**	04	04

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Sl. No.	Parameters	Unit	Time Weighted Average	Ambient air concentration ( $\mu\text{g}/\text{m}^3$ )	
				Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area
8	Ammonia ( $\text{NH}_3$ )	$\mu\text{g}/\text{m}^3$	Annual*	100	100
			24 hours**	400	400
9	Benzene ( $\text{C}_6\text{H}_6$ )	$\text{ng}/\text{m}^3$	Annual*	05	05
10	Benzo(a)Pyrene (BaP)		Annual*	01	01
11	Arsenic (As)		Annual*	06	06
12	Nickel (Ni)		Annual*	20	20

\* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 08 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

**Note.**-Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025



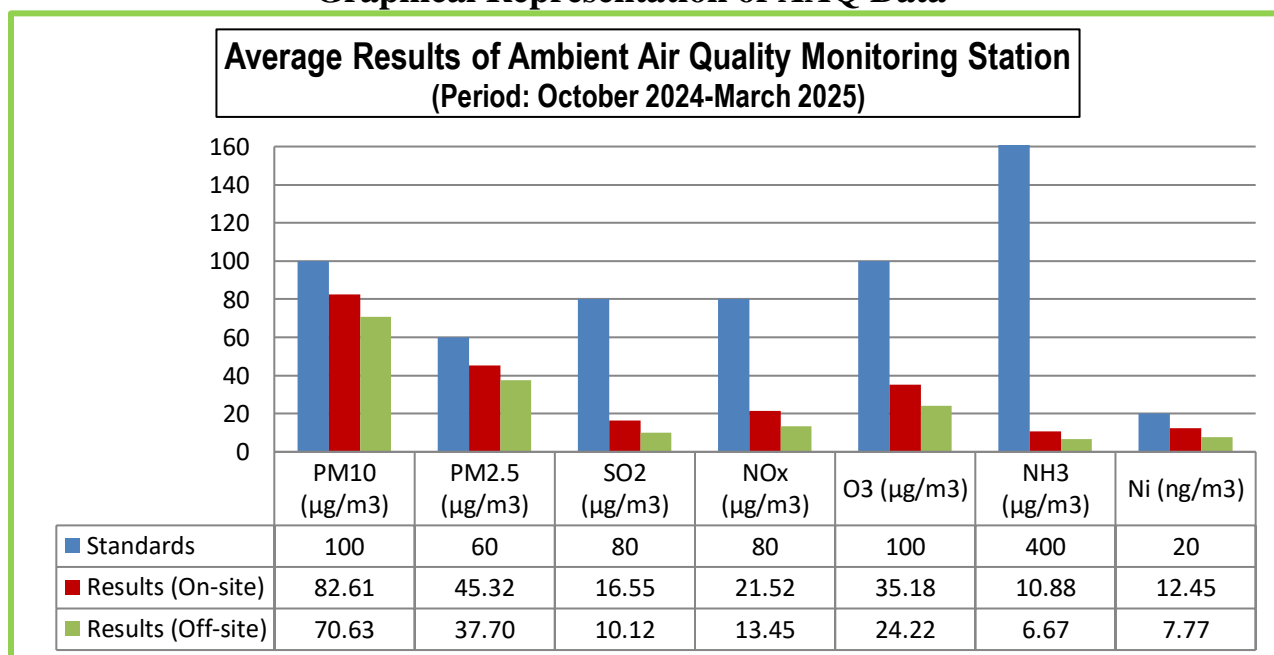
### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)

Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	51.40	29.13	16.32	21.08	35.68	10.87	0.142	1.73	4.49	0.18	12.44	0.543
Nov 24	91.99	44.17	16.46	21.52	32.31	11.10	0.140	1.81	4.35	0.18	12.15	0.562
Dec 24	86.39	47.54	16.98	21.67	35.90	11.29	0.145	3.13	4.53	0.51	12.55	0.673
Jan 25	91.77	52.72	16.43	21.58	36.15	10.55	0.146	2.72	4.61	0.43	12.54	0.604
Feb 25	90.03	51.28	16.50	21.73	35.74	10.71	0.139	2.43	4.44	0.39	12.38	0.579
Mar 25	84.07	47.05	16.60	21.56	35.32	10.78	0.142	1.90	4.53	0.26	12.61	0.633
<b>Average</b>	<b>82.61</b>	<b>45.32</b>	<b>16.55</b>	<b>21.52</b>	<b>35.18</b>	<b>10.88</b>	<b>0.142</b>	<b>2.29</b>	<b>4.49</b>	<b>0.33</b>	<b>12.45</b>	<b>0.599</b>

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	32.40	20.10	9.96	13.53	24.01	6.71	0.075	1.15	2.14	0.05	7.80	0.339
Nov 24	81.65	36.50	10.51	13.83	23.74	6.63	0.078	1.45	2.32	0.05	7.69	0.321
Dec 24	79.80	43.16	10.23	13.18	25.28	6.82	0.080	2.45	2.22	0.36	7.72	0.649
Jan 25	79.64	43.78	10.28	12.84	24.03	6.39	0.078	2.10	2.46	0.32	7.66	0.504
Feb 25	79.26	44.92	9.88	13.63	23.82	6.65	0.076	2.09	2.30	0.27	7.94	0.468
Mar 25	71.02	37.73	9.84	13.68	24.42	6.79	0.074	1.54	2.30	0.11	7.81	0.522
<b>Average</b>	<b>70.63</b>	<b>37.70</b>	<b>10.12</b>	<b>13.45</b>	<b>24.22</b>	<b>6.67</b>	<b>0.077</b>	<b>1.80</b>	<b>2.29</b>	<b>0.19</b>	<b>7.77</b>	<b>0.467</b>

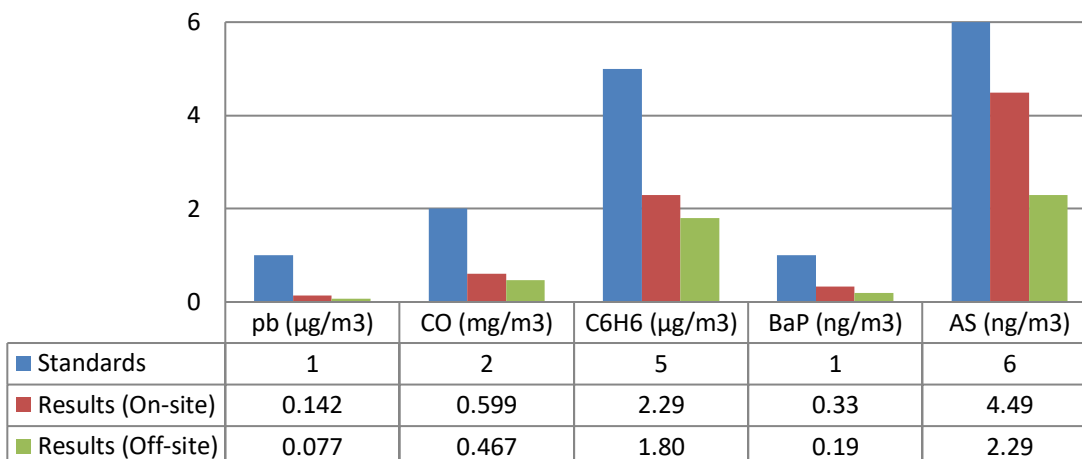
### Graphical Representation of AAQ Data



## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025



### Average Results of Ambient Air Quality Monitoring Station (Period: October 2024-March 2025)



### Monthly wise Report of Ambient Air Quality Monitoring Station

MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)												
Station Name & Code: Central Lab. (AAQMS-1)												
Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	52.71	30.42	16.64	21.09	36.25	10.72	0.145	1.74	4.52	0.19	12.56	0.544
Nov 24	94.25	38.47	17.01	21.41	32.11	11.40	0.139	1.80	4.24	0.16	12.07	0.576
Dec 24	88.21	47.65	16.42	22.69	37.59	10.98	0.144	3.09	4.54	0.51	12.52	0.694
Jan 25	92.21	53.59	16.28	21.90	35.94	10.10	0.149	2.80	4.67	0.44	12.67	0.614
Feb 25	91.78	51.76	16.31	22.04	35.59	10.41	0.143	2.52	4.64	0.42	12.52	0.566
Mar 25	84.19	48.27	16.39	22.33	35.87	10.05	0.143	1.84	4.58	0.25	12.68	0.629
<b>Average</b>	<b>83.89</b>	<b>45.03</b>	<b>16.51</b>	<b>21.91</b>	<b>35.56</b>	<b>10.61</b>	<b>0.144</b>	<b>2.30</b>	<b>4.53</b>	<b>0.33</b>	<b>12.50</b>	<b>0.604</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)												
Station Name & Code: Gate No.1 (AAQMS-2)												
Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	51.36	29.11	15.82	20.47	37.66	11.58	0.142	1.75	4.57	0.23	12.48	0.548
Nov 24	97.94	47.83	16.45	21.05	31.88	11.81	0.136	1.77	4.07	0.16	11.79	0.563
Dec 24	86.22	47.38	16.68	21.38	35.95	11.64	0.154	3.26	4.81	0.54	12.76	0.655
Jan 25	90.79	53.22	16.70	22.35	36.23	10.57	0.138	2.53	4.26	0.41	12.23	0.599
Feb 25	87.26	48.82	16.82	22.52	36.37	11.42	0.135	2.26	4.35	0.35	12.30	0.564
Mar 25	87.23	48.31	16.59	21.18	35.83	11.41	0.151	2.13	4.75	0.32	12.82	0.634
<b>Average</b>	<b>83.47</b>	<b>45.78</b>	<b>16.51</b>	<b>21.49</b>	<b>35.65</b>	<b>11.41</b>	<b>0.143</b>	<b>2.28</b>	<b>4.47</b>	<b>0.34</b>	<b>12.40</b>	<b>0.594</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

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### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)

#### Station Name & Code: SCR (AAQMS-3)

Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	51.17	28.16	15.33	20.61	35.26	11.22	0.142	1.70	4.51	0.16	12.45	0.523
Nov 24	86.45	46.43	16.52	22.55	32.38	10.63	0.136	1.82	4.29	0.19	12.17	0.541
Dec 24	86.23	45.73	16.97	20.72	35.51	11.43	0.144	3.15	4.57	0.51	12.62	0.660
Jan 25	90.48	51.95	16.65	21.43	36.43	10.50	0.143	2.58	4.55	0.42	12.39	0.601
Feb 25	91.49	52.38	15.78	21.30	35.57	10.11	0.142	2.53	4.46	0.42	12.45	0.581
Mar 25	81.90	44.87	16.05	21.68	34.86	10.08	0.134	1.83	4.26	0.24	12.29	0.631
<b>Average</b>	<b>81.29</b>	<b>44.92</b>	<b>16.22</b>	<b>21.38</b>	<b>35.00</b>	<b>10.66</b>	<b>0.140</b>	<b>2.27</b>	<b>4.44</b>	<b>0.32</b>	<b>12.40</b>	<b>0.590</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)

#### Station Name & Code: PPWH (AAQMS-4)

Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	49.93	27.80	17.17	21.86	34.40	10.22	0.136	1.71	4.31	0.16	12.23	0.559
Nov 24	92.64	48.63	16.01	21.60	32.36	10.63	0.140	1.78	4.38	0.16	12.04	0.533
Dec 24	85.19	50.39	16.85	21.84	34.78	10.54	0.137	3.02	4.11	0.49	12.19	0.696
Jan 25	92.78	52.00	15.89	21.77	35.60	11.12	0.149	2.70	4.89	0.41	12.69	0.603
Feb 25	89.30	51.16	16.47	21.74	35.98	10.44	0.135	2.33	4.24	0.38	12.23	0.594
Mar 25	83.80	47.76	16.80	21.87	34.41	10.52	0.140	1.89	4.62	0.24	12.70	0.633
<b>Average</b>	<b>82.27</b>	<b>46.29</b>	<b>16.53</b>	<b>21.78</b>	<b>34.59</b>	<b>10.58</b>	<b>0.140</b>	<b>2.24</b>	<b>4.43</b>	<b>0.31</b>	<b>12.35</b>	<b>0.603</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

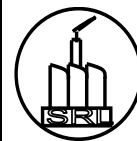
### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (On-site Plant)

#### Station Name & Code: Power Plant (AAQMS-5)

Month	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	BaP ( $\text{ng}/\text{m}^3$ )	Ni ( $\text{ng}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Oct 24	51.84	30.14	16.67	21.39	34.86	10.61	0.144	1.75	4.56	0.18	12.50	0.543
Nov 24	88.68	39.48	16.31	20.96	32.84	11.04	0.152	1.90	4.78	0.25	12.68	0.597
Dec 24	86.11	46.55	17.99	21.73	35.68	11.85	0.148	3.13	4.62	0.51	12.63	0.661
Jan 25	92.58	52.86	16.61	20.46	36.56	10.44	0.149	3.01	4.66	0.46	12.74	0.601
Feb 25	90.30	52.30	17.11	21.07	35.20	11.14	0.141	2.49	4.54	0.40	12.40	0.591
Mar 25	83.23	46.06	17.17	20.73	35.66	11.85	0.141	1.84	4.45	0.24	12.56	0.638
<b>Average</b>	<b>82.12</b>	<b>44.57</b>	<b>16.98</b>	<b>21.06</b>	<b>35.13</b>	<b>11.16</b>	<b>0.146</b>	<b>2.35</b>	<b>4.60</b>	<b>0.34</b>	<b>12.59</b>	<b>0.605</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

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### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

#### Station Name & Code: IOC Township (AAQMS-10)

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Oct 24	32.00	19.68	9.58	13.46	23.44	6.71	0.072	1.12	2.02	0.05	7.68	0.334
Nov 24	91.28	42.16	10.07	13.21	23.84	6.75	0.081	1.47	2.38	0.05	7.81	0.334
<b>Average</b>	<b>61.64</b>	<b>30.92</b>	<b>9.83</b>	<b>13.34</b>	<b>23.64</b>	<b>6.73</b>	<b>0.077</b>	<b>1.30</b>	<b>2.20</b>	<b>0.05</b>	<b>7.75</b>	<b>0.334</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

#### Station Name & Code: Manaharpur (AAQMS-11)

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Oct 24	32.80	20.53	10.34	13.60	24.58	6.72	0.078	1.19	2.27	0.05	7.92	0.344
Nov 24	72.01	30.83	10.95	14.45	23.64	6.50	0.074	1.42	2.27	0.05	7.56	0.307
<b>Average</b>	<b>52.41</b>	<b>25.68</b>	<b>10.65</b>	<b>14.03</b>	<b>24.11</b>	<b>6.61</b>	<b>0.076</b>	<b>1.31</b>	<b>2.27</b>	<b>0.05</b>	<b>7.74</b>	<b>0.326</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

#### Station Name & Code: Nandarampur (AAQMS-6)

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Dec 24	79.66	42.61	10.19	13.93	25.02	6.75	0.084	2.54	2.32	0.37	7.93	0.658
Jan 25	79.92	43.33	10.52	13.70	24.64	6.38	0.081	2.19	2.60	0.35	7.79	0.503
<b>Average</b>	<b>79.79</b>	<b>42.97</b>	<b>10.36</b>	<b>13.82</b>	<b>24.83</b>	<b>6.57</b>	<b>0.083</b>	<b>2.37</b>	<b>2.46</b>	<b>0.36</b>	<b>7.86</b>	<b>0.581</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

#### Station Name & Code: Near CPT Hospital (AAQMS-8)

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Dec 24	79.93	43.71	10.28	12.43	25.54	6.90	0.077	2.36	2.13	0.34	7.50	0.640
Jan 25	79.36	44.24	10.05	11.97	23.43	6.41	0.075	2.01	2.31	0.29	7.52	0.506
<b>Average</b>	<b>79.65</b>	<b>43.98</b>	<b>10.17</b>	<b>12.20</b>	<b>24.49</b>	<b>6.66</b>	<b>0.076</b>	<b>2.19</b>	<b>2.22</b>	<b>0.32</b>	<b>7.51</b>	<b>0.573</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)

#### Station Name & Code: Basudebpur (AAQMS-7)

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Feb 25	79.90	45.27	10.40	14.05	24.10	6.52	0.079	2.28	2.45	0.31	8.11	0.474
Mar 25	71.77	38.07	9.87	13.68	24.34	7.11	0.078	1.62	2.40	0.12	7.96	0.531
<b>Average</b>	<b>75.84</b>	<b>41.67</b>	<b>10.14</b>	<b>13.87</b>	<b>24.22</b>	<b>6.82</b>	<b>0.079</b>	<b>1.95</b>	<b>2.43</b>	<b>0.22</b>	<b>8.04</b>	<b>0.503</b>

Note: All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.



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**MONTHLY AVERAGE RESULTS OF AMBIENT AIR QUALITY (Off-site Plant)**

**Station Name & Code: Hatiberia Swati Complex (AAQMS-9)**

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Feb 25	78.63	44.56	9.35	13.21	23.55	6.77	0.072	1.90	2.14	0.23	7.77	0.463
Mar 25	70.26	37.40	9.80	13.69	24.50	6.47	0.070	1.45	2.20	0.11	7.66	0.513
<b>Average</b>	<b>74.45</b>	<b>40.98</b>	<b>9.58</b>	<b>13.45</b>	<b>24.03</b>	<b>6.62</b>	<b>0.071</b>	<b>1.68</b>	<b>2.17</b>	<b>0.17</b>	<b>7.72</b>	<b>0.488</b>

**Note:** All parameters are 24 hrs. sampling basis except CO & Ozone 8 hrs. sampling basis.

### On-line Hydrocarbon Analyzer

One no. On-line Hydrocarbon Analyzer was installed & commissioned on January 2007. The On-line Hydrocarbon Analyzer was located at Central Laboratory. Monitoring of ambient air quality has been carried out at Central Laboratory (Inside the plant). The identified location monitoring is carried out every one hour for Total Hydrocarbon, Methane & Non Methane Hydrocarbon. The study area has been considered as an industrial area. The results for the month of **October 2024 to March 2025** are given.

**Average results of On-line Hydrocarbon Analyzer**  
**Location : Central Laboratory**

Month	THC (ppm)	CH <sub>4</sub> (ppm)	NMHC (ppm)
Oct 24	3.51	2.89	0.62
Nov 24	3.19	2.53	0.66
Dec 24	3.49	2.71	0.78
Jan 25	3.03	2.24	0.79
Feb 25	3.28	2.52	0.76
Mar 25	3.05	2.33	0.72
<b>Average</b>	<b>3.26</b>	<b>2.54</b>	<b>0.72</b>



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### On-line Ambient Air Quality Monitoring Station (AAQMS)

One On-line Ambient Air Quality Monitoring station was installed & commissioned on 29 February 2008. The on-line AAQMS was located at South Control Room. AAQMS contains four analyzers (PM<sub>2.5</sub>, SO<sub>2</sub> & H<sub>2</sub>S, NO<sub>x</sub>, and Hydrocarbon analyzer) for ambient air quality analysis and five sensors (Wind Speed, Wind Direction, Relative Humidity, Pressure and Temperature) for monitoring of meteorological parameters. AAQMS contains five analyzers (PM<sub>10</sub>, NH<sub>3</sub>, O<sub>3</sub>, CO & Benzene) was installed on August 2018. The study area has been considered as an industrial area. The results for the month of **October 2024 to March 2025** are given.

#### Average results of On-line Ambient Air Quality Monitoring Station (AAQMS) Location : South Control Room

Month	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	H <sub>2</sub> S (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	Benzene (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
Oct 24	69.00	23.91	13.50	10.10	14.30	13.46	33.89	2.76	1.02
Nov 24	142.00	40.20	8.19	9.86	17.73	13.44	39.12	2.76	1.02
Dec 24	145.00	64.17	12.57	9.68	24.72	13.47	31.49	2.76	0.86
Jan 25	133.00	59.03	15.93	9.45	24.14	13.47	25.75	2.76	0.86
Feb 25	81.00	43.10	13.04	7.35	18.63	13.58	25.50	2.77	0.82
Mar 25	69.00	35.58	10.81	8.44	23.72	12.17	26.73	2.76	0.69
<b>Average</b>	<b>106.50</b>	<b>44.33</b>	<b>12.34</b>	<b>9.15</b>	<b>20.54</b>	<b>13.27</b>	<b>30.41</b>	<b>2.76</b>	<b>0.88</b>

Month	WS (m/s)	Wind Degree	Temperature (°C)	RH (%)	Pressure (mbar)	THC (PPM)	CH <sub>4</sub> (PPM)	NMHC (PPM)
Oct 24	5.14	174.54	30.95	65.29	702.50	3.43	2.51	0.93
Nov 24	4.21	296.77	29.22	46.00	755.35	6.57	2.83	3.78
Dec 24	2.29	19.23	20.46	39.95	765.10	3.99	2.41	1.58
Jan 25	2.38	31.55	18.02	46.49	765.10	3.41	2.32	1.08
Feb 25	4.65	353.05	23.53	49.92	765.10	2.43	1.82	0.61
Mar 25	4.34	350.19	25.48	47.22	765.20	2.79	2.19	0.60
<b>Average</b>	<b>3.84</b>	<b>204.22</b>	<b>24.61</b>	<b>49.15</b>	<b>753.06</b>	<b>3.77</b>	<b>2.35</b>	<b>1.43</b>



CHAPTER NO. – 06

**VENT EMISSION  
& WORK ZONE AIR  
QUALITY**

## 6.0 VENT EMISSION AND WORK ZONE AIR QUALITY

### A. Methods of measurement

Sl. No.	Parameters	Standards of measurement	Range of Testing	Methodology
1.	Benzene	Method no. 12, OSHA	0.04 ppm & above	Absorption on activated charcoal, desorption by carbon disulphide & analysis by GC using FID
2.	Butadiene	Method no. 56, OSHA	0.09 ppm & above	Absorption on activated charcoal, desorption by carbon disulphide & analysis by GC using FID
3.	Hexane	Methods of Air Sampling and Examination, Third Edition. Edited by James P. Lodge, Method 109	0.05 ppm & above	Absorption on activated charcoal, desorption by carbon disulphide & analysis by GC using FID

### **Benzene Emission from Vent of Benzene Extraction Unit.** **(October 2024 to March 2025)**

Location	Standard	Month
BEU	5.0 mg/Nm <sup>3</sup>	All results are well below the standards in all months (<0.1µg/m <sup>3</sup> )

### **Work Zone Monitoring Results** **Half-Yearly Average Results** **(October 2024 to March 2025)**

Plant	Standard (ppm)	Average Results (ppm)
Benzene Extraction Unit	1.0	<b>0.155</b>
Butadiene Extraction Unit	1.0	<b>0.230</b>
Hexane Area	500.0	<b>10.52</b>

Standards as per OSHA (TWA for 8 hrs. exposure)

### **Work Zone Monitoring Results** **Monthly Wise Report**

Month			Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Half-Yearly Average
Sl. No.	Plant	Location	Results (ppm)						
BENZENE									
1	BEU	5P – 02 A & B Hartcut Feed Pump(BEU)	0.051	0.062	0.073	0.081	0.077	0.071	0.069
2		Benzene Sampling Point (050-SP-108)& 5P-07 A & B(BEU)	0.198	0.234	0.248	0.265	0.257	0.241	0.241
BUTADIENE									
4	BDEU	Butadiene Extension Unit	0.124	0.143	0.162	0.173	0.166	0.151	0.153
5		BDEU Sampling Point	0.246	0.284	0.318	0.343	0.334	0.318	0.307
HEXANE									
6	HDPE	V- 2405 Draining Point	7.45	8.27	9.04	9.71	9.43	9.27	8.86
7		Flaker House(Ground Floor)	10.96	11.53	12.26	13.02	12.86	12.48	12.19

CHAPTER NO. – 07

# AMBIENT NOISE

## 7.0 AMBIENT NOISE

In order to establish ambient noise levels for the Study Area, measurement of noise levels were performed at seven locations. i.e 5 ( Five) Nos. of identified main noise generation units and 5 (Five) locations at the boundary wall (1 meter away from the boundary walls). Noise monitoring was measured in decibel unit i.e. Leq dB(A) where A denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear and Leq is an energy mean of the noise level, over a specified period. Monitoring was carried out once in a season in each location.

**The monitoring locations in plant boundary for ambient noise level are as follows:**

Sl.No.	Location Details	Location Code	Direction from the plant Center
1.	Near Gate No.-1	AN 1	East of north east
2.	Near Gate No.-3	AN 2	East of south east
3.	South Gate	AN 3	South
4.	CPP	AN4	North of north west
5.	North Gate	AN5	North

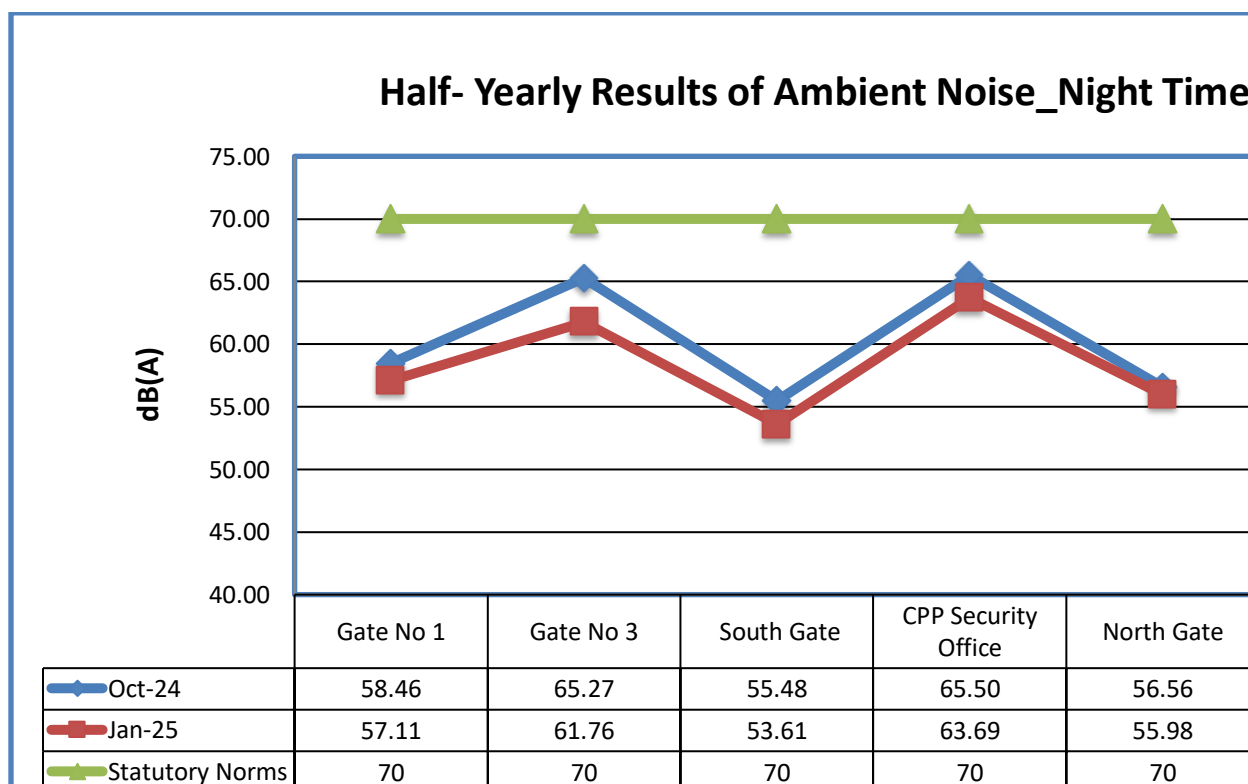
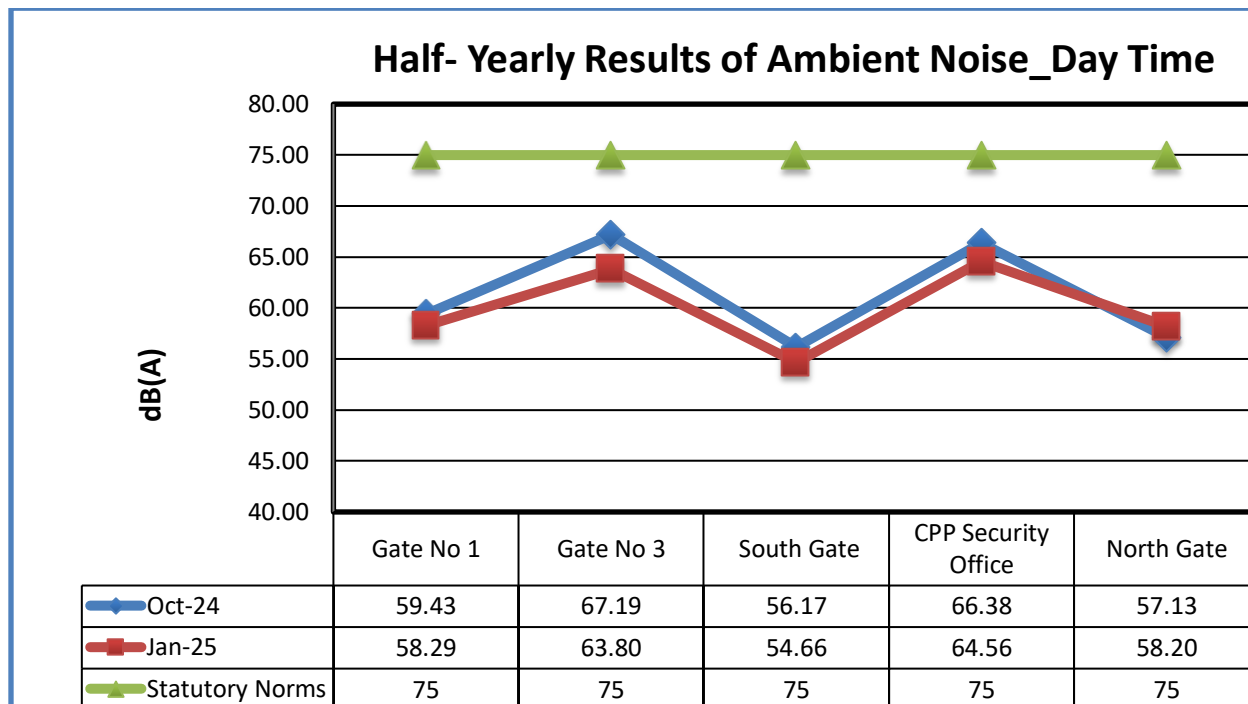
### 24 hours Noise (Ambient Noise) Standards (CPCB & WBPCB Standards)

Duration	Unit are dB(A)			
	Industrial	Commercial	Residential	Silence
<b>DAY (6 am to 10 pm)</b>	<b>75</b>	<b>65</b>	<b>55</b>	<b>50</b>
<b>NIGHT (10 pm to 6 am)</b>	<b>70</b>	<b>55</b>	<b>45</b>	<b>40</b>

### Ambient Noise Level (Average) October 2024 to March 2025

LOCATION	October 2024		January 2025	
	Day	Night	Day	Night
Near Gate No-1	59.43	58.46	58.29	57.11
Near Gate No-3	67.19	65.27	63.80	61.76
Near South Gate	56.17	55.48	54.66	53.61
Near CPP Security Office	66.38	65.50	64.56	63.69
Near North Gate	57.13	56.56	58.20	55.98

### Graphical Representation of Ambient Noise Data



CHAPTER NO. – 08

LEAK DETECTION

UNDER LDAR

PROGRAM

## 8.0 LDAR PROGRAM

### Fugitive emission monitoring

#### Fugitive Emission Sources:

Fugitive emission sources include leaks of hydrocarbon vapors from process equipment and evaporation of hydrocarbons from open areas, rather than through a stack or vent. Fugitive emission sources include valves of all types, flanges, pump seals, process drains, cooling towers, and oil/water separators. Normally, control of fugitive emissions involves minimizing leaks and spills through equipment changes, procedure changes, and improved monitoring, housekeeping, and maintenance practices.

#### Fugitive emission monitoring:

The technique which has been used to detect and control emissions from equipment leaks is known as Leak Detection and Repair (LDAR) Programme. The method which is used in LDAR program is Stratified Emission Factor Method. In this method the screening values are distributed in different ranges, like

- 0-1000 ppmv
- 1001-10,000 ppmv
- Over 10,000 ppmv

Emission factors for each screening value range have been generated from data gathered during previous EPA studies. These stratified emission factors represent the leak rate measured during fugitive emission testing. Their development incorporated the statistical methods used by EPA in developing other emission factors. The emission factor for each discrete interval, by equipment type and service, is presented in the table.

<b>Emission Factors(kg/hr/source) for Screening value range (ppmv)</b>				
<b>Source</b>	<b>Service</b>	<b>0-1000</b>	<b>1001-10000</b>	<b>Over- 100000</b>
Valves	Gas/Vapor	0.00014	0.00165	0.0451
	Light liquid	0.00028	0.00963	0.0852
	Heavy liquid	0.00023	0.00023	0.00023
Pump	Light liquid	0.00198	0.0335	0.437
	Heavy liquid	0.0038	0.0926	0.3885
Compressor seals	Gas/Vapor	0.01132	0.264	1.608
Pressure relief devices	Gas/Vapor	0.0114	0.279	1.691
Source	Service	0-1000	1001-10000	Over- 100000
Flanges, connections	All	0.00002	0.00875	0.0375
Open-ended lines	All	0.00013	0.00876	0.01195

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**Reference: USEPA Handbook on Control Techniques for Fugitive VOC Emissions from Chemical Process Facilities. EPA/625/R-93/005, March 1994.**

All screening values must be recorded according to the applicable ranges. The product of the appropriate emission factor and the number of components in each screening value range and source type. The total emission rate is the sum of all the emission rates for each value range and source type.

$EE = (NL1 * SEF1) + (NL2 * SEF2) + (NL3 * SEF3)$
<b>EE=emission estimate</b>
<b>NL1= number leaking in first range (0-1000)</b>
<b>NL2= number of leaking in second range (1001-10,000)</b>
<b>NL3= number of leaking component in third range(over 10,000)</b>
<b>SEF1= stratified emission factor for first range</b>
<b>SEF2= stratified emission factor for second range</b>
<b>SEF3= stratified emission factor for third range</b>

LDAR program has been adopted for identifying the leakage valves, pumps and flanges and quantifying the total VOC emitted from those equipments of different units. The points where the emission is over 1 ppm are considered as leaking points. Based on those identified points the total VOC emission will be estimated for each unit.

**Total VOC emission from PP, LLDPE, IOP-ECR, IOP-NCR, CPP, BEU & BDEU**

<b>Location</b>	<b>Computed Emission Estimates (EE) Actual Unit – Ton/Annum</b>	<b>Computed Emission Estimates (EE) in 100%</b>
PP	0.055	6.50
LLDPE	0.038	4.49
HDPE	0.136	16.07
IOP- ECR	0.236	27.90
IOP- NCR	0.022	2.60
CPP	0.05	5.91
BEU	0.14	16.55
BDEU	0.169	19.98
<b>Total</b>	<b>0.846</b>	<b>100.00</b>



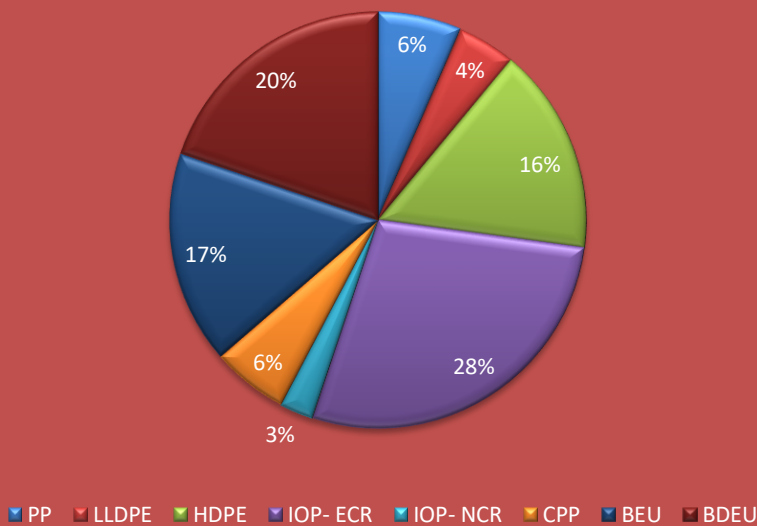


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## HALDIA PETROCHEMICALS LIMITED HALF YEARLY ENVIRONMENTAL DATA GENERATION REPORT OCTOBER 2024 – MARCH 2025



### Computed Emission Estimated (EE) Period: October 2024 to March 25



### Total VOC emission from PP,LLDPE,HDPE, IOP ECR, IOP NCR, CPP, BEU & BDEU

#### 1. Total VOC emission from PP measured in October 2024:

No of points checked: 541

No of leaking (VOC>1ppm) points: 84

No of non leaking points: 457

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	18	0	0	0.00504
	Heavy liquid	0	0	0	0
Flange	All	66	0	0	0.00132
<b>Total</b>					<b>0.00636</b>
					<b>0.055 (Ton/Annum)</b>

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**2. Total VOC emission from LLDPE measured in October 2024 & November 2024:**

No of points checked: 554

No of leaking (VOC>1ppm) points: 53

No of non leaking points: 501

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	13	0	0	0.00364
	Heavy liquid	0	0	0	0
Flange	All	40	0	0	0.0008
<b>Total</b>					<b>0.00444</b>
					<b>0.038 (Ton/Annum)</b>

**3. Total VOC emission from HDPE measured in November 2024 & December 2024:**

No of points checked: 1607

No of leaking (VOC>1ppm) points: 174

No of non leaking points: 1433

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	2	0	0	0.00396
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	32	0	0	0.00896
	Heavy liquid	0	0	0	0
Flange	All	140	0	0	0.0028
<b>Total</b>					<b>0.016</b>
					<b>0.136 (Ton/Annum)</b>

**4. Total VOC emission from IOP- ECR measured in December 2024 & January 2025:**

No of points checked: 2103

No of leaking (VOC>1ppm) points: 233

No of non leaking points: 1870

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	4	0	0	0.00792
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	57	0	0	0.01596
	Heavy liquid	0	0	0	0
Flange	All	172	0	0	0.00344
<b>Total</b>					<b>0.02732</b>
					<b>0.236 (Ton/Annum)</b>



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### 5. Total VOC emission from IOP- NCR measured in January 2025:

No of points checked: 364

No of leaking (VOC>1ppm) points: 36

No of non leaking points: 328

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	7	0	0	0.00196
	Heavy liquid	0	0	0	0
Flange	All	29	0	0	0.00058
<b>Total</b>					<b>0.00254</b>
					<b>0.022 (Ton/Annum)</b>

### 6. Total VOC emission from CPP measured in February 2025:

No of points checked: 250

No of leaking (VOC>1ppm) points: 36

No of non leaking points: 214

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	1	0	0	0.00198
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	12	0	0	0.00336
	Heavy liquid	0	0	0	0
Flange	All	23	0	0	0.00046
<b>Total</b>					<b>0.0058</b>
					<b>0.05 (Ton/Annum)</b>

### 7. Total VOC emission from BEU measured in February 2025:

No of points checked: 726

No of leaking (VOC>1ppm) points: 108

No of non leaking points: 618

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	4	0	0	0.00792
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	24	0	0	0.00672
	Heavy liquid	0	0	0	0
Flange	All	80	0	0	0.0016
<b>Total</b>					<b>0.01624</b>
					<b>0.14 (Ton/Annum)</b>

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**8. Total VOC emission from BDEU measured in March 2025:**

No of points checked: 780

No of leaking (VOC>1ppm) points: 139

No of non leaking points: 641

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	3	0	0	0.00594
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	41	0	0	0.01148
	Heavy liquid	0	0	0	0
Flange	All	95	0	0	0.0019
<b>Total</b>					<b>0.01932</b>
					<b>0.169 (Ton/Annum)</b>

**Reference: USEPA Handbook on Control Techniques for Fugitive VOC Emissions from Chemical Process Facilities. EPA/625/R-93/005, March 1994.**