



→ o/c.

Plant:
Post Box No.-12, Durgachak,
Haldia, Dist. - Purba Medinipore
West Bengal, Pin-721602, India
Tel.: +91 (03224) 274007/384/400/876
WEBSITE : www.haldiapetrochemicals.com
CIN:U24100WB2015PLC205383

HPL/IMS/HSEF/R/4.3.2/08/ENV/E-04/WBPCB

September 09, 2022

The Chief Engineer- O&E Cell
West Bengal Pollution Control Board,
Paribesh Bhawan,
10A, Block – LA, Sector-III,
Kolkata – 700 098



Sub : Submission of Environmental Statement for the Financial Year 2021-22

Dear Sir,

We are pleased to submit the Environmental Statement of our plant for the financial year 2021-22 ending 31st March, 2022 in Form – V, duly filled up along with all necessary enclosures, as per the provision of Rule 14 of The Environment (Protection) Rules, 1986 and amendments for your kind perusal. The same has been submitted in the online portal <https://wbocmms.nic.in/> of WBPCB also.

One CD comprising of the above Environmental Statement is also enclosed for your reference.

Thanking you,

Yours very truly,

Abhijit Basu
Chief General Manager - HSEF & PSM

Encl.: As above

CC: Asst. Environment Engineer, & In – Charge,
Haldia Regional Office,
West Bengal Pollution Control Board
Haldia

Environmental Statement FY 2021-22

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**[FORM – V]
(SEE RULE 14)**

Environmental Statement for the Financial Year ending the 31st March 2022

PART – A

- (i) Name and address of the owner/occupier of the industry, operation or process :** **Mr. Subhasendu Chatterjee**
Haldia Petrochemicals Limited
Plant :
P. B. No. 12, Durgachak,
Haldia, Dist. – Purba Midnapore,
Pin – 721 602
Tel: (03224) 274007/384/400
Fax: (03224) 272755/274880
Registered Office:
Tower 1, Bengal Eco Intelligence
Park (Techna), Block EM, Plot
No. 3, Sector V, Salt Lake,
PO: Bidhan Nagar, District: North
24 Paraganas, Kolkata 700 091,
Tel: 7112 2334, 7112 2445
- (ii) Industry Category :** Red, Petrochemicals (Basic & Intermediates)
- (iii) Production Capacity :** 7,00,000 TPA of Ethylene
- (iv) Year of Establishment :** 2000
- (v) Date of last Environmental Statement Submitted :** September 09, 2021

PART - B

Water and Raw Material Consumption

i) Water Consumption (Avg) m³/d

Process: 1774 m³/d
 Cooling: 31390 m³/d (including Boiler feed water and fire water makeup)
 Domestic: 1245 m³/d

Name of Product (Saleable)	Process Water Consumption per unit of Saleable Product (m ³ /MT)	
	During the previous financial year (2020-21)	During the current financial year (2021-22)
1) HDPE 2) LLDPE 3) PP 4) Benzene 5) Butadiene 6) Cyclo-Pentane 7) CBFS 8) LPG 9) Py Gas 10) Butene-1 11) MTBE	8.42	9.6

Note: Specific Water consumption was more due to less production in 2021-22 for the annual complex shut down in August – September, 2021.

(ii) Raw Material Consumption

*Name of raw materials	Name of products	Consumption of raw material per unit of output	
		During the Previous Financial Year 2020-21	During the Current Financial Year 2021-22

* Industry may use codes if disclosing details of raw materials would violate contractual obligations, otherwise all industries have to name the raw material used.

Ref. Annexure - 1

PART – C
Pollution discharged to environment/unit of output
 (Parameters as specified in the consent issued)

Sl No.	Pollutants	Quantity of pollutants discharged (Kg/day)	Concentration of pollutants discharges (Mass/volume)				Percentage of variations from prescribed standard with reasons		
			Parameter	Unit	Standards	Avg.			
a.	Water (Treated Effluent)	61	pH	-	6.5-8.5	7.44	No variation		
			TSS	mg/l	100	14.94			
			BOD	mg/l	30	10.15			
			COD	mg/l	250	51.32			
			Total Oil & Grease	mg/l	10.0	BDL			
			COD	311	Phenol	mg/l		1.0	BDL
					Sulphide	mg/l		2.0	BDL
			TSS	90	Cyanide	mg/l		0.2	BDL
					Fluoride	mg/l		5.0	0.70
					Total Chromium	mg/l		2.0	BDL
					Chromium (Cr ⁺⁶)	mg/l		0.1	BDL
					Iron as Fe	mg/L		1.0	0.33
					Zinc as Zn	mg/L		1.0	0.116
					Copper as Cu	mg/L		1.0	<0.05
			Phosphate as P	mg/L	5.0	0.56			
			Free available Chlorine (FRC)	mg/L	0.5	<0.1			
			Monthly data given in PART – G, Table 1.1 & 1.2						
b.	Air (Stack Emission)		Pl. see PART – G, Table- 3.1 to 3.5			No variation			
	PM	4187							
	SO _x	2054							
	NO _x	11615							

Note: All the data are of Annual Average Data (FY 2021-22)

PART – D

Hazardous Wastes

As specified under Hazardous Wastes and Other Wastes (Management & Transboundary Movement) Rules, 2016.

Sl. No.	Hazardous Waste		Total Quantity Generated (MT)	
			Financial Year 2020-21	Financial Year 2021-22
01	Process	Used Oil (5.1)	46.25	58.0
		Waste Oil (5.2)	385.15	320.6
		Oil impregnated Coke – NCU (36.2)	20.39	16.06
		Waste Resin (35.2)	3.16	16.0
		Oil Contaminated Cotton Waste (33.2)	2.19	3.27
		Tank Bottom Sludge + Waste Oil filter (3.3)	102.0	Nil
02	From Pollution Control Facilities	Sludge generated from WWTP (35.3)	163.62	138.56
		Ash from Incinerator* (37.2)	16.04	5.0

* Incinerator was not operational since August'21

PART – E
Solid Wastes

		Total Quantity (Kg)	
		During the previous financial year (2020-2021)	During the current financial year (2021-2022)
(a)	From Process*	N.A	N.A
(b)	From Pollution Control Facility	N.A	N.A
(c)	(1) Quantity Recycled or Re-utilized within the unit	NIL	NIL
	(2) Sold	Ref. Annexure – 2 (Sl. No. 1-17)	
	(3) Disposed	Ref. Annexure – 2 (Sl. No. 18)	

N.A – Not Applicable

PART – F

PLEASE SPECIFY THE CHARACTERISATION (IN TERMS OF COMPOSITION OF QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES.

Please refer **Annexure - 2** for Solid Waste and **Annexure – 3** (Form-IV) for Hazardous Waste. It specified the characteristics of generated wastes and the disposal practices adopted to handle them in safe manner.

PART – G

IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

Following steps have been taken to ensure safe disposal of the liquid, solid and gaseous effluents for environmental pollution control.

1. Liquid Effluent Treatment

HPL Complex generates liquid wastewater from Naphtha Cracker Unit, Butadiene Unit, Pyrolysis Gasoline Hydrogenation Unit, Benzene Extraction Unit, HDPE Unit, LLDPE Unit, PP Unit, Cooling Tower, Nitrogen Plant (put up by Praxair India Pvt. Ltd. on BOO basis), DM Water Plant, Captive Power Plant and Utilities and off-site buildings. HPL Plant has a suitable treatment system before disposal of plant generated wastewater and a comprehensive wastewater management system comprising of appropriate collection, treatment, and disposal facilities via only one mixed out fall.

Our 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 (**WWTP**).

ISBL Treatment is provided for the following streams:

- i) **Spent caustic stream from Naphtha Cracker Unit (NCU):** Spent caustic stream emerging from cracker unit is highly alkaline and contains high oxygen demand. In the spent caustic treatment plant, Na_2S is converted to sodium thiosulphate by oxidation process. After this treatment the stream is sent to WWTP.

- ii) **Neutralization / free oil removal in NCU:** Corrugated plate interceptors (CPI) have been provided in NCU for removal of floating oil from different waste streams of NCU.
- iii) **Polymer Plants:** Wash water and effluent streams from process contain trace hydrocarbon and polymers, which is, collected ISBL and then sent to WWTP after oil skimming and removal. Provision for removal of polymer powders and floating oil has been provided in the polymer plants
- iv) Neutralization of effluent generated from regeneration in Demineralization of water (DM) plant.

The OSBL treatment facilities (Wastewater Treatment Plant) are designed for treating process wastewater for reduction free and emulsified oil, sulphide, phenol, thiosulphate, total suspended solids (**TSS**), Bio-chemical Oxygen Demand (**BOD**) and Chemical Oxygen Demand (**COD**) and the contaminated rainwater for removal of oil and suspended solids. The treated effluents from the Waste Water Treatment Plant are meeting the discharge standards stipulated by West Bengal Pollution Control Board.

WWTP has been broadly designed for following treatment systems:

- **Oil 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. The effluent from TPI unit 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. The equalization tank effluent is

pumped to the pH Adjustment tank where the pH of the effluent is maintained in the range 7.0 to 8.0 by dosing H₂SO₄ or NaOH 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. Hydrogen Peroxide can also be dosed to oxidize sulfide (If sulfide level is more than 20 ppm) in the inlet effluent. The effluent is then routed to Flocculation Tank where addition of De-oiling Poly-electrolyte (DOPE) helps in breaking the oil-water emulsion and formation of alum flocs.

The effluent from flocculation tank is routed to the dissolved air floatation (DAF) tank. Mixture of air and water at high pressure is used to skim off the floating materials at top. Heavy sludge settles at bottom. The oily scum and the bottom sludge are routed to the chemical and oily sludge sump or Wet slop oil sump depending upon the characteristics. The clarified DAF effluent is directed to the aeration tank for biological treatment.

- **Biological Treatment System:** Activated sludge process 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 entrapment of the atmospheric air with the help of surface aerators. The nutrients i.e. urea & DAP solution are dosed at the inlet of aeration tank to provide nitrogen, phosphorus for microorganisms. 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 overflow 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. Bio-sludge is re-circulated to aeration tank inlet to maintain desired microorganism concentration. Sludge from re-circulation line is bleed-off regularly to sludge thickener to remove dead microorganism cells. The overflow from the clarifier is the treated effluent, which is routed to the guard pond. Two guard ponds (2 x 4,090 m³) 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 standards. Moreover, the guard ponds are provided with impervious layers to prevent percolation possibilities and consequent contamination of soil and sub-soil water.

- **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 Ltd. Sanitary effluent after collection in various suitable pits, is pumped to Bar Screen 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.
- **Contaminated Rainwater Treatment System:** During wet weather, the contaminated rainwater stream of HPL complex is received in the receiving sump of WWTP. This effluent is transferred to surge pond by dedicated high capacity WWF pumps (4 x 3,000 m³/h) after passing through bar screen and grit chamber. Floating oil skimmer is provided to remove the free oil layer formed in the surge pond and routed to the wet slop oil sump.

TPI has been provided to remove floating oil and suspended particles from the effluent. Provision has been made to transfer the surge pond effluent to equalization tank for processing along with other normal waste streams. Otherwise, if all parameters are within limit, it can be transferred to guard pond for disposal along with treated effluent.

- **Slop Oil Collection System:** The slop oil is collected in wet slop oil tank from various units e.g. TPI separator- I & II, Equalization tank, Dissolved air floatation tank and surge pond and transferred to slop oil tanks for storage. Slop oil is also received from KOD of flare system. The dry slop oil, retained in the tank after decantation of water, will be disposed as low-grade fuel to authorized external agencies or burnt in incinerator. One 1,000 m³ capacity tank has also been made to store the dry slop oil. The decanted water from slop oil tank bottom is recycled to receiving sump by gravity.
- **Sludge Handling System:** The oily sludge from the TPI separators, DAF tanks and clarifier is collected in chemical and oily sludge sump from where it is routed to sludge thickener. The under flow from the sludge thickener is routed to the thickened sludge sump from where it is pumped to the centrifuge. Dewatering polyelectrolyte is dosed in centrifuge to achieve better sludge consistency. Periodically sludge is collected from centrifuge and is stored in secured On-Site Storage Pit.
- **Final Discharge System:** Co-generation power plant, Cooling tower, Nitrogen plant and DM water plant effluent is being collected in Cooling Tower Blow Down (CTBD) and DM waste pond. CTBD and DM waste pond overflow/drain, which is totally free of any organics, or oil is routed to treat effluent sump along with treated effluent from guard pond for final disposal through a channel.

The treated effluent from WWTP is discharged into the river Hooghly through Haldia Green Belt Canal. Also, 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 the rivers Hooghly and Haldi are tidal in nature, the buffering capacity of the green belt canal will ensure to hold the treated effluent discharged (via green

belt canal) during the high tide period. The final effluent meets the WBPCB prescribed standards.

Environmental Laboratory checks the quality of effluent daily as per specifications of effluent standards. In case the effluent does not meet the stipulated standard, it would be recycled to the WWTP for retreating to achieve the stipulated effluent quality standards.

Annual Effluent Quality

Sample was collected from the WWTP discharge point daily. Analytical results indicate that average value of all the parameters in all four season are well within norms.

Analytical results of the WWTP treated effluent & HPL final Outfall indicate that average value of all the parameters in all four seasons are well within statutory norms. All average values of all parameters are well within the WBPCB prescribed norms.

WWTP Treated Effluent & HPL Final Outfall is analyzed on daily grab sampling basis for the following parameters annual and summarized seasonal results are given in Table No.: 1.1 and 1.2 respectively.

As per the guideline of CPCB Online Effluent Monitoring System was installed on March'16 for continuous monitoring of treated effluent for 05 nos. of parameters (pH, Flow, BOD, COD & TSS) and Online Stack Monitoring System was installed in 04 nos. of stacks of CPP on March'17 for continuous monitoring of PM, SO₂, NO_x & CO. The data of both the analysers is transferred successfully to CPCB server.

TABLE 1.1: MONTHLY DATA OF WWTP TREATED EFFLUENT

Sl. No.	Parameter	Unit	WBPCB Standard	Apr'21	May'21	Jun'21	Jul'21	Aug'21	Sept'21	Oct'21	Nov'21	Dec'21	Jan'22	Feb'22	Mar'22
1.	pH	--	6.5-8.5	7.35	7.27	7.13	7.20	7.39	7.52	7.46	7.62	7.68	7.56	7.52	7.55
2.	TSS	mg/l	100	14.43	13.87	14.67	14.81	17.48	15.07	14.29	14.20	15.19	14.52	15.25	15.48
3.	BOD	mg/l	30	8.27	8.84	8.10	9.03	26.90	14.13	9.19	8.20	8.00	7.29	6.71	7.10
4.	COD	mg/l	250	38.33	42.23	37.32	42.42	172.15	69.57	43.97	39.30	33.71	33.10	31.64	32.06
5.	Total O&G	mg/l	10	<5.0	<5.0	<5.0	<5.0	7.09	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6.	Phenol	mg/l	1.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
7.	Sulfide	mg/l	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
8.	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9.	Fluoride	mg/l	5.0	0.73	0.71	0.72	0.71	0.68	0.69	0.71	0.70	0.69	0.70	0.71	0.67
10.	Total Chromium	mg/l	2.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
11.	Hexavalent Chromium(Cr+ ⁶)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
12.	Iron as Fe	mg/L	1.0	0.65	0.47	0.27	0.25	0.21	0.43	0.37	0.36	0.46	0.11	0.25	0.17
13.	Zinc as Zn	mg/L	1.0	0.152	0.172	0.167	0.089	0.072	0.086	0.068	0.185	0.185	0.045	0.099	0.070
14.	Copper as Cu	mg/L	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
15.	Phosphate as P	mg/L	5.0	1.31	1.02	0.94	1.05	0.21	0.24	0.27	0.24	0.65	0.22	0.17	0.37
16.	Free available Chlorine	mg/L	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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

TABLE 1.2: MONTHLY DATA OF EFFLUENT OF HPL FINAL OUTFALL

Sl. No.	Parameter	Unit	WBPCB Standard	Apr'21	May'21	Jun'21	Jul'21	Aug'21	Sept'21	Oct'21	Nov'21	Dec'21	Jan'22	Feb'22	Mar'22
1.	pH	--	6.5-8.5	7.88	7.58	7.40	7.15	7.34	7.61	7.35	7.55	7.82	7.90	7.75	7.67
2.	TSS	mg/l	100	26.17	25.35	24.77	24.23	26.00	23.70	24.32	24.57	25.48	25.29	26.14	25.48
3.	BOD	mg/l	30	9.30	9.40	9.0	9.42	18.48	10.83	10.03	9.00	9.48	9.06	8.61	9.0
4.	COD	mg/l	250	43.07	44.26	42.65	44.90	151.10	50.47	44.74	42.87	41.65	42.68	40.14	40.48
5.	Total O&G	mg/l	10	<5.0	<5.0	<5.0	<5.0	8.54	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6.	Phenol	mg/l	1.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
7.	Sulfide	mg/l	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
8.	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9.	Fluoride	mg/l	5.0	0.60	0.56	0.57	0.57	0.53	0.54	0.57	0.57	0.60	0.59	0.59	0.60
10.	Total Chromium	mg/l	2.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
11.	Hexavalent Chromium(Cr ⁺⁶)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
12.	Iron as Fe	mg/L	1.0	0.48	0.75	0.29	0.45	0.36	0.74	0.54	0.61	0.80	0.76	0.25	1.32
13.	Zinc as Zn	mg/L	1.0	0.136	0.243	0.107	0.075	0.028	0.274	0.017	0.246	0.246	0.051	0.060	0.065
14.	Copper as Cu	mg/L	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
15.	Phosphate as P	mg/L	5.0	1.01	0.98	0.80	0.62	0.18	0.44	0.15	0.27	0.37	0.24	0.26	0.34
16.	Free available Chlorine	mg/L	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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

2. Gaseous Pollutant

The gaseous pollutants from the Haldia Petrochemicals Complex mainly are hydrocarbon vapors, SO₂ and NO_x.

All major hydrocarbons as well as minor intermittent streams with low hydrocarbon content is released to a totally enclosed flare header and burnt in a properly designed flare stack. Even in case of emergency conditions e.g. process upsets and power failure the release of hydrocarbons from all relief valves of the process units can contribute a flare load much below the maximum capacity i.e. 1286 Tones /hr.

Low NO_x burners have been adopted in Naphtha Cracker furnaces and Captive Power Plant (CPP) to ensure the minimal emission of NO_x to the atmosphere.

The Haldia Petrochemicals Complex adopts sulphur-free gas as fuel for the cracker heaters in Naphtha Cracker units and low sulphur naphtha as well as surplus fuel gas from the Naphtha Cracker Plant as fuels in the Combined Cycle Co-generation Power Plant, thereby minimizing SO₂ emissions. Since fuel gas & naphtha are used in the Haldia Petrochemicals Complex, contribution of emissions of Particulate Matters (PM) is practically negligible.

New online stack monitoring system was installed in the stacks Auxiliary Boilers and HRSGs of CPP. M/s. Environnement S.A installed the online SO_x, NO_x & CO monitoring system and M/s ICE installed the PM monitoring system in both the Auxiliary Boilers and HRSGs. The integrated system was commissioned and the online data was sent to the servers of CPCB & WBPCB from March 2017 onwards.

03 nos. of Coal - based CFBC boilers (120 TPH each) were installed in our Captive Power Plant. The Commissioning & subsequent stabilisation activities were under progress from December 2021 onwards. A common stack of 140 meter height was connected with three boilers through the Electrostatic Precipitators.

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

Sl. No	Unit	No.of Stack	Parameters	Frequency of Monitoring
1.	Naptha Cracker Unit	09	SO ₂ , NO _x , CO,	Once in a month
2.	Pyrolysis Gasoline Hydrogenation Unit	01	SO ₂ , NO _x , CO, PM	Once in a month
3.	Py-gas Desulfurisation Unit	01	SO ₂ , NO _x , CO, PM	Once in a month
4.	Incinerator	01	SO ₂ , NO _x , CO, PM, TOC	Once in a month
			HCL, HF, Dioxin & Furan	Quarterly
5.	CPP – Auxiliary Boiler	02	SO ₂ , NO _x , CO, PM	Twice in a month
6.	CPP –GT & HRSG	02	SO ₂ , NO _x , CO, PM	Twice in a month
7.	CPP – Emergency DG	01	SO ₂ , NO _x , CO, PM	Quarterly

The Stack monitoring data are given in Table No. 3.1, 3.2, 3.3, 3.4 & 3.5.

TABLE 3.1: ANNUAL AVERAGE – NCU

Stack: NCU (2F-201 to 2F-209)

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)
2F – 201	5.44	23.02	3.18
2F – 202	5.04	23.89	3.73
2F – 203	5.00	21.87	4.36
2F – 204	5.08	23.78	3.91
2F – 205	6.25	22.77	4.64
2F – 206	5.08	25.78	3.82
2F – 207	5.70	24.59	4.18
2F – 208	5.49	23.54	3.91
2F – 209	6.22	25.62	3.91
Standard	50	350	NA

All values corrected to 3% Oxygen

TABLE 3.2: ANNUAL AVERAGE – PGHU

Stack: PGHU (4F – 101)

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)	PM (mg/Nm ³)
4F – 101	14.08	62.98	35.73	6.41
Standard	50	350	NA	10

All values corrected to 3% Oxygen

TABLE 3.3: ANNUAL AVERAGE – PGDS

Stack: PGDS (4F – 201)

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)	PM (mg/Nm ³)
4F – 201	11.33	58.98	30.27	3.76
Standard	50	250	NA	5

All values corrected to 3% Oxygen

TABLE 3.4: ANNUAL AVERAGE – Incinerator

Stack: Incinerator

Furnace Heater Name	Results in mg/Nm ³							ngTEQ/Nm ³
	SO ₂	NO _x	CO	PM	TOC	HCL	HF	Dioxin & Furan
Incinerator	10.07	47.00	29.00	32.14	2.21	15.68	0.42	<0.1
Standard	200	400	100	50	20	50	4	0.1

All values corrected to 11% Oxygen

TABLE 3.5: ANNUAL AVERAGE – Captive Power Plant (CPP)

Stack: Captive Power Plant (CPP)

Furnace Heater Name	Results in mg/Nm ³			
	SO ₂	NO _x	CO	PM
Auxiliary Boiler # 1	5.61	23.43	4.00	10.63
Auxiliary Boiler # 2	5.49	22.06	4.30	11.06
HRSG & GT # 1	5.20	39.08	5.21	13.97
HRSG & GT # 2	5.96	43.67	5.20	11.95
Standard	NA	188	11500	50

NO_x values are corrected to 15% Oxygen

Ambient Air Quality

Monitoring of ambient air quality has been carried out at eleven locations (Five locations inside the plant & six locations outside the plant). In all the identified locations monitoring are carried out twice in a week basis for Respirable Particulate Matter (PM10), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO) and Benzene and once in a week for PM2.5, Ozone (O₃), Lead (Pb), Ammonia(NM₃), Arsenic (As), Nickel (Ni), Benzo(a)Pyrene (BaP) throughout the year.

Ambient air quality is compared with national standards in Table.3.6, 3.7, 3.8 & 3.9.

An On-line Ambient Air Quality Monitoring Station (AAQMS) has been installed in the South Control Room in February 2008 for continuous monitoring of the ambient air quality in that region for continuous monitoring of PM_{2.5} , SO₂, SO_x, NO₂, NO_x, Total Hydrocarbon (THC), Wind Speed, Wind Direction, Temperature, Pressure & Relative Humidity. The system has been upgraded with new analysers (PM₁₀, NH₃, O₃, CO & Benzene) in 2018. On-line monitoring of Hydrocarbon in ambient air is also operational round the clock in over Central laboratory building. The On-line AAQMS & Hydrocarbon analyzer data was given in Table 3.8. The online data of ambient air quality is being transferred to both the servers at CPCB and WBPCB end.

AMBIENT AIR QUALITY MONITORING STATION

A. On-Site Ambient Air Quality Monitoring Station (AAQMS)

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	Power Plant (Security Gate)	North - West

B. Off-Site Ambient Air Quality Monitoring Station (AAQMS)

Sl. No.	Station Code	Name of Station	Direction from HPL Complex
1.	AAQM – 6	Nandarampur	N
2.	AAQM – 7	Basudevpur	NE
3.	AAQM – 8	Near CPT Hospital	S
4.	AAQM – 9	Hatiberia (Swati Complex)	SSW
5.	AAQM – 10	IOC Township	S
6.	AAQM – 11	Manoharpur	WNW

National Ambient Air Quality Standards

Sl. No.	Parameters	Unit	Time Weighted Average	Ambient air concentration ($\mu\text{g}/\text{m}^3$)	
				Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area
1	Sulphur Dioxide (SO_2)	$\mu\text{g}/\text{m}^3$	Annual*	50	20
			24 hours**	80	80
2	Nitrogen Dioxide (NO_2)		Annual*	40	30
			24 hours**	80	80
3	Particulate Matter (PM_{10})		Annual*	60	60
			24 hours**	100	100
4	Particulate Matter ($\text{PM}_{2.5}$)		Annual*	40	40
			24 hours**	60	60
5	Ozone (O_3)		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^3	8 hours**	02	02
		1 hours**	04	04	
8	Ammonia (NH_3)	$\mu\text{g}/\text{m}^3$	Annual*	100	100
		24 hours**	400	400	
9	Benzene (C_6H_6)	$\mu\text{g}/\text{m}^3$	Annual*	05	05
10	Benzo(a)Pyrene (BaP)	ng/m^3	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.

TABLE 3.6: ANNUAL AMBIENT AIR QUALITY (Avg. Results On-site and Off-site)
April 2021 to March 2022

Month	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	C ₆ H ₆ (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
On-Site Plant	53.69	29.46	18.92	22.91	2.29	0.600	29.81	8.20	0.36	4.24	12.08	0.137
Off-Site Plant	44.18	21.79	13.28	17.17	1.79	0.368	26.21	5.83	0.18	2.22	8.05	0.081

TABLE 3.7: MONTH WISE AIR QUALITY (On-Site Locations)

Location	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	C ₆ H ₆ (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
April 21	63.65	30.88	20.25	22.59	1.87	0.538	24.66	8.36	0.35	4.37	12.32	0.142
May 21	57.05	28.02	20.98	23.46	1.95	0.552	27.37	9.06	0.33	4.50	12.23	0.142
June 21	47.21	22.02	18.65	22.51	*	0.540	30.07	9.05	*	*	*	*
July 21	44.13	20.26	19.02	22.21	1.54	0.569	30.41	8.11	0.15	4.21	12.04	0.129
Aug. 21	36.28	17.77	18.38	23.38	1.54	0.538	30.69	7.46	0.15	4.18	11.96	0.128
Sept. 21	39.55	19.33	18.56	21.36	1.62	0.569	28.47	7.38	0.17	4.12	11.92	0.133
Oct. 21	37.04	18.56	16.96	22.73	1.59	0.819	28.56	7.78	0.18	4.13	11.75	0.133
Nov. 21	50.66	25.68	18.21	24.77	2.13	0.781	28.90	8.04	0.39	4.15	12.17	0.142
Dec. 21	60.96	30.39	19.51	24.69	3.04	0.531	31.15	7.84	0.59	4.45	12.35	0.149
Jan. 22	73.25	73.28	19.28	22.92	3.71	0.593	33.34	8.43	0.68	4.12	11.97	0.133
Feb. 22	69.96	33.96	18.55	21.39	3.33	0.544	31.59	8.49	0.55	4.12	12.04	0.136
Mar. 22	64.59	33.36	18.72	22.89	2.83	0.627	32.49	8.44	0.42	4.27	12.14	0.136

Note: *Samples could not be sent to the laboratory of M/s SRL, Kolkata for analysis due to Lockdown.

TABLE 3.8: MONTH WISE AIR QUALITY (Off-Site Locations)

Location	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	C ₆ H ₆ (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
April 21	53.91	26.77	14.64	16.91	1.64	0.324	22.89	5.96	0.05	2.31	8.03	0.080
May 21	53.06	26.39	14.51	16.82	1.66	0.391	23.58	6.98	0.05	2.26	8.19	0.082
June 21	37.49	17.52	13.63	18.13	*	0.362	25.43	6.30	*	*	*	*
July 21	32.17	14.96	13.69	16.91	0.93	0.386	26.97	5.56	0.05	2.12	8.22	0.076
Aug. 21	28.91	14.71	12.49	17.33	1.22	0.323	28.52	5.42	0.05	2.20	8.01	0.083
Sept. 21	29.85	15.68	12.49	15.35	1.22	0.386	26.53	5.24	0.05	2.16	8.00	0.074
Oct. 21	30.08	15.02	11.74	17.23	1.31	0.481	25.51	5.53	0.05	2.21	7.85	0.081
Nov. 21	37.44	19.68	12.37	18.34	1.54	0.429	24.15	5.51	0.14	2.22	8.21	0.084
Dec. 21	49.45	24.28	13.38	19.12	2.21	0.304	26.92	5.51	0.39	2.18	7.90	0.081
Jan. 22	63.38	31.41	13.37	17.43	3.00	0.301	27.88	5.95	0.46	2.22	7.98	0.081
Feb 22	60.88	28.73	13.30	16.20	2.72	0.332	28.90	6.04	0.36	2.29	8.03	0.084
Mar 22	53.56	26.32	13.75	16.24	2.28	0.398	27.28	5.97	0.28	2.20	8.08	0.082

Note: Samples could not be sent to the laboratory of M/s SRL, Kolkata for analysis due to Lockdown.

TABLE 3.9: Annual Average results of On-line Ambient Air Quality Monitoring Station (AAQMS) & HC Analyzer for the month of April 2021 to March 2022.

Location	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	H ₂ S (µg/m ³)	NO _x (µg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	Benzene (µg/m ³)	CO (mg/m ³)
South Control Room (SCR)	78.18	27.03	15.90	13.12	26.06	14.43	42.34	1.83	0.55
	WS (m/s)	Wind Degree	Temperature (°C)	RH (%)	Pressure (mmHg)	THC (PPM)	CH ₄ (PPM)	NMHC (PPM)	
	1.93	254.57	26.63	73.77	725.22	3.12	1.78	1.35	
Central Laboratory						3.16	2.11	1.05	

Ground level concentration of pollutants

The impacts due to emission from Nine (9) stacks of Naphtha Cracker Unit (NCU), One stack of PGHU and Incinerator, Four stacks of Captive Power Plant (CPP).

The status of ground level concentration (GLC) values are from the stacks emission up to surrounding 10 km from the plant.

The prediction of ground level concentration (GLC) of pollutants from the stacks of HPL was carried out with the help of air quality simulation model ISCST-3.

The impact has been predicated over the study area, which covers 20 km X 20 km area with the HPL Plant at its centre. GLC values are calculated at every 500 m grid point all around HPL complex. To obtain greater resolution the locations of receptors (As per the guidelines of CPCB) are define with respect to 16 radial wind directions (N to WNW) and radial distance from the centre. The radial distances are selected in such a way that the distances are function of physical stack height.

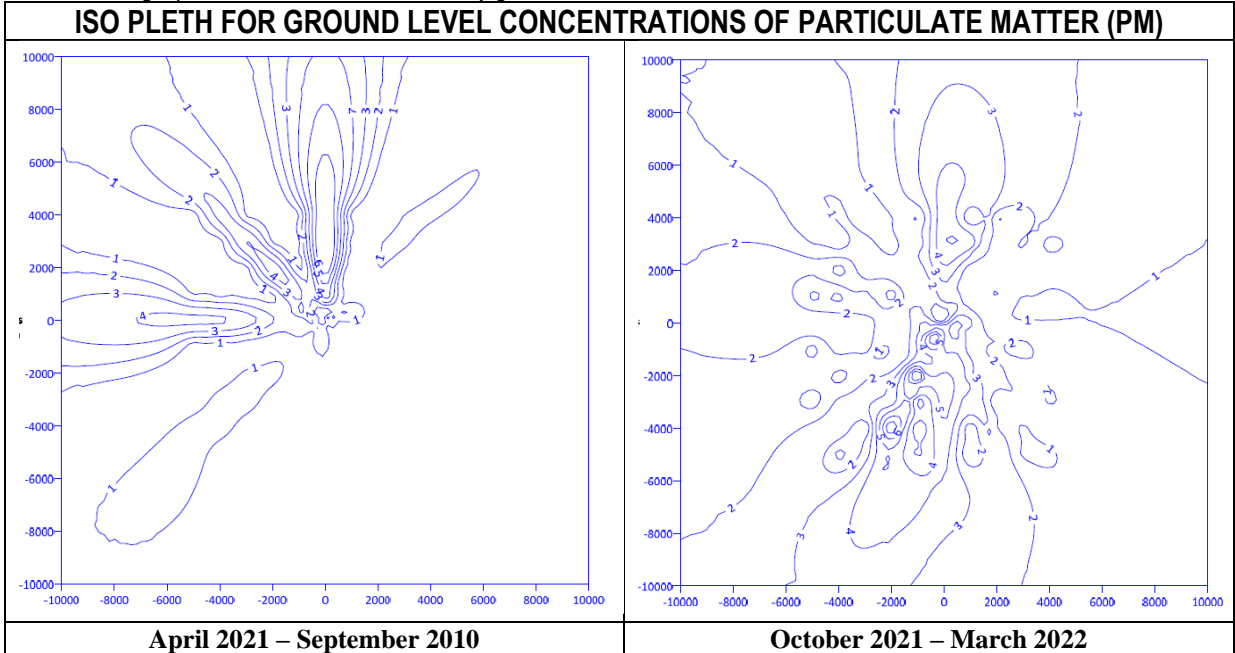
The emission of PM, SO₂, NO_x and CO from nos. of 9 stacks of Naphtha Cracker Unit (Stack height 40 m, Average Temperature 130°C), no. of one stack of PGHU (Stack height 33 m, Average Temperature 260°C, Velocity 7 m/sec), PGDS (Stack height 30 m, Average Temperature 270°C, Velocity 7 m/sec) and Incinerator (Stack height 30 m, Average Temperature 70°C, Velocity 7 m/sec), nos. of two stacks of Auxiliary Boiler (Stack height 54.3 m, Average Temperature 150°C, Velocity 10 m/sec), and nos. of two stacks of GT & HRSG (Stack height 45 m, Average Temperature 190°C, Velocity 14 m/sec) are considered. Measured stack monitoring values are taken for GLC calculation. Measured all months meteorological data (April 2020 to March 2021) are used for calculations.

The GLC's are predicted based on the emission data like height, top, diameter and concentration of PM, SO₂, NO_x and CO.

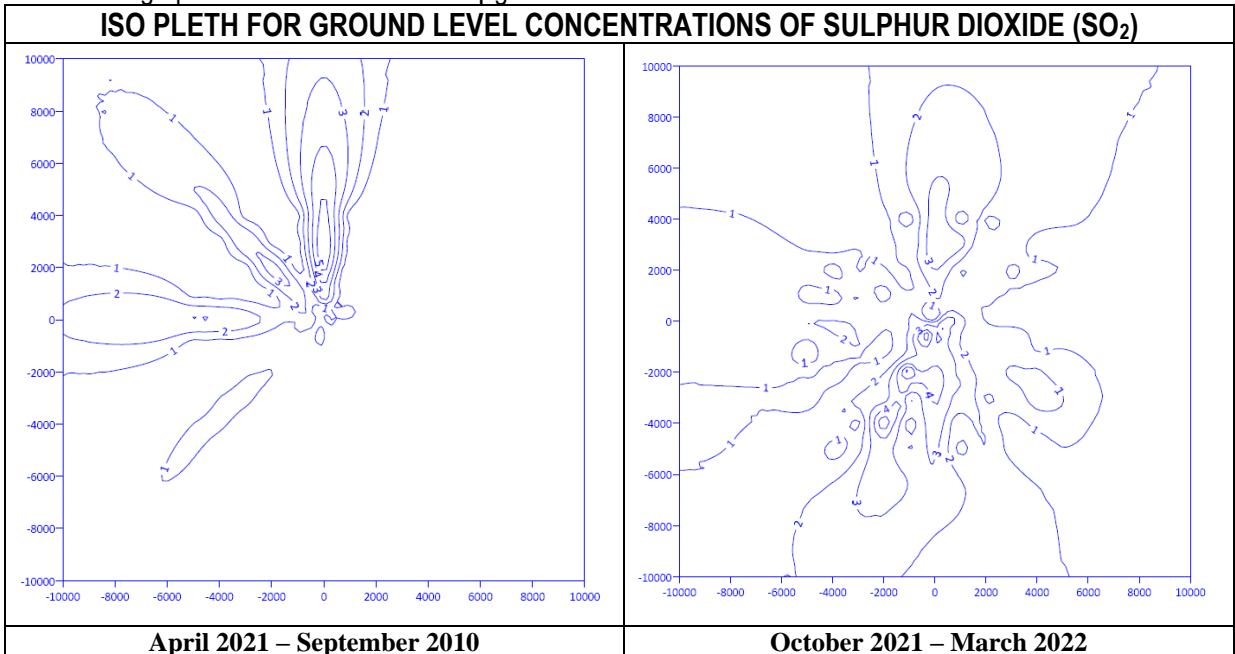
GLC of two seasons like April 2021 to September 2021 and October 2021 to March 2022 are given.

ISO PLETH FOR GROUND LEVEL CONCENTRATIONS

X axis: Distance in Meter
 Y axis: Distance in Meter
 Nos. in the graph denotes concentration in $\mu\text{g}/\text{m}^3$

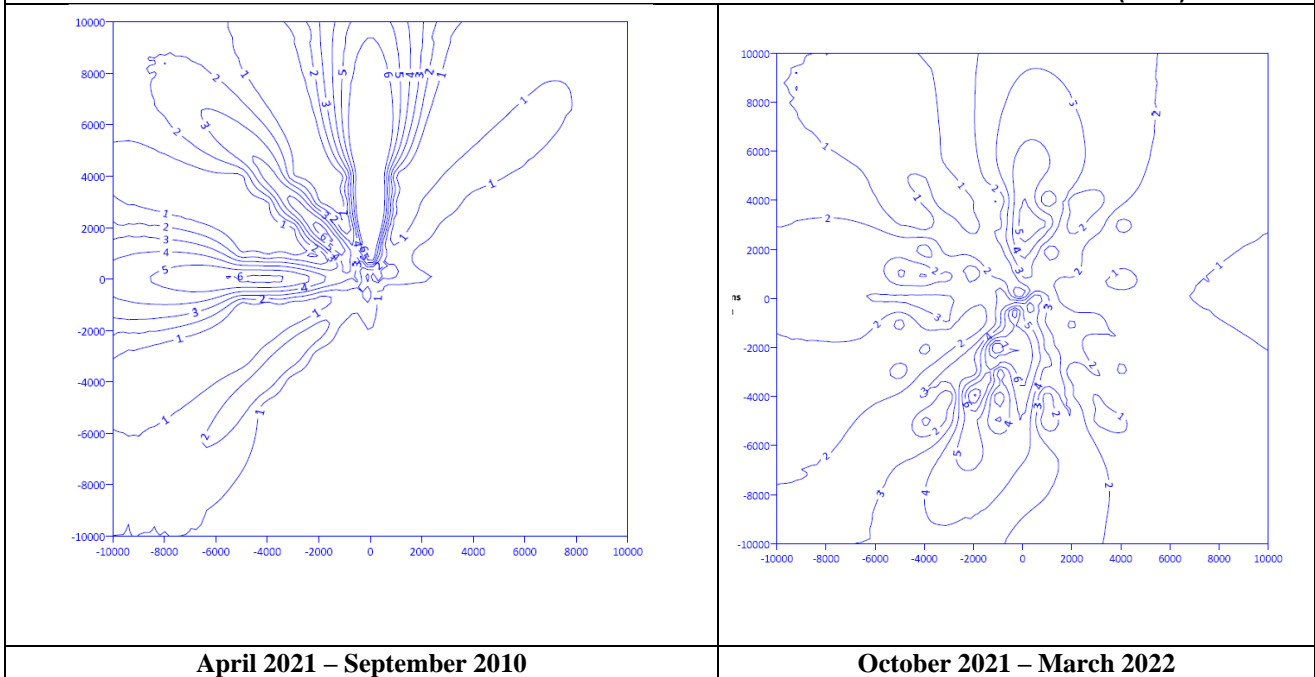


X axis: Distance in Meter
 Y axis: Distance in Meter
 Nos. in the graph denotes concentration in $\mu\text{g}/\text{m}^3$



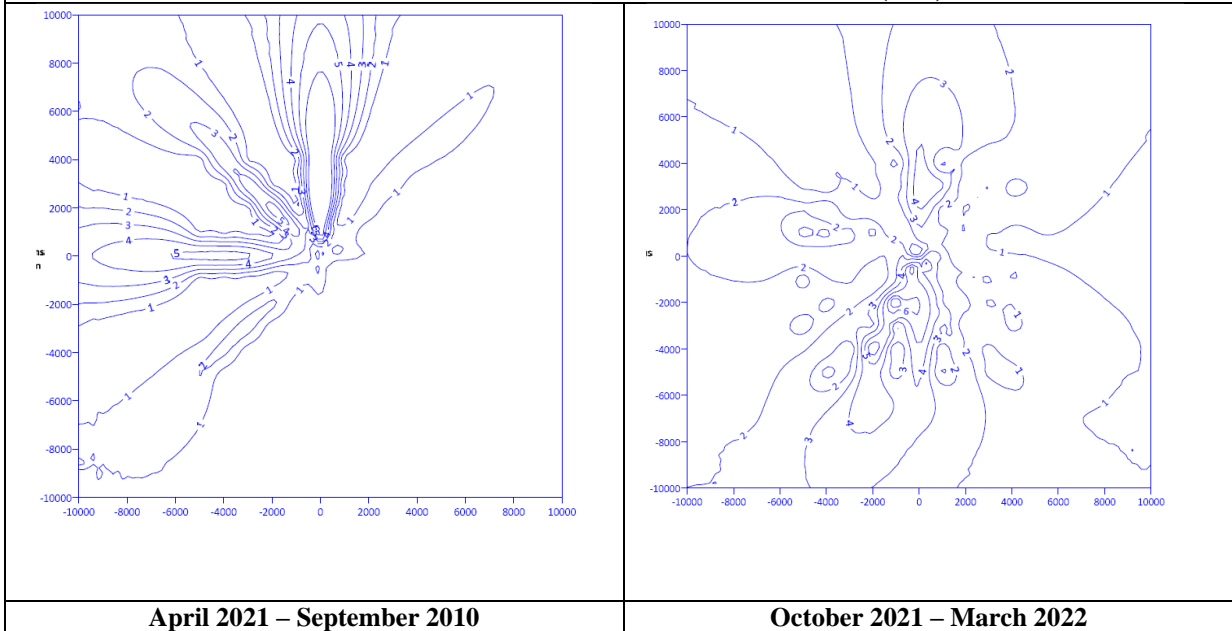
X axis: Distance in Meter
 Y axis: Distance in Meter
 Nos. in the graph denotes concentration in $\mu\text{g}/\text{m}^3$

ISO PLETH FOR GROUND LEVEL CONCENTRATIONS OF NITROGEN DIOXIDE (NO_x)



X axis: Distance in Meter
 Y axis: Distance in Meter
 Nos. in the graph denotes concentration in $\mu\text{g}/\text{m}^3$

ISOPLETH FOR CARBON MONOXIDE (CO)



Fugitive Emission Monitoring

The main sources of fugitive hydrocarbon emissions from HPL Complex remain in the storage tanks/spheres and likely loss of hydrocarbons through the pump / valve glands. Uses of international standards have been made in design of storage tank, spheres, valves and pumps to minimize fugitive emissions. Any accidental release through pressure relief valves is diverted to the high point flare stack.

In order to minimize the fugitive emission from the Hydrocarbon storage the following engineering designs have been adopted.

- Naptha Tank - floating roof
- Benzene / C6 Hydrocarbon – internal floating roof tanks
- Hydrogenated Pyrolysis Gasoline / C5 Hydrocarbons – totally enclosed dome-roof tank.
- Canned pumps or pumps with double mechanical seals for toxic hydrocarbons like butadiene and benzene
- Bellow seal valves for benzene and butadiene

In view of all these design provisions in Haldia Petrochemicals Complex, it is ensured that levels of fugitive emissions are negligible.

Work Zone Monitoring

TABLE 3.10: ANNUAL WORK ZONE AIR QUALITY (Avg.)

Plant	Standards (ppm)	Average Results (ppm)
Benzene Extraction Unit	1.0	0.140
Butadiene Extraction Unit	1.0	0.214
Butadiene Loading Area	1.0	0.037
Hexane Area	500.0	9.87

Leak Detection & Repair (LDAR):

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 and the leakage would be arrested accordingly.

The technique which has been used to control emissions from equipment leaks is Leak Detection and Repair (LDAR). 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.

Emission Factors(kg/hr/source) for Screening value range (ppmv)				
Source	Service	0-1000	1001-10000	Over- 100000
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
Flanges, connections	All	0.00002	0.00875	0.0375
Open-ended lines	All	0.00013	0.00876	0.01195

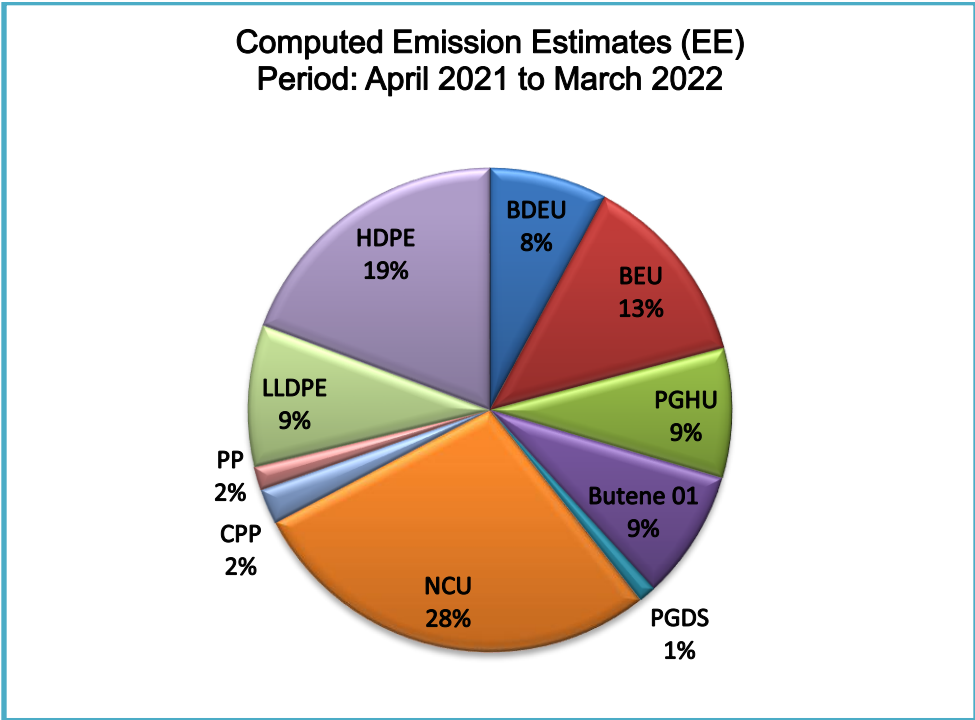
Reference: USEPA Handbook on Control Techniques for Fugitive VOC Emissions from Chemical Process Facilities. EPA/625/R-93/005, March 1994.

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.

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

**TABLE 3.11: Estimated VOC emission from NCAU (BDEU, BEU, PGHU, Butene 1 & PGDS),
NCU, CPP, PP, LLDPE, HDPE,**

Location	Computed Emission Estimates (EE) Unit – Ton/Annum	Computed Emission Estimates (EE) in 100%
BDEU	0.020	7.87
BEU	0.033	12.99
PGHU	0.022	8.66
Butene 01	0.022	8.66
PGDS	0.003	1.18
NCU	0.071	27.95
CPP	0.006	2.36
PP	0.004	1.57
LLDPE	0.024	9.45
HDPE	0.049	19.29
TOTAL	0.254	100.00



4. Noise Control Measures at HPL Complex

Noise levels are to be maintained below 90 dBA for 8-hour exposure as per OSHA standard. This is being achieved by taking the following measures:

- Proper acoustic design and sound engineering practices have been adopted in the plant design.
- Equipment have been provided with noise reduction devices
- Only in areas that are mainly unoccupied, a noise level of more than 90 dBA may be allowed.
- Limitation of exposure time and use of PPE in high noise zone.

Noise Level Result:

In order to establish ambient noise levels for the study area, measurement of noise levels were performed at 05 (Five) nos. of locations (1 meter away from the boundary walls). Monitoring was carried out once in a season in each location.

A Precision Integrated Sound Level Meter (SL - 4001) manufactured by Lutron of Taiwan was used to measure hourly noise levels at each monitoring location during a 15-minute sampling period at hourly intervals for a 24-hour period. Noise monitoring was carried out for one day during each season at each monitoring location.

The noise levels recorded during daytime nighttime are summarized and compared with the norms prescribed by Ministry of Environment and Forests (Notification for Ambient Noise dated 26 December, 1989) and consent condition of WBPCB. It has been found that the sound level in all season is well within the standard.

The monitoring locations in plant boundary 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.	BOO Gate	AN4	North of north west
5.	North Gate	AN5	North

Measurements were taken in the all four locations in same day at one-hour interval for 24 hours once in each season. The ambient noise monitoring results are given in Table 4.1.

**Table – 4.1: ANNUAL DATA OF AMBIENT NOISE LEVEL
(Day Time & Night Time)**

LOCATION	April 2021		July 2021		October 2021		January 2022	
	Day	Night	Day	Night	Day	Night	Day	Night
Near Gate No-1	54.61	54.29	56.0	54.8	57.01	55.36	57.47	56.30
Near Gate No-3	66.04	67.20	66.1	65.5	65.51	63.54	66.34	65.20
Near South Gate	56.03	55.68	66.1	65.6	54.97	53.11	56.16	56.35
Near CPP Security Office	54.60	53.92	67.9	65.6	66.64	64.85	67.07	66.18
Near North Gate	64.84	65.96	55.9	53.7	55.80	54.16	54.65	53.97

Note: Sound Pressure Level in leq dB (A)

PART – H

ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

Annual Allocation / expenditure of funds for Environmental Safeguards (including capital expenditure) under various heads during **FY 2022 – 2023** work to approx. **Rs. 32.14 Crores.**

1. Environmental Monitoring Cost	:	Rs. 70.00 lacs
[Rate Contract for Environmental & Process Monitoring Job at HPL Complex]		
2. Greening Drive Activities	:	Rs. 125.0 lacs
[Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]		
3. Statutory Fees & Insurance Expenses	:	Rs. 26.7 lacs
[Analysis charges, PLI Policy]		
4. Environmental Awareness Programme	:	Rs. 5.0 lacs
[Celebration of World Environment Day, Workshop Seminar]		
5. Hazardous Wastes Disposal Expenses	:	Rs. 119.0 lacs
6. Operational, Maintenance & Installation Cost of Environment protection system:		
5.1 Operational cost of WWTP	:	Rs. 576.6 lacs
5.2 Operational cost of Flare Stack Emission System	:	Rs. 2222.6 lacs
5.3 Operation cost of Incinerator	:	Rs. 36.28 lacs
5.4 Operation cost of Benzene Recovery Unit	:	Rs. 0.90 lacs
5.5 CMC for the Hydrocarbon Analyser, AAQMS	:	Rs. 21.32 lacs
5.6 CMC for Online Effluent & Stack Monitoring system	:	Rs. 6.15 lacs
5.7 Other Expenses (Calibration, Spares & Consumables)	:	Rs. 2.5 lacs
7. Training/Workshop/Seminar/Subscription	:	Rs. 2.65 lacs
		Total Rs. 3214.7 lacs

All above-mentioned measures are considered for the abatement of pollution at HPL Complex.

Environmental Expenditure details (actual) during April'21 to March'22 are given below:

1. Environmental Monitoring Cost	:	Rs. 73.18 lacs
[Rate Contract for Environmental & Process Monitoring Job at HPL Complex]		
2. Greening Drive Activities	:	Rs. 91.62 lacs
[Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]		
3. Statutory Fees & Insurance Expenses	:	Rs. 3.47 lacs
[Analysis charges of WBPCB + Environmental Relief Fund of PLI Policy]		
4. Hazardous Wastes Disposal Expenses	:	Rs. 42.19 lacs
5. Operational, Maintenance & Installation Cost of Environment protection system:		
5.1 Operational cost of WWTP	:	Rs. 576.6 lacs
5.2 Operational cost of Flare Stack Emission System	:	Rs. 2222.6 lacs
5.3 Operation cost of Incinerator	:	Rs. 36.28 lacs
5.4 Operation cost of Benzene Recovery Unit	:	Rs. 0.90 lacs
5.5 CMC for the Hydrocarbon Analyser, AAQMS	:	Rs. 21.32 lacs
5.6 CMC for Online Effluent & Stack Monitoring system	:	Rs. 6.15 lacs
7. Training/Workshop/Seminar/Subscription	:	Rs. 2.51 lcs
		Total Rs.3076.8 lacs

All above-mentioned annual expenditure of funds for Environmental Safeguards under various heads during 2021-22 works to approx. **Rs. 30.76 Crores.**

PART – I
ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

GREEN BELT DEVELOPMENT

A Green belt of approx 103-hectare area and 50-100 m width was developed surrounding the HPL Complex. Before starting the construction work, HPL started plantation work for green belt all along the boundary. The developed green belt acts as a buffer zone between HPL complex and surroundings. Selection and diversity of plant species are as per the guidelines of Ministry of MoEFCC.

The plants add beauty and act as sink for carbon dioxide and will reduce the physical impact outside the premises, in case of any on-site emergency.

Total Nos. of trees as on April 30, 2022

Sl. No.	Plants Name	Number				Total
		Zone-1	Zone-2	Zone-3	Zone-4	
1	Casurina	1538	84	320	101	2043
2	Azadirachta (Neem)	2157	120	87	192	2556
3	Arjun	3667	279	457	333	4736
4	Acacia	4438	168	832	194	5632
5	Lagerstroemia (Jarul)	2952	210	320	128	3610
6	Alstonia(chatim)	455	35	54	25	569
7	Jaman (Jam)	127	45	51	25	248
8	Bottle brush	1715	239	555	54	2563
9	Karamja	27125	2255	6381	3402	39163
10	Cassia renigera	4	3	3	0	10
11	Putranjiva (Bakul)	2287	20	402	241	2950
12	Spathodea	792	0	0	0	792
13	Peltophorum (Khiris)	35	23	13	37	108
14	Caesalpinia – Flava (Radha chura)	25232	329	21123	6721	53405
15	Nerium (Karabi)	69	5	0	0	74
16	Bombax (Simul)	132	25	22	67	246
17	Dalbergia (Sisu)	13	7	0	12	32
18	Albizzia (Sirish)	26	4	7	24	61
19	Habal	100	23	85	23	231
20	Polyalthia (Debdaru)	2	0	0	0	2
21	Others(Ficus benamina, Leucaena (subabul), Babla, Tal, Bel Etc.	1490	54	882	746	3172
	TOTAL	74356	3928	31594	12325	122203

Annexure - 1: Consumption & Production Data 2021-22

A. Naphtha Cracker Unit:

Name of Raw Material	Consumption (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2020-21	2021-22		2020-21	2021-22	2020-21	2021-22
Naphtha	1714450	1623240	Ethylene	603776	574508	3.15	3.13
			Propylene	303567	293000	6.27	6.14
LPG Recycle	82613	59331	RPG	423258	400110	4.49	4.50
			C4 Mix	171187	164568	11.11	10.94
C5 Recycle	57645	70281	CBFS	72136	63755	26.37	28.24
			Hydrogen	13099	12555	145.19	143.38
C6 Raffinate	47239	47315	Propane	9379	8817	202.80	204.17

B. Naphtha Cracker Associated Unit (NCAU):

1. PGHU:

Name of Raw Material	Consumption (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2020-21	2021-22		2020-21	2021-22	2020-21	2021-22
RPG	423382	400124	Py Gas (High Sulfur)	143686	125878	2.99	3.23
Hydrogen	6032	6028	Benzene Heart Cut	177403	162593	2.42	2.50
			Cyclopentane	6258	5007	68.62	81.12

2. PGDS

Py Gas (High Sulfur)	143686	121414	Py Gas (Low Sulfur)	143329	121286	1.00	1.00
Hydrogen	567	618					

3. BEU:

Benzene Heart Cut	177242	162658	Benzene	126225	111846	1.40	1.45
			C ₆ Raffinate	47306	47305	3.75	3.44

4. BDEU:

C ₄ Mix	160378	151669	Butadiene	69588	62761	2.30	2.42
			C ₄ raffinate	81549	80854	1.97	1.88

5. CHU:

C ₄ Mix	10912	12854	C ₄ LPG	33923	38582	2.86	2.49
C ₄ raffinate	81481	80516	Semi Hydrogenated C ₄ raffinate	90879	86601	1.07	1.11
Semi Hydrogenated C ₄ raffinate	2609	563					
Hydrogen	2033	2200					

6. Butene-1:

Semi Hydrogenated C ₄ raffinate	88271	86038	Butene-1	18504	17812	6.14	6.10
Methanol	25415	22535	MTBE	66958	61824	1.70	1.76

C. Polymer Plants

1. High Density Polyethylene (HDPE):

Name of Raw Material	Consumption (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2020-21	2021-22		2020-21	2021-22	2020-21	2021-22
Ethylene	298706	275613	HDPE Granules	301563	276736	1.001	1.006
Propylene	373	293					
Butene - I	2504	2180					
Hydrogen	194	176					

2. Poly Propylene (PP)

Ethylene	10874	10773	PP Granules	289160	280177	1.060	1.058
Propylene	295564	285538					
Hydrogen	66	72					

3. Linear Low Density Polyethylene (LLDPE):

Ethylene	294832	284924	LLDPE Granules	309672	297548	1.007	1.013
Propylene	9057	8919					
Butene - I	7697	7266					
Hydrogen	309	292					

Soild Waste Generation (Non-Hazardous)					
Sl. No.	Name of the solid waste	Unit	2020-21	2021-22	Management & Disposal
1	ALUMINIUM SCRAP	MT	2.59	6.44	Sold by E-tendering to scrap dealers & recyclers
2	CABLE SCRAP(ALLUMINIUM & COPPER MIXED)	MT	Nil	Nil	
3	CHARCOAL	MT	Nil	Nil	
4	CUT AND TORN WOVEN SACKS	MT	Nil	Nil	
5	HDPE BROKEN PALLETS	MT	55.66	13.47	
6	M.S SCRAP (ROLLING & MELTING SCRAP)	MT	139.11	278.06	
7	SS SCRAP	MT	Nil	Nil	
8	RUBBISH- SCRAP	MT	502.52	582.22	
9	WOODEN SCRAP (LOCAL)	MT	14.61	12.2	
10	WOVEN SACKS-TORN	MT	Nil	Nil	
11	EMPTY HDPE CARBOYS (25 KG)	No	140	Nil	
12	EMPTY HDPE DRUMS LARGE (220 L)	No	30	80	
13	EMPTY HDPE DRUMS SMALL (25/30 KG)	No	Nil	Nil	
14	EMPTY MS DRUMS OPEN LID (60/80 KG)	No	1143	670	
15	EMPTY MS DRUMS OPEN LID (220 L)	No	411	351	
16	EMPTY HDPE CARBOYS (50KG)	No	Nil	140	
17	EMPTY MS DRUMS SMALL LID(180L/200 L)	No	179	229	
18	CANTEEN FOOD WASTE	MT	5	5	Disposed to BWML through Haldia Municipality



Annexure-3

Plant:
Post Box No.-12, Durgachak,
Haldia, Dist. - Purba Medinipore
West Bengal, Pin-721602, India
Tel.: +91 (03224) 274007/384/400/876
WEBSITE : www.haldiapetrochemicals.com
CIN:U24100WB2015PLC205383

HPL/IMS/HSEF/R/4.3.2/08/ENV/E-04/WBPCB

June 29, 2022

Chief Engineer (WMC)
West Bengal Pollution Control Board
Paribesh Bhawan,
10A, Block – LA, Sector-III,
Kolkata – 700 098

Sub: Submission of Annual Return (Form IV) for the Financial Year 2021-22

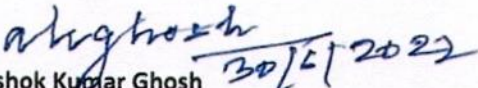
Dear Sir,

This is to inform you that we have submitted the Annual Return (Form IV) for Hazardous Wastes handled at our end, online into the portal <https://wbocmms.nic.in> for the financial year 2021-212 as per the provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

Trust the above is in line with your requirement.

Thanking you,

Yours very truly,


Ashok Kumar Ghosh
Executive Vice President & Head Plant

Encl.: As above

2320810

FORM 4
[See rules 6(5), 13(8), 16(6) and 20 (2)]
Annual Return
under
Hazardous & Other Wastes(Management & Transboundary Movement) Rules, 2016
Transboundary Movement) Rules, 2016

To be submitted to State Pollution Control Board by 30th day of June of every year for the preceding period April to March

Return No : 2320810

Period : 2021-2022

1. Name of facility/Industry Industry Address of facility/Industry	Haldia Petrochemicals Limited HPL Link Road			
2. UID	WB0251966536			
3. Authorisation No Date of issue: Date of Expiry	173/2S(HW)-294/99-2000 (Pt-I) 31/12/2021 31/12/2025			
4. (i) Name of the authorised person & Designation	Ashok Kumar Ghosh Executive Vice President & Head Plant			
(ii) Correspondence Address	P.O & P.S.: Durgachak, P.O Box No.-12, Haldia, Purba Medinipur, Pin-721602			
(iii) Mobile No	9434027167			
(iv) Land Line No (with area code)	(03224)274400			
(iv) Fax number (with area code)	(03224)274861			
(vi) e-mail	ashok.ghosh@hpl.co.in			
(vii) Type of HW Handler	Generator			
(viii) If involved in Interstate Movement of HW	Yes			
5. Production during the year (product wise), wherever applicable	Sr.no	Product Name	Quantity	Unit
	1	HDPE	276736	Metric Ton
	2	LLDPE	297548	Metric Ton
	3	PP	280177	Metric Ton
	4	Benzene	111846	Metric Ton
	5	Butadiene	62761	Metric Ton
	6	Cyclopentane	5007	Metric Ton
	7	CBFS	63755	Metric Ton
	8	Py Gas	125750	Metric Ton
	9	Butene-1	17812	Metric Ton
	10	MTBE	61824	Metric Ton

Part A. To be filled by hazardous waste generators

Sr. no	Name of Process	Category	Waste Stream	Unit	Quantity in stock at the beginning of the year	Total quantity of waste generated	Quantity dispatched to disposal facility	Quantity dispatched to recycler or co-processors or pre-processor	Quantity dispatched to others	Quantity utilised in house	Quantity in storage at the end of the year
1	Schedule 1 - 1. Petrochemical processes pyrolytic operations	Spent catalyst and molecular sieves	1.6	Metric Ton	100.15 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	65.66 Metric Tonnes/Y ear	16.4 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	18.09000000000003 Metric Tonnes/Y ear
2	Schedule 1 - 3. Cleaning, emptying and maintenance of petroleum oil storage tanks including ships	Sludge and filters contaminated with oil	3.3	Metric Ton	85.97 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	34.28 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	51.69 Metric Tonnes/Y ear
3	Schedule 1 - 5. Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications	Used or spent oil	5.1	Metric Ton	140 Metric Tonnes/Y ear	58 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	113.84 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	84.16 Metric Tonnes/Y ear
4	Schedule 1 - 5. Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications	Wastes or residues containing oil	5.2	Metric Ton	16.5 Metric Tonnes/Y ear	320.6 Metric Tonnes/Y ear	101.67 Metric Tonnes/Y ear	223.22 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	12.210000000000036 Metric Tonnes/Y ear
5	Schedule 1 - 33. Handling of hazardous chemicals and wastes	Contaminated cotton rags or other cleaning materials	33.2	Metric Ton	10.75 Metric Tonnes/Y ear	3.27 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	14.02 Metric Tonnes/Y ear
6	Schedule 1 - 35. Purification and treatment of exhaust air/gases, water and waste water from the processes in this schedule and common industrial effluent treatment plants (CETPs)	Spent ion exchange resin containing toxic metals	35.2	Metric Ton	2.37 Metric Tonnes/Y ear	16 Metric Tonnes/Y ear	16.32 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	1.41 Metric Tonnes/Y ear	0.640000000000006 Metric Tonnes/Y ear

7	Schedule 1 - 35.Purification and treatment of exhaust air/gases, water and waste from the processes in this schedule and common industrial effluent treatment plants (CETPs)	Chemical sludge from waste water treatment	35.3	Metric Ton	0 Metric Tonnes/Y ear	138.56 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	53.26 Metric Tonnes/Y ear	85.30000000000001 Metric Tonnes/Y ear
8	Schedule 1 - 36.Purification process for organic compounds/solvents	Spent carb on or filter medium	36.2	Metric Ton	21.89 Metric Tonnes/Y ear	16.06 Metric Tonnes/Y ear	18.81 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	19.140000000000004 Metric Tonnes/Y ear
9	Schedule 1 - 37.Hazardous waste treatment processes, e.g. pre-processing, incineration and concentration	Ash from incinerator and flue gas cleaning residues	37.2	Metric Ton	0 Metric Tonnes/Y ear	5 Metric Tonnes/Y ear	4.83 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0 Metric Tonnes/Y ear	0.16999999999999993 Metric Tonnes/Y ear

Part B. To be filled by Treatment, storage and disposal facility operators

Sr. no	Name of Process	Category	Waste Stream	Unit	Quantity in stock at the beginning of the year	Total quantity received	Quantity treated	Quantity disposed in landfills as such and after treatment	Quantity incinerated (If applicable)	Quantity processed other than specified above	Quantity in storage at the end of the year
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Part C. To be filled by recyclers or co-processors or other users

Sr. no	Name of Process	Category	Waste Stream	Unit	Quantity in stock at the beginning of the year	Quantity of waste received during the year from Domestic sources	Quantity of waste received during the year Imported	Quantity recycled or co-processed or used	Quantity re-exported (wherever applicable)	Quantity in storage at the end of the year
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Whether Importing Other Wastes Not-Selected

Part D. Details of Interstate Movement

Sr.no	Name of Industry (Within State)	District	Receiving/Sending	Name of Industry (Other State)	State	Type of Waste	Qty.(MTA)	Purpose (Recycling/Disposal/Incineration)
1	Haldia Petrochemicals Ltd	Purba Medinipur	Sending	Uttam Chemicals	Maharashtra	Spent Catalysts	16.4 MTA	Recycling

Part D. Details of Import of Other Waste Import & Recycling					
Sr.no	Name of the Importer)	Imported from (country name)	Type of Other waste	Quantity Imported (MTA)	Quantity Recycled (MTA)

Date : 29/06/2022

Place : Purba Medinipur

Subhasendu Chatterjee

Name of the Occupier or Operator of the disposal facility