→ O/C

HALDIA PETROCHEMICALS LTD

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 08, 2021

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 2020-21

Dear Sir,

We are pleased to submit the Environmental Statement of our plant for the financial year 2020-21 ending 31st March, 2021 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.

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

Thanking you,

Yours very truly,

Ashok Kumar Ghosh
Executive Vice President & Head Plant

HALDIA REGIONAL OFFICE
W B P C B
14 SEP 2021
RECEIVED
Durgachak Super Market

Encl.: As above

CC: Asst. Environment Engineer,
Haldia Regional Office,
West Bengal Pollution Control Board

Environmental Statement
FY 2020-21

SALIENT FEATURES OF HPL COMPLEX

Name of the Unit	:	Haldia Petrochemicals Limited
Size of Industry	:	Large
Water Supply	:	Water is supplied by M/s. Haldia Development Authority from Geonkhali Water Works. Total 6.62 MGD water was supplied in 2020-21 against the maximum permissible quantity of 10.0 MGD.
Power Supply	:	Captive Power Plant & WBSEDCL
Main Raw Material	:	NAPHTHA
Gross Capital Investment on land, building, plant & machinery excluding capital investment on pollution control system	:	Rs. 9790 Crores as on 31.03.21
Total area	:	453 Hectare
Green Belt Area	:	103 Hectare
Manpower	:	754 (own employees) as on 31-03-21

[FORM – V]

(SEE RULE 14)

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

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 : Special Red

(iii) Production Capacity : 7,00,000 TPA of Ethylene

(iv) Year of Establishment : 2000

(v) Date of last Environmental Statement Submitted : September 16, 2020

PART - B

Water and Raw Material Consumption

i) Water Consumption (Avg) m^3/d

Process: **1849 m^3/d**

Cooling: **31193 m^3/d** (including Boiler feed water and fire water makeup)

Domestic: **1134 m^3/d**

Name of Product (Saleable)	Process Water Consumption per unit of Saleable Product (m^3/MT)	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
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	**9.05**	**8.42**

Note: Water Consumption and production was less in 2020-21 due to shut down of plant during COVID19 Pandemic.

(ii) Raw Material Consumption

Name of raw materials	Name of products	Consumption of raw material per unit of output	
		During the Previous Financial Year 2019-20	During the Current Financial Year 2020-21

Ref. Annexure - I

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

Sl No.	Pollutants	Quantity of pollutants discharged m^3/day (avg.)	Concentration of pollutants discharges (Mass/volume)				Percentage of variations from prescribed standard with reasons
a.	Process effluent Sanitary effluent CT Blow down & DM regeneration effluent	2402 170 1894	Parameter	Unit	**Standards**	Avg.	**No variation**
			pH	-	6.5-8.5	7.32	
			TSS	mg/l	100	15.61	
			BOD	mg/l	30	11.61	
			COD	mg/l	250	55.07	
			Total Oil & Grease	mg/l	10.0	BDL	
			Phenol	mg/l	1.0	BDL	
			Sulphide	mg/l	2.0	BDL	
			Cyanide	mg/l	0.2	BDL	
			Fluoride	mg/l	5.0	0.74	
			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	0.229	
			Copper as Cu	mg/L	1.0	<0.05	
			Phosphate as P	mg/L	5.0	0.38	
			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**				
		Ambient Air Quality	Pl. see **PART – G, Table- 3.6 to 3.9**				
		Work Zone Air Quality	Pl. see **PART – G, Table- 3.10 & 3.11**				

Note: All the data are of Annual Average Data (FY 2020-21)

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 2019-2020	Financial Year 2020-2021
01	Process	Used Oil (5.1)	45.45	46.25
		Waste Oil (5.2)	238.71	385.15
		Oil impregnated Coke – NCU (36.2)	12.99	20.39
		Waste Resin (35.2)	5.04	3.16
		Oil Contaminated Cotton Waste (33.2)	2.28	2.19
		Spent Catalysts (1.6)	26.41	Nil
		Tank Bottom Sludge + Waste Oil filter (3.3)	75.68	102.0
02	From Pollution Control Facilities	Sludge generated from WWTP (35.3)	195.03	163.62
		Ash from Incinerator (37.2)	38.03	16.04

PART – E

Solid Wastes

	Total Quantity (Kg)	
	During the previous financial year (2019-2020)	During the current financial year (2020-2021)
(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	N.A	N.A
(2) Sold	Ref. Annexure – II (Sl. No. 1-16)	
(3) Disposed	Ref. Annexure – II (Sl. No. 17)	

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 – III** containing **Form-IV** submitted to WBPCB for financial year 2020-21. It specifies 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 H_2SO_4 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 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 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. 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 m^3) 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 m^3/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 m^3 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, SO_2, 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'20	May'20	Jun'20	Jul'20	Aug'20	Sept'21	Oct'21	Nov'21	Dec'21	Jan'21	Feb'21	Mar'21
1.	pH	--	6.5-8.5	7.35	7.29	7.08	7.23	7.11	7.14	7.39	7.34	7.43	7.61	7.41	7.41
2.	TSS	mg/l	100	12.77	13.30	12.93	13.81	12.90	16.83	13.55	13.93	16.77	16.65	25.07	18.79
3.	BOD	mg/l	30	11.83	12.23	12.27	13.42	11.77	21.10	10.19	10.17	9.74	8.84	10.0	8.33
4.	COD	mg/l	250	49.79	52.29	55.60	62.06	54.16	115.33	47.13	47.40	48.26	42.61	48.36	37.79
5.	Total O&G	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0	<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	0.66	0.72	0.73	0.76	0.74	0.73	0.74	0.75	0.75	0.74	0.78	0.73
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	0.37	0.81	0.62	0.12	0.22	0.11	0.19	0.45	0.44	0.20	0.33	0.10
13.	Zinc as Zn	mg/L	1.0	*	*	0.531	0.236	0.188	0.740	0.051	0.078	0.066	0.090	0.192	0.116
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
15.	Phosphate as P	mg/L	5.0	0.28	0.48	0.56	0.50	0.55	0.44	0.18	0.40	0.28	0.27	0.27	0.30
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.

* Analysis of Zn & Cu parameters could not be done because sample could not be sent to Kolkata Laboratory of SRL due to lock down.

TABLE 1.2: MONTLY DATA OF EFFLUENT OF HPL FINAL OUTFALL

Sl. No.	Parameter	Unit	WBPCB Standard	Apr'20	May'20	Jun'20	Jul'20	Aug'20	Sept'21	Oct'21	Nov'21	Dec'21	Jan'21	Feb'21	Mar'21
1.	pH	--	6.5-8.5	7.58	7.12	7.01	7.15	6.91	6.86	7.06	7.08	7.35	7.54	7.53	7.57
2.	TSS	mg/l	100	22.70	23.19	22.50	21.68	23.47	25.27	23.42	22.53	24.71	24.48	30.32	27.45
3.	BOD	mg/l	30	10.28	11.77	10.93	13.13	10.45	17.24	9.32	9.50	9.16	8.48	8.52	9.48
4.	COD	mg/l	250	42.63	50.65	49.40	62.10	47.81	93.20	43.52	43.10	44.84	41.58	42.54	42.16
5.	Total O&G	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0	<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	0.54	0.57	0.57	0.63	0.61	0.60	0.60	0.62	0.61	0.60	0.63	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	0.41	0.96	0.68	0.93	0.55	0.36	0.51	0.75	0.57	0.24	0.21	<0.1
13.	Zinc as Zn	mg/L	1.0	*	*	0.279	0.244	0.217	0.360	0.129	0.053	0.062	0.042	0.162	0.047
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
15.	Phosphate as P	mg/L	5.0	0.20	0.36	0.89	0.46	0.39	0.36	0.34	0.28	0.31	0.24	0.38	0.22
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.

* Analysis of Zn & Cu parameters could not be done because sample could not be sent to Kolkata Laboratory of SRL due to lock down.

2. Hazardous Waste Disposal

The hazardous wastes generated in 2020-21 have been given in Annexure – III (Form – IV).

Sludge generated from WWTP is incinerated in own incinerator and partly sent to M/s West Bengal Waste Management Limited (M/s. WBWML), Srikrishnapur, Haldia for secure land filling. The incinerator-ash is sent M/s. WBWML for secure land filling in periodical manner. Waste oil is sent partly to M/s. WBWML for incineration and partly to the MoEFCC authorized recyclers. Oil Impregnated coke & Waste Resin is sent to own incinerator for incineration, Used Oil is sent to MoEFCC authorized recycler. Tank Bottom Sludge is sent to WBWML Partly.

The organization is also sending saleable Used oil & Waste oil to MoEFCC authorized re-processors and Spent Catalysts to MoEFCC authorized recyclers, these have resulted into revenue generation along with safe disposal of generated hazardous waste.

3. Gaseous Pollutant

The gaseous pollutants from the Haldia Petrochemicals Complex mainly are hydrocarbon vapors, SO_2 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 SO_2 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 SOx, NOx & 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.

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	5.67	19.95	3.09
2F – 202	4.86	22.56	3.91
2F – 203	5.56	20.62	4.45
2F – 204	5.40	22.09	4.00
2F – 205	5.41	21.69	4.45
2F – 206	4.90	22.75	4.00
2F – 207	5.86	21.19	3.91
2F – 208	5.71	22.08	4.55
2F – 209	5.63	21.44	4.36
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/Nm3)
4F – 101	12.23	64.48	27.82	6.33
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/Nm3)
4F – 101	15.85	56.49	25.27	4.16
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/Nm3							ngTEQ/Nm^3
	SO_2	NOx	CO	PM	TOC	HCL	HF	Dioxin & Furan
Incinerator	9.34	39.68	23.14	38.48	2.21	17.37	0.44	<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)

	Results in mg/Nm3			
Furnace Heater Name	SO_2	NOx	CO	PM
Auxiliary Boiler # 1	4.97	19.50	4.09	10.07
Auxiliary Boiler # 2	5.22	20.24	4.38	10.41
HRSG & GT # 1	5.25	37.73	5.71	12.31
HRSG & GT # 2	4.88	40.45	5.50	10.62
Standard	NA	188	11500	50

NOx 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 (SO_2), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO) and Benzene and once in a week for PM2.5, Ozone (O_3), Lead (Pb), Ammonia(NM_3), 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 $PM_{2.5}$, SO_2, SOx, NO_2, NOx, Total Hydrocarbon (THC), Wind Speed, Wind Direction, Temperature, Pressure & Relative Humidity. The system has been upgraded with new analysers (PM_{10}, NH_3, O_3, 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	Haldia Bhavan/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 ($\mu g/m^3$)	
				Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area
1	Sulphur Dioxide (SO_2)	$\mu g/m^3$	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 ($PM_{2.5}$)		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)	$\mu g/m^3$	Annual*	100	100
			24 hours**	400	400
9	Benzene (C_6H_6)		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 2020 to March 2021

Month	PM_{10}(µg/m3)	$PM_{2.5}$(µg/m3)	SO_2(µg/m3)	NO_x(µg/m3)	C_6H_6(µg/m3)	CO(mg/m3)	O_3(µg/m3)	NH_3(µg/m3)	BaP(ng/m3)	As(ng/m3)	Ni(ng/m3)	Pb(µg/m3)
On-Site Plant	54.24	26.52	17.41	23.78	2.05	0.563	24.54	9.22	0.35	4.21	11.97	0.138
Off-Site Plant	48.29	23.95	13.67	19.67	1.65	0.334	23.78	7.75	0.11	2.19	8.12	0.078

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

Location	PM10(µg/m3)	PM2.5(µg/m3)	SO2(µg/m3)	NOx(µg/m3)	C6H6(µg/m3)	CO(mg/m3)	O3(µg/m3)	NH3(µg/m3)	BaP(ng/m3)	As(ng/m3)	Ni(ng/m3)	Pb(µg/m3)
April 20	39.18	16.79	16.31	21.07	*	0.561	23.08	8.45	*	*	*	*
May 20	43.95	23.89	18.36	22.78	*	0.628	23.57	8.85	*	*	*	*
June 20	45.30	22.35	17.75	26.14	1.56	0.533	26.05	9.69	0.28	4.13	11.88	0.138
July 20	42.20	20.88	16.05	22.57	1.60	0.541	24.76	9.58	0.18	4.06	11.54	0.135
August 20	48.88	25.27	16.60	21.66	1.73	0.635	24.88	8.91	0.43	3.99	11.85	0.138
September 20	49.29	25.60	17.14	24.30	1.75	0.545	25.26	9.26	0.35	4.04	11.91	0.133
October 20	47.93	23.92	16.33	24.45	1.76	0.533	25.03	9.08	0.31	4.11	11.90	0.134
November 20	58.52	29.20	17.31	24.63	2.64	0.552	23.96	9.99	0.52	4.47	12.35	0.140
December 20	74.13	35.54	17.28	24.80	3.14	0.564	25.04	10.18	0.49	4.38	12.24	0.142
January 21	73.64	35.21	18.33	24.55	2.52	0.522	24.70	9.39	0.38	4.31	12.25	0.140
February 21	65.19	30.42	18.19	23.98	1.87	0.543	24.18	8.69	0.29	4.19	11.55	0.131
March 21	62.72	29.12	19.25	24.43	1.88	0.604	23.91	8.62	0.30	4.39	12.22	0.146

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

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

Location	PM10(µg/m3)	PM2.5(µg/m3)	SO2(µg/m3)	NOx(µg/m3)	C6H6(µg/m3)	CO(mg/m3)	O3(µg/m3)	NH3(µg/m3)	BaP(ng/m3)	As(ng/m3)	Ni(ng/m3)	Pb(µg/m3)
June 20	40.97	20.88	15.10	19.88	1.27	0.322	24.23	8.36	0.09	2.08	8.11	0.074
July 20	35.26	17.75	12.35	18.90	1.39	0.320	23.72	8.26	0.05	2.13	8.28	0.073
August 20	36.44	19.13	12.83	18.00	1.33	0.393	23.59	7.91	0.05	2.06	8.02	0.077
September 20	39.53	21.21	13.78	20.43	1.47	0.331	24.60	7.95	0.05	2.16	8.24	0.078
October 20	38.95	20.13	13.37	20.42	1.45	0.321	24.27	8.82	0.05	2.16	7.72	0.076
November 20	50.02	24.70	14.52	21.01	1.78	0.383	23.52	8.41	0.21	2.23	8.02	0.078
December 20	67.62	32.20	13.90	21.18	2.79	0.325	24.69	8.28	0.37	2.44	8.30	0.082
January 21	63.78	30.41	14.69	19.89	1.80	0.307	23.79	7.45	0.11	2.18	8.26	0.082
February 21	56.83	27.23	12.94	17.53	1.61	0.332	22.79	5.91	0.05	2.21	8.07	0.079
March 21	53.54	25.89	13.24	19.50	1.59	0.301	22.61	6.18	0.06	2.22	8.14	0.078

Note: Offsite locations were exempted due to Lockdown on April 20 & May 20.

TABLE 3.9: Annual Average results of On–line Ambient Air Quality Monitoring Station (AAQMS) & HC Analyzer for the month of April 2020 to March 2021.

Location	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	H_2S ($\mu g/m^3$)	NOx ($\mu g/m^3$)	NH_3 ($\mu g/m^3$)	O_3 ($\mu g/m^3$)	Benzene ($\mu g/m^3$)	CO (mg/m^3)
South Control Room (SCR)	61.50	17.12	15.60	14.63	25.17	10.46	28.46	2.75	0.56
	WS (m/s)	Wind Degree	Temperature (^0C)	RH (%)	Pressure (mmHg)	THC (PPM)	CH_4 (PPM)	NMHC (PPM)	
	1.05	196.41	27.44	68.87	755.85	2.69	1.54	1.15	
Central Laboratory						2.90	1.86	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, SO_2, NOx and CO from nos. of 9 stacks of Naphtha Cracker Unit (Stack height 40 m, Average Temperature 130^oC), no. of one stack of PGHU (Stack height 33 m, Average Temperature 260^oC, Velocity 7 m/sec), PGDS (Stack height 30 m, Average Temperature 270^oC, Velocity 7 m/sec) and Incinerator (Stack height 30 m, Average Temperature 70^oC, Velocity 7 m/sec), nos. of two stacks of Auxiliary Boiler (Stack height 54.3 m, Average Temperature 150^oC, Velocity 10 m/sec), and nos. of two stacks of GT & HRSG (Stack height 45 m, Average Temperature 190^oC, 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.

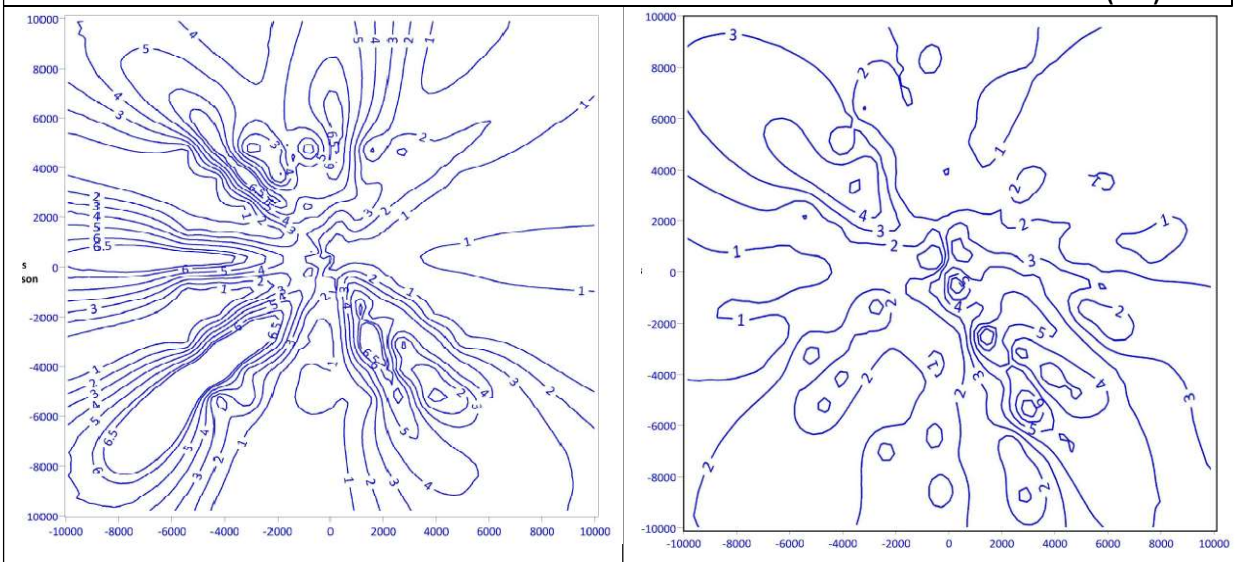
The GLC's are predicted based on the emission data like height, top, diameter and concentration of PM, SO_2, NOx and CO.

GLC of two seasons like April 2020 to September 2020 and October 2020 to March 2021 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 µg/m^3

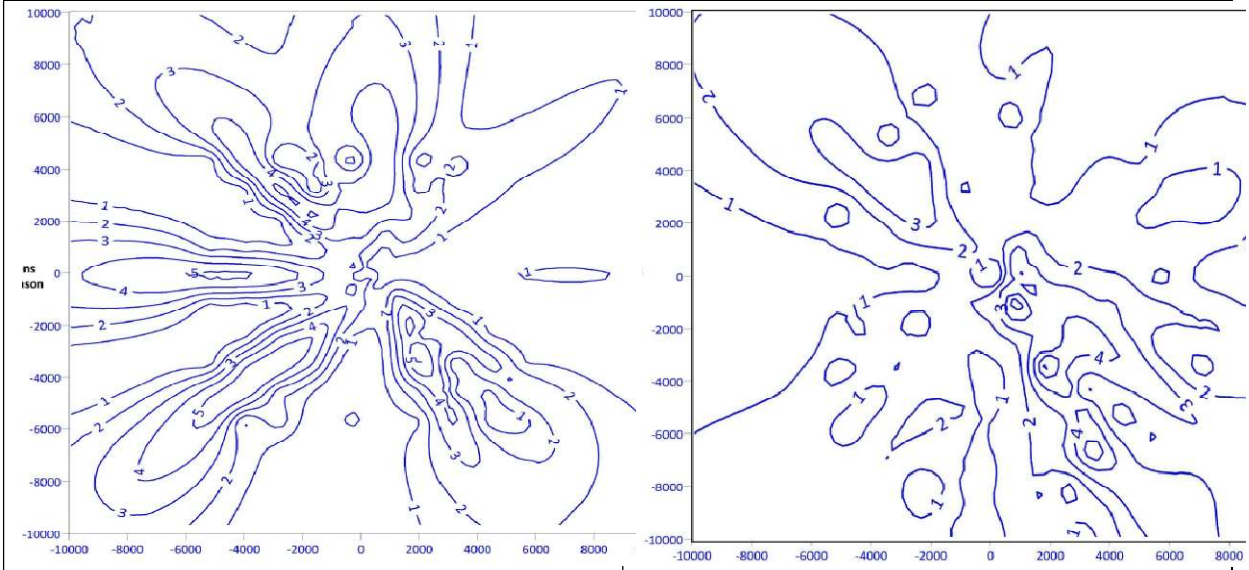
ISO PLETH FOR GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER (PM)



April 2020 – September 2020	October 2020 – March 2021

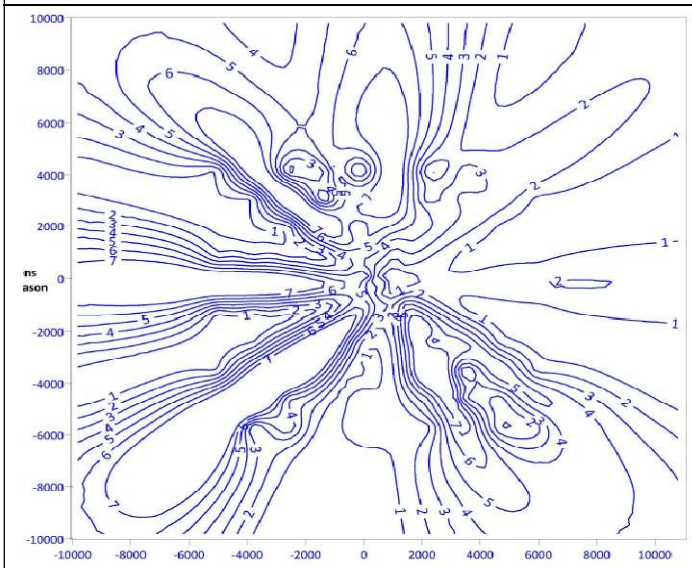
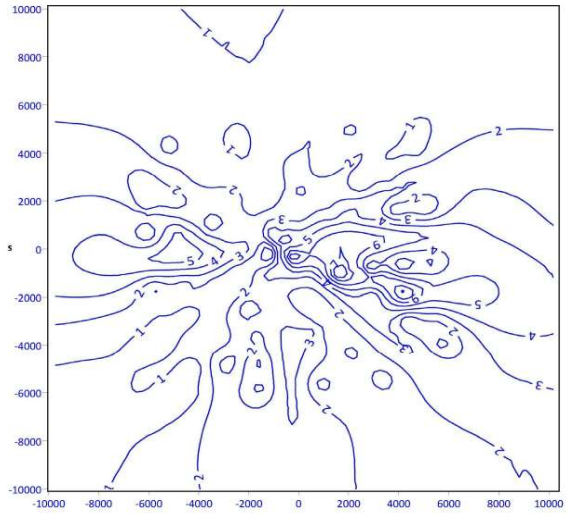
X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m^3

ISO PLETH FOR GROUND LEVEL CONCENTRATIONS OF SULPHUR DIOXIDE (SO_2)

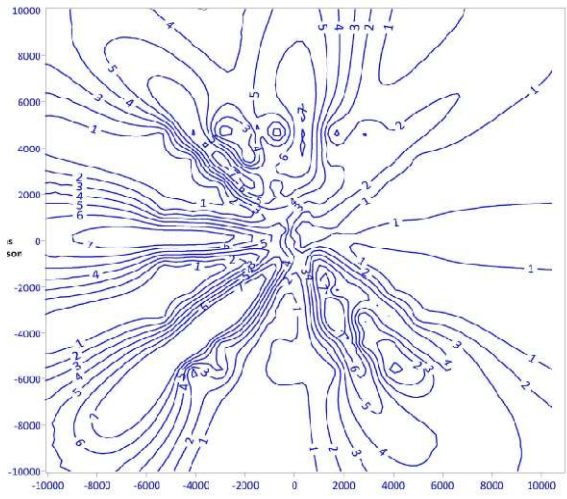
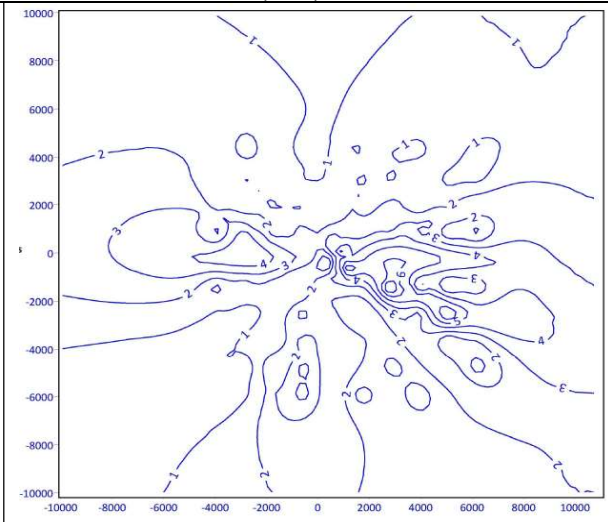


April 2020 – September 2020	October 2020 – March 2021

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m^3

ISO PLETH FOR GROUND LEVEL CONCENTRATIONS OF NITROGEN DIOXIDE (NOx)	
	
April 2020 – September 2020	**October 2020 – March 2021**

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m^3

ISOPLETH FOR CARBON MONOXIDE (CO)	
	
April 2020 – September 2020	**October 2020 – March 2021**

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.

- Naphtha 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	0.123
Butadiene Extraction Unit	1.0	0.173
Butadiene Loading Area	1.0	0.045
Hexane Area	500.0	9.745

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

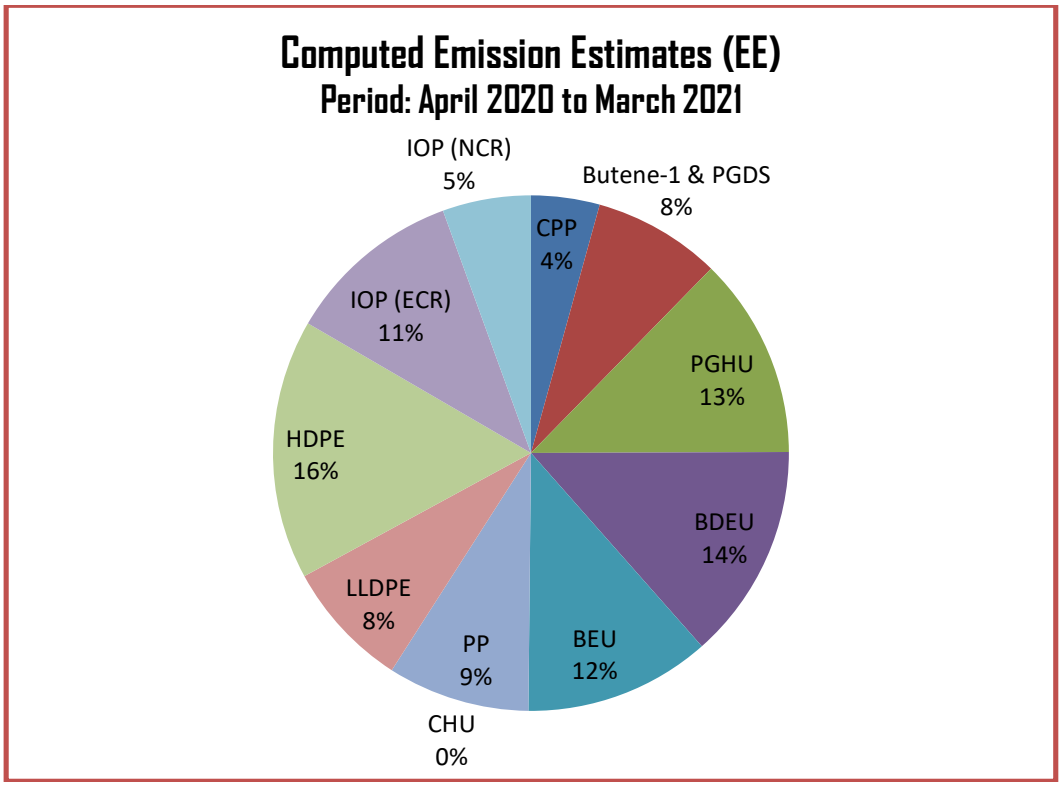
Reference: USEPA Handbook on Control Techniques for Fugitive VOC Emissions from Chemical Process Facilities. EPA/625/R-93/005, March 1994.

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 CPP, NCAU (Butene 1 & PGDS, PGHU, BDEU, BEU & CHU), PP, LLDPE, HDPE, IOP-ECR & IOP-NCR

Location	Computed Emission Estimates (EE) Unit – Ton/Annum	Computed Emission Estimates (EE) in 100%
CPP	0.014	4.31
Butene-1 & PGDS	0.026	8.00
PGHU	0.041	12.62
BDEU	0.044	13.54
BEU	0.038	11.69
CHU	0	0.00
PP	0.029	8.92
LLDPE	0.026	8.00
HDPE	0.053	16.31
IOP (ECR)	0.036	11.08
IOP (NCR)	0.018	5.54
TOTAL	**0.325**	**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 2020		July 2020		October 2020		January 2021	
	Day	Night	Day	Night	Day	Night	Day	Night
Near Gate No-1	56.8	55.6	56.6	54.9	58.3	56.7	55.9	55.6
Near Gate No-3	70.8	68.8	69.5	68.2	68.6	68.4	68.1	69.4
Near South Gate	53.2	53.7	56.5	56.5	57.8	54.8	55.8	57.1
Near CPP Security Office	70.1	69.1	57.2	56.1	68.9	67.9	56.3	56.5
Near North Gate	53.9	53.8	69.0	67.7	57.2	57.7	67.3	68.0

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 2021 – 2022** work to approx. **Rs. 19.59 Crores.**

1. Environmental Monitoring Cost [Rate Contract for Environmental & Process Monitoring Job at HPL Complex]	:	**Rs. 75.00 lacs**
2. Greening Drive Activities [Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]	:	**Rs. 145.0 lacs**
3. Statutory Fees & Insurance Expenses [Analysis charges, PLI Policy]	:	**Rs. 1.70 lacs**
4. Environmental Awarness Progamme [Celebration of World Environment Day, Workshop Seminar]	:	**Rs. 5.0 lacs**
5. Hazardous Wastes Disposal Expenses	:	**Rs. 85.0 lacs**
6. Operational, Maintenance & Installation Cost of Environment protection system:		
5.1 Operational cost of WWTP	:	**Rs. 339.9 lacs**
5.2 Operational cost of Flare Stack Emission System	:	**Rs. 1218.9 lacs**
5.3 Operation cost of Incinerator	:	**Rs. 58.02 lacs**
5.4 Operation cost of Benzene Recovery Unit	:	**Rs. 0.90 lacs**
5.5 CMC for the Hydrocarbon Analyser, AAQMS	:	**Rs. 15.89 lacs**
5.6 CMC for Online Effluent & Stack Monitoring system	:	**Rs. 8.5 lacs**
6.7 Other Expenses (Calibration, Spares & Consumables)	:	**Rs. 2.5 lacs**
7. Training/Workshop/Seminar/Subscription	:	**Rs. 2.5 lacs**
		Total Rs. 1958.81 lacs

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

Environmental Expenditure details (actual) during April'20 to March'21 are given below:

1. Environmental Monitoring Cost [Rate Contract for Environmental & Process Monitoring Job at HPL Complex]	:	**Rs. 65.4 lacs**
2. Greening Drive Activities [Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]	:	**Rs. 103.34 lacs**
3. Statutory Fees & Insurance Expenses [Analysis charges of WBPCB + Environmental Relief Fund of PLI Policy]	:	**Rs. 2.05 lacs**
4. Hazardous Wastes Disposal Expenses	:	**Rs. 25.1 lacs**
5. Operational, Maintenance & Installation Cost of Environment protection system:		
5.1 Operational cost of WWTP	:	**Rs. 339.9 lacs**
5.2 Operational cost of Flare Stack Emission System	:	**Rs. 1218.9 lacs**
5.3 Operation cost of Incinerator	:	**Rs. 58.02 lacs**
5.4 Operation cost of Benzene Recovery Unit	:	**Rs. 0.90 lacs**
5.5 CMC for the Hydrocarbon Analyser, AAQMS	:	**Rs. 15.89 lacs**
5.6 CMC for Online Effluent & Stack Monitoring system	:	**Rs. 8.5 lacs**
7. Training/Workshop/Seminar/Subscription	:	**Rs. 1.54 lcs**
		Total Rs.1839.54 lacs

All above-mentioned annual expenditure of funds for Environmental Safeguards under various heads during 2020-21 works to approx. **Rs. 18.4 Crores**.

PART – I
ANY OTHER PARTICULERS 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 28th February 2021

Sl. No.	Plants Name	Number				Total (1+2+3+4)
		Zone-1	Zone-2	Zone-3	Zone-4	
1	Casurina	1538	320	84	101	2043
2	Azadirachta (Neem)	1071	87	120	192	1470
3	Arjun	3667	457	279	333	4736
4	Acacia	4438	832	168	194	5632
5	Lagerstroemia (Jarul)	2952	320	210	128	3610
6	Alstonia(chatim)	455	54	35	16	560
7	Jaman (Jam)	27	21	15	5	68
8	Bottle brush	1712	555	239	54	2560
9	Karamja	22888	3825	1990	1955	30658
10	Cassia renigera	1420	2722	125	6232	10499
11	Putranjiva (Bakul)	2287	402	20	241	2950
12	Spathodea	99	0	0	732	831
13	Peltophorum (Khiris)	26	1	4	24	55
14	Caesalpinia – Flava (Radha chura)	16716	14148	298	3465	34627
15	Nerium (Karabi)	69	0	5	0	74
16	Bombax (Simul)	132	22	25	67	246
17	Dalbergia (Sisu)	13	0	7	12	32
18	Albizzia (Sirish)	50	5	5	21	81
19	Habal	100	85	16	23	365
20	Polyalthia (Debdaru)	6	24	132	28	190
21	Others(Ficus benjamina, Leucaena (subabul), Babla, Tal, Bel Etc.	2032	3012	2750	842	8636
22	New plantation during the period of 2020-21 (Karamja, Casurina, Akacia, Arjun)	10132	0	0	0	10132
	TOTAL	68830	26892	6527	14665	120055

Annexure - 1: Consumption & Production Data 2020-21

A. Naphtha Cracker Unit:

Name of Raw Material	Consumptiuon (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2019-20	2020-21		2019-20	2020-21	2019-20	2020-21
Naphtha	1896096	1714450	Ethylene	649180	603776	3.20	3.15
			Propylene	336399	303567	6.17	6.27
LPG Recycle	52776	82613	RPG	477549	423258	4.35	4.49
			C4 Mix	190247	171187	10.92	11.11
C5 Recycle	72833	57645	CBFS	71879	72136	28.90	26.37
			Hydrogen	14076	13099	147.55	145.19
C6 Raffinate	55311	47239	Propane	12293	9379	168.95	202.80

B.Naphtha Cracker Associated Unit(NCAU):

1. PGHU:

Name of Raw Material	Consumptiuon (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2019-20	2020-21		2019-20	2020-21	2019-20	2020-21
RPG	477634	423382	Py Gas (High Sulfur)	161446	143686	2.99	2.99
Hydrogen	5159	6032	Benzene Heart Cut	192287	177403	2.51	2.42
			Cyclopentane	6209	6258	77.75	68.62

2. PGDS

Py Gas (High Sulfur)	116407	143686	Py Gas (Low Sulfur)	116277	143329	1.00	1.00
Hydrogen	511	567					

3. BEU:

Benzene Heart Cut	192393	177242	Benzene	131176	126225	1.47	1.40
			C_6 Raffinate	55211	47306	3.48	3.75

4. BDEU:

C_4 Mix	190247	160378	Butadiene	83297	69588	2.28	2.30
			C_4 raffinate	96745	81549	1.97	1.97

5. CHU:

C_4 Mix	714	10912	C_4 LPG	29002	33923	3.42	2.86
C_4 raffinate	96820	81481	Semi Hydrogenated C4 raffinate	100724	90879	0.98	1.07
Semi Hydrogenated C4 raffinate	35	2609					
Hydrogen	1594	2033					

6. Butene-1:

Semi Hydrogenated C4 raffinate	100690	88271	Butene-1	21214	18504	6.09	6.14
Methanol	28547	25415	MTBE	77704	66958	1.66	1.70

C.Polymer Plants

1. High Density Polyethylene (HDPE):

Name of Raw Material	Consumptiuon (MT)		Name of Products	Production (MT)		Consumption of Raw Material per Unit of Product, MT/MT	
	2019-20	2020-21		2019-20	2020-21	2019-20	2020-21
Ethylene	303677	298706	HDPE Granules	305802	301563	1.003	1.001
Propylene	216	373					
Butene - I	2620	2504					
Hydrogen	202	194					

2. Poly Propylene (PP)

Ethylene	11561	10874	PP Garanules	322082	289160	1.049	1.060
Propylene	326291	295564					
Hydrogen	68	66					

3. Linear Low Density Polyethylene(LLDPE):

Ethylene	332522	294832	LLDPE Granules	345712	309672	1.010	1.007
Propylene	10297	9057					
Butene - I	6058	7697					
Hydrogen	350	309					

Annexure - 2

	Soild waste Generation (Non-Hazardous)			
Sl. No.	**Name of the solid waste**	**Unit**	**2020-21**	**Management & Disposal**
1	ALUMINIUM SCRAP	MT	2.59	Sold by E-tendering to scrap dealers & recyclers
2	CABLE SCRAP(ALLUMINIUM & COPPER MIXED)	MT	Nil	
3	CHARCOAL	MT	Nil	
4	CUT AND TORN WOVEN SACKS	MT	Nil	
5	HDPE BROKEN PALLETS	MT	55.66	
6	M.S SCRAP (ROLLING & MELTING SCRAP)	MT	139.11	
7	SS SCRAP	MT	Nil	
8	RUBBISH- SCRAP	MT	502.52	
9	WOODEN SCRAP (LOCAL)	MT	14.61	
10	WOVEN SACKS-TORN	MT	Nil	
11	EMPTY HDPE CARBOYS (25 KG)	No	140	
12	EMPTY HDPE DRUMS LARGE (220 L)	No	30	
13	EMPTY HDPE DRUMS SMALL (25/30 KG)	No	Nil	
14	EMPTY MS DRUMS OPEN LID (60/80 KG)	No	1143	
15	EMPTY MS DRUMS OPEN LID (220 L)	No	411	
16	EMPTY MS DRUMS SMALL LID(180L/200 L)	No	179	
17	CANTEEN FOOD WASTE	MT	5.11	Sent to Municipality

Annexure-3

HALDIA PETROCHEMICALS LTD

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, 2021

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 2020-21

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 2020-21 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,

1/7/2021

Ashok Kumar Ghosh
Head – Plant & Executive Vice President

Encl.: As above

Annexure-3

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 : *758302* **Period :** *2020-2021*

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**	*59/2S(HW)-294/99-2000 (Pt-I)* *23/02/2016* *31/12/2020*
4. (i) Name of the authorised person & Designation	*Ashok Kumar Ghosh* *Head Plant & Executive Vice President*
(ii) Correspondence Address	*P.O & P.S.: Durgachak, Post Box No.: 12, Haldia* *Purba Medinipur - 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*	*301563*	*Metric Ton*
2	*LLDPE*	*309672*	*Metric Ton*
3	*PP*	*289160*	*Metric Ton*
4	*Benzene*	*126225*	*Metric Ton*
5	*Butadiene*	*69588*	*Metric Ton*
6	*Cyclopentane*	*6258*	*Metric Ton*
7	*CBFS*	*72136*	*Metric Ton*
8	*Py Gas*	*143329*	*Metric Ton*
9	*Butene-1*	*18504*	*Metric Ton*
10	*MTBE*	*66958*	*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 I - 1.Petrochemical processes pyrolytic operations	Spent catalyst and molecular sieves	1.6	Metric Ton	131.57 Metric Tonnes/Year	31.1 Metric Tonnes/Year	12.42 Metric Tonnes/Year	50.1 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	100.15 Metric Tonnes/Year
2	Schedule I - 3.Cleaning,emptying and maintenance of petroleum oil storage tanks including ships	Sludge and filters contaminated with oil	3.3	Metric Ton	35.96 Metric Tonnes/Year	102 Metric Tonnes/Year	51.99 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	85.97 Metric Tonnes/Year
3	Schedule I - 5.Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications	Used or spent oil	5.1	Metric Ton	164.31 Metric Tonnes/Year	46.25 Metric Tonnes/Year	0 Metric Tonnes/Year	70.56 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	140.00 Metric Tonnes/Year
4	Schedule I - 5.Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications	Wastes or residues containing oil	5.2	Metric Ton	1.8 Metric Tonnes/Year	385.15 Metric Tonnes/Year	46.11 Metric Tonnes/Year	324.34 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	16.50 Metric Tonnes/Year
5	Schedule I - 33.Handling of hazardous chemicals and wastes	Contaminated cotton rags or other cleaning materials	33.2	Metric Ton	8.56 Metric Tonnes/Year	2.19 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	10.75 Metric Tonnes/Year
6	Schedule I - 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)	Spention exchange resin containing toxic metals	35.2	Metric Ton	1.8 Metric Tonnes/Year	3.16 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	2.59 Metric Tonnes/Year	0 Metric Tonnes/Year	2.37 Metric Tonnes/Year

7	Schedule I - 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)	Chemical sludge from waste water treatment	35.3	Metric Ton	0 Metric Tonnes/Year	163.62 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	163.62 Metric Tonnes/Year	0 Metric Tonnes/Year	0.00 Metric Tonnes/Year
8	Schedule I - 36.Purification process for organic compounds/solvents	Spent carbon or filter medium	36.2	Metric Ton	8.71 Metric Tonnes/Year	20.39 Metric Tonnes/Year	6.63 Metric Tonnes/Year	0 Metric Tonnes/Year	0.58 Metric Tonnes/Year	0 Metric Tonnes/Year	21.89 Metric Tonnes/Year
9	Schedule I - 37.Hazardous waste treatment processes, e.g. pre-processing, incineration and concentration	Ash from incinerator and flue gas cleaning residues	37.2	Metric Ton	52.97 Metric Tonnes/Year	16.04 Metric Tonnes/Year	15.5 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	0 Metric Tonnes/Year	53.51 Metric Tonnes/Year

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

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

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	Surchem Chemicals Pvt Ltd	Maharshtra	Spent Catalysts	50.1 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 : *29/06/2021*
Place : *Purba Medinipur*

Subhasendu Chatterjee
Name of the Occupier or Operator of the disposal facility