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 16, 2020

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 2019-20

Dear Sir,

We are pleased to submit the Environmental Statement of our plant for the financial year 2019-20 ending 31st March, 2020 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,

akghosh 16/9/2020.

Ashok Kumar Ghosh
EVP & Head Plant

A. K. GHOSH
Head Plant & Executive Vice President
Haldia Petrochemicals Ltd.
Haldia

Encl.: As above

CC: Asst. Environmental Engineer,
Haldia Regional Office,
West Bengal Pollution Control Board,
Supermarket, Durgachak,
Haldia - 721602

Environmental Statement
FY 2019-20

Haldia Petrochemicals Ltd.

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 8.24 MGD water was consumed in 2019-20 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. 11088 Crores as on 31.03.20
Total area	:	453 Hectare
Green Belt Area	:	103 Hectare
Manpower	:	721 (own employees) as on 31-03-20

[FORM – V]

(SEE RULE 14)

Environmental Statement for the Financial Year ending the 31st March 2020

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 30, 2019

PART - B

Water and Raw Material Consumption

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

Process: **1667 m^3/d**

Cooling: **34001 m^3/d** (including Boiler feed water and fire water makeup)

Domestic: **1028 m^3/d**

Name of Product (Saleable)	Process Water Consumption per unit of Saleable Product (m^3/MT)	
	During the previous financial year (2018-19)	During the current financial year (2019-20)
1) HDPE 2) LLDPE 3) PP 4) Benzene 5) Butadiene 6) Cyclo-Pentane 7) CBFS 8) LPG 9) Motor Spirit 10) Py Gas	**9.6**	
1) HDPE 2) LLDPE 3) PP 4) Benzene 5) Butadiene 6) Cyclo-Pentane 7) CBFS 8) LPG 9) Motor Spirit 10) Py Gas 11) Butene-1 12) MTBE		**9.05**

Note: Operation of Butene-1 plant started in Fy 2019-20 for the product of Butene-1 & MTBE

(ii) Raw Material Consumption

Name of raw materials	Name of products	Consumption of raw material per unit of output	
		During the Previous Financial Year 2018-19	During the Current Financial Year 2019-20

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	2325 174 2618	Parameter	Unit	**Standards**	Avg.	**No variation**
			pH	-	6.5-8.5	7.24	
			TSS	mg/l	100	12.86	
			BOD	mg/l	30	10.43	
			COD	mg/l	250	43.57	
			Total Oil & Grease	mg/l	10.0	BDL	
			Phenol	mg/l	1.0	BDL	
			Sulphide	mg/l	2.0	0.70	
			Cyanide	mg/l	0.2	BDL	
			Fluoride	mg/l	5.0	0.75	
			Total Chromium	mg/l	2.0	BDL	
			Chromium (Cr^{+6})	mg/l	0.1	BDL	
			Iron as Fe	mg/L	1.0	0.26	
			Zinc as Zn	mg/L	1.0	0.196	
			Copper as Cu	mg/L	1.0	<0.05	
			Phosphate as P	mg/L	5.0	0.57	
			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 2019-20)

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 2018-2019	Financial Year 2019-2020
01	Process	Used Oil	167.6	45.45
		Waste Oil	832.35	236.91
		Oil impregnated Coke - NCU	12.03	12.99
		Waste Resin	2.25	5.04
		Oil Contaminated Cotton Waste	2.89	2.28
		Waste Oil filter	0.23	1.88
		Spent Catalysts	5.04	26.41
		Tank Bottom Sludge	Nil	73.8
		Butadine Polymeric Material (Popcorn)	Nil	1.8
02	From Pollution Control Facilities	Sludge generated from WWTP	177.65	195.03
		Ash from Incinerator	41.76	38.03

PART – E

Solid Wastes

	Total Quantity (Kg)	
	During the previous financial year (2018-2019)	During the current financial year (2019-2020)
(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 2019-20. 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'19	May'19	Jun'19	Jul'19	Aug'19	Sept'19	Oct'19	Nov'19	Dec'19	Jan'20	Feb'20	Mar'20
1.	pH	--	6.5-8.5	7.20	7.11	7.10	7.25	7.28	7.14	7.18	7.20	7.23	7.32	7.39	7.43
2.	TSS	mg/l	100	15.73	13.03	13.13	12.58	13.16	12.90	13.0	12.40	12.13	11.90	12.03	12.37
3.	BOD	mg/l	30	9.03	9.84	9.77	9.90	9.90	10.77	12.96	12.22	-	10.55	9.41	10.38
4.	COD	mg/l	250	39.93	41.03	39.69	40.29	40.81	46.43	58.26	49.03	42.45	42.87	36.69	45.40
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	0.62	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.78	<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	0.80	0.78	0.81	0.75	0.74	0.75	0.73	0.72	0.73	0.71	0.74	0.79
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	0.20	0.47	0.21	0.38	0.15	0.25	0.35	0.17	0.23	0.15	0.25	0.30
13.	Zinc as Zn	mg/L	1.0	0.345	0.770	0.149	0.239	0.073	0.086	0.142	0.08	0.072	0.163	0.125	0.111
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	0.82	0.30	0.37	0.97	0.32	0.82	0.60	0.27	0.70	0.61	0.53	0.57
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.
BDL – Below Detection Limit
BOD Incubator was out of order on December 2019

TABLE 1.2: MONTLY DATA OF EFFLUENT OF HPL FINAL OUTFALL

Sl. No.	Parameter	Unit	WBPCB Standard	Apr'19	May'19	Jun'19	Jul'19	Aug'19	Sept'19	Oct'19	Nov'19	Dec'19	Jan'20	Feb'20	Mar'20
1.	pH	--	6.5-8.5	7.35	7.08	7.33	7.35	7.10	7.19	7.32	7.39	7.57	7.44	7.58	7.50
2.	TSS	mg/l	100	25.0	23.35	21.76	22.65	23.35	23.10	22.77	22.23	21.81	21.06	21.48	22.80
3.	BOD	mg/l	30	10.0	11.52	10.50	11.65	11.55	9.93	10.50	10.67	-	10.65	9.97	11.23
4.	COD	mg/l	250	43.60	47.78	43.47	47.29	47.0	42.17	46.94	44.27	41.06	42.84	40.0	44.83
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	0.63	0.65	0.67	0.61	0.58	0.63	0.61	0.59	0.59	0.59	0.60	0.65
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	0.84	0.68	0.52	0.69	0.71	0.30	0.56	0.35	0.77	0.20	0.35	0.57
13.	Zinc as Zn	mg/L	1.0	0.361	0.320	0.150	0.192	0.081	0.045	0.175	0.174	0.224	0.161	0.195	0.143
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	1.05	0.43	0.45	1.17	0.36	0.77	0.80	0.51	0.95	0.52	0.37	0.54
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.
BDL – Below Detection Limit
BOD Incubator was out of order on December 2019

2. Hazardous Waste Disposal

The hazardous wastes generated in 2019-20 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 MoEF authorized recyclers. Oil Impregnated coke & Waste Resin is sent to own incinerator for incineration, Used Oil is sent to MoEF authorized recycler. Waste Oil filter would be sent to WBWML for Incineration. Oil contaminated cotton waste is to WBWML for Incineration. Butadiene Polymeric material (Popcorn) is incinerated in own incinerator, Tank Bottom Sludge is sent to partly to WBWML partly incinerated in own incinerator.

The organization is also sending saleable Used oil & Waste oil to MoEF authorized re-processors, 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	4.12	17.76	3.00
2F – 202	3.78	17.99	3.91
2F – 203	4.66	19.08	4.55
2F – 204	4.93	19.98	4.25
2F – 205	5.15	19.18	4.64
2F – 206	4.77	18.85	4.17
2F – 207	5.87	19.80	4.55
2F – 208	4.99	18.93	5.00
2F – 209	4.99	19.73	4.83
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	11.33	51.08	24.85	7.30
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	10.09	47.69	20.43	4.23
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	10.66	30.99	24.15	35.72	2.25	14.72	0.45	<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	5.29	13.01	4.50	9.62
Auxiliary Boiler # 2	4.65	14.39	4.91	8.09
HRSG & GT # 1	4.30	29.96	5.91	8.92
HRSG & GT # 2	4.30	29.90	5.60	8.19
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	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 2019 to March 2020

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	49.73	25.09	16.28	24.70	2.07	0.570	23.57	9.73	0.41	4.15	11.99	0.138
Off-Site Plant	41.88	21.32	12.63	20.89	1.57	0.353	22.47	8.40	0.15	2.32	8.46	0.083

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

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)
April 19	54.09	27.15	18.51	29.31	2.12	0.662	23.95	10.39	0.35	4.20	11.93	0.134
May 19	52.90	26.19	18.19	27.35	2.38	0.628	24.00	10.57	0.38	4.14	12.01	0.137
June 19	49.50	24.35	15.76	25.65	1.91	0.540	23.25	10.39	0.29	4.07	11.96	0.132
July 19	36.20	18.68	14.79	24.35	1.78	0.561	23.63	9.64	0.32	3.90	11.71	0.134
August 19	37.02	19.32	15.20	23.63	1.70	0.578	22.21	9.04	0.29	4.13	12.12	0.138
September 19	44.28	23.22	15.88	23.68	2.17	0.572	22.57	9.44	0.33	4.04	11.54	0.133
October 19	42.54	22.16	15.19	22.82	1.88	0.569	22.99	9.34	0.48	4.05	11.78	0.135
November 19	47.10	23.88	15.65	23.56	1.70	0.544	23.39	9.42	0.33	4.29	12.12	0.144
December 19	53.55	26.86	16.58	25.39	1.97	0.533	23.50	9.78	0.46	4.52	12.47	0.146
January 20	55.46	28.92	15.70	23.64	2.65	0.538	24.60	9.04	0.61	4.13	11.92	0.141
February 20	66.88	34.75	16.19	24.00	2.61	0.545	24.83	9.79	0.59	4.13	12.07	0.138
March 20	57.14	25.61	17.63	22.95	1.96	0.562	23.84	9.91	0.39	4.16	12.16	0.136

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

Month	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 19	49.12	25.45	13.93	25.32	1.61	0.421	23.59	9.30	0.14	2.30	8.01	0.078
May 19	48.61	24.63	12.98	20.68	1.77	0.398	23.78	9.02	0.09	2.33	8.41	0.078
June 19	43.10	21.33	12.31	20.00	1.52	0.369	23.31	9.09	0.05	2.42	9.05	0.083
July 19	30.82	16.20	11.68	20.84	1.43	0.351	23.47	7.90	0.13	2.29	8.29	0.087
August 19	29.53	15.83	11.09	19.99	1.31	0.323	20.92	7.57	0.05	2.30	8.10	0.083
September 19	34.06	17.79	12.09	20.08	1.42	0.325	21.60	7.74	0.08	2.11	7.84	0.079
October 19	34.66	18.43	11.31	19.02	1.51	0.386	21.24	8.11	0.14	2.26	8.03	0.084
November 19	37.90	19.12	12.33	20.40	1.37	0.344	21.54	8.15	0.05	2.37	8.72	0.086
December 19	46.21	23.77	13.77	21.65	1.66	0.321	22.20	9.07	0.10	2.42	8.91	0.090
January 20	44.51	22.84	12.70	20.96	1.81	0.323	22.71	7.97	0.34	2.33	8.67	0.086
February 20	50.10	26.20	13.20	21.65	1.66	0.332	23.13	8.12	0.50	2.33	8.75	0.083
March 20	53.93	24.13	14.12	20.11	1.68	0.342	22.10	8.70	0.12	2.32	8.68	0.082

TABLE 3.9: Annual Average results of On–line Ambient Air Quality Monitoring Station (AAQMS) & HC Analyzer for the month of April 2019 to March 2020.

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)	76.84	41.66	26.31	11.09	20.46	12.52	17.89	4.09	0.46
	WS (m/s)	Wind Degree	Temperature (^0C)	RH (%)	Pressure (mmHg)	THC (PPM)	CH_4 (PPM)	NMHC (PPM)	
	1.57	163.52	28.00	74.53	763.0	2.64	1.43	1.21	
Central Laboratory						2.40	1.57	0.84	

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). Total nos. of stacks fifteen (15).

The status of ground level concentration (GLC) values 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°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 Boilerof (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 2019 to March 2020) are used for calculations.

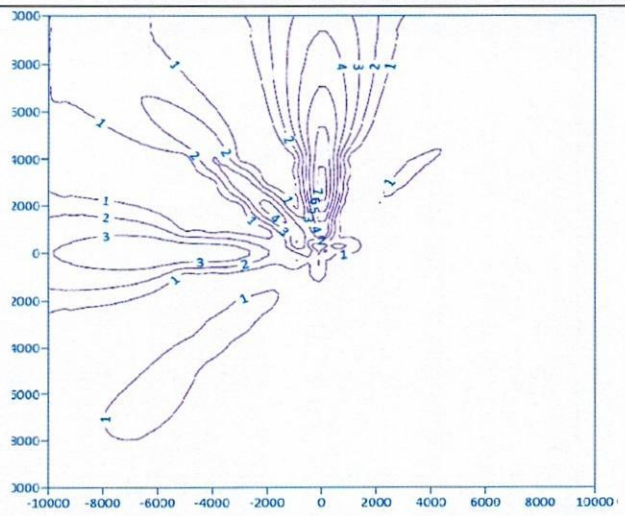
The GLC's are predicted based on the emission data like height, top, diameter and concentration of PM, SO_2, NOx and CO.

GLC of two seasons like April 2019 to September 2019 and October 2019 to March 2020 are given.

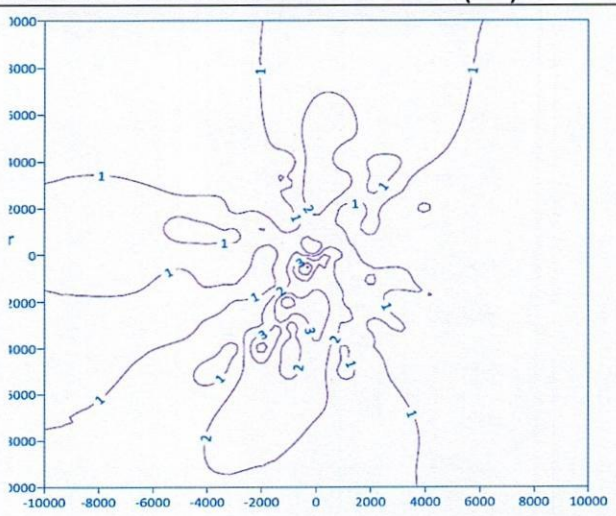
ISO PLETH FOR GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER (PM)

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m³

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



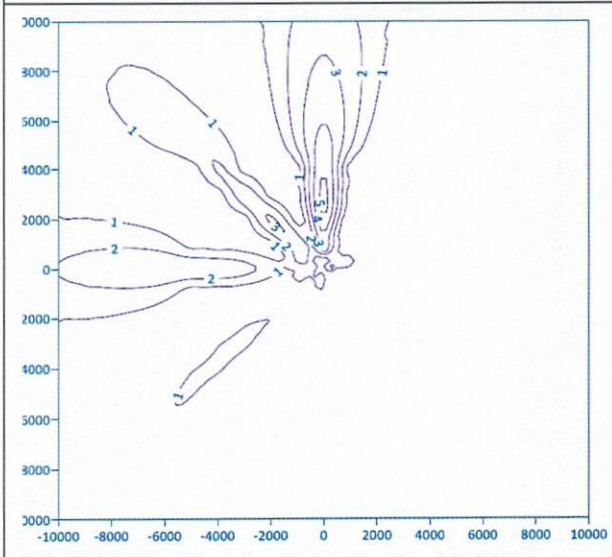
April 2019 – September 2019



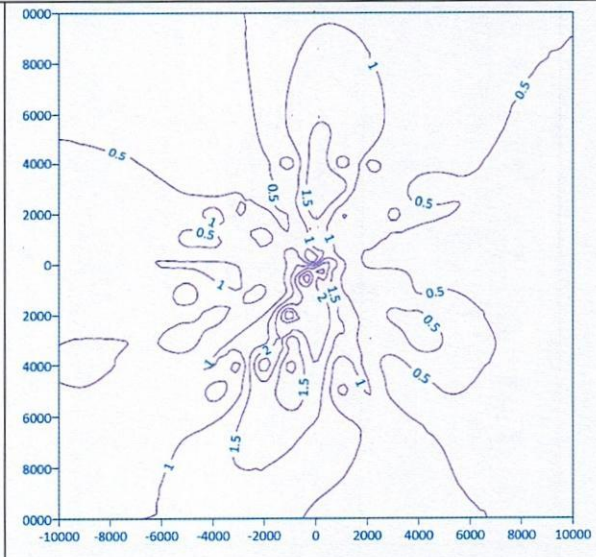
October 2019 – March 2020

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m³

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



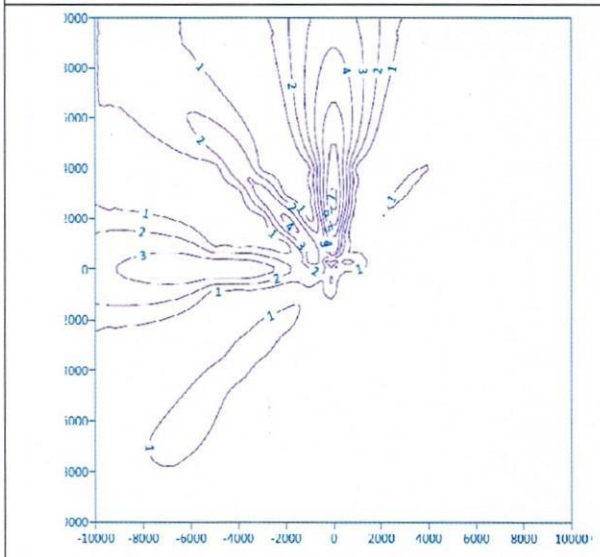
April 2019 – September 2019



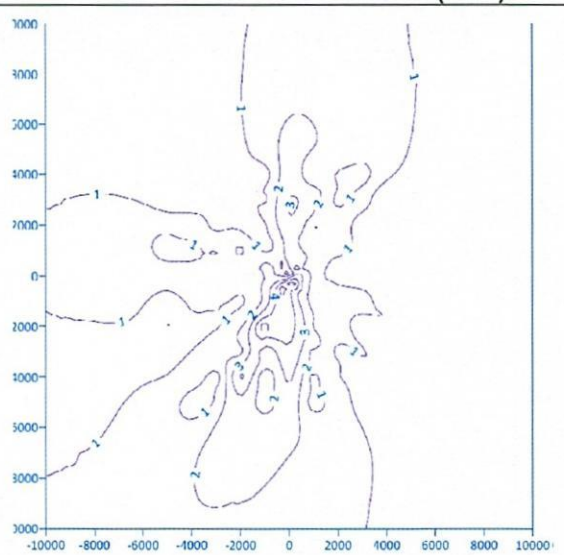
October 2019 – March 2020

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m³

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



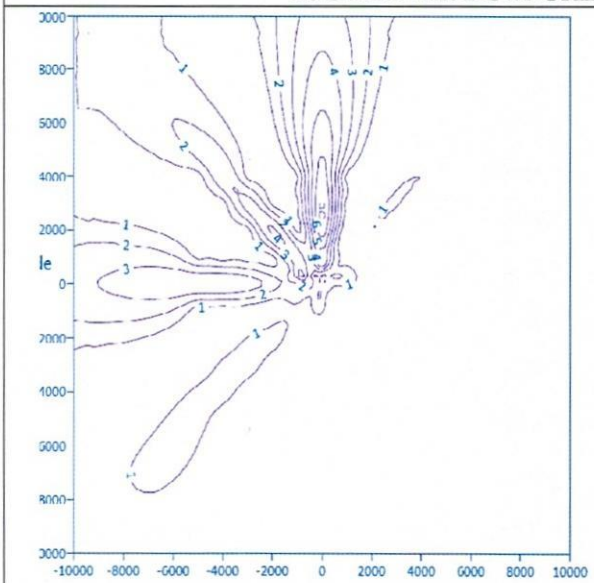
April 2019 – September 2019



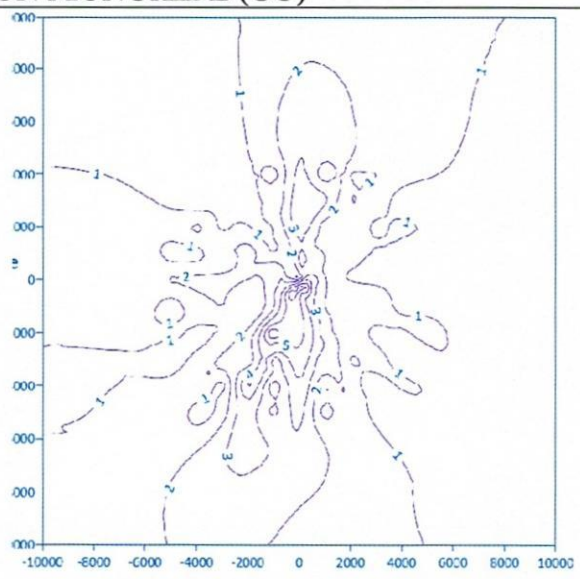
October 2019 – March 2020

X axis: Distance in Meter
Y axis: Distance in Meter
Nos. in the graph denotes concentration in µg/m³

ISOPLETH FOR CARBON MONOXIDE (CO)



April 2019 – September 2019



October 2019 – March 2020

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	0.115
Butadiene Extraction Unit	1.0	0.058
Butadiene Loading Area	1.0	0.151
Hexane Area	500.0	9.58

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

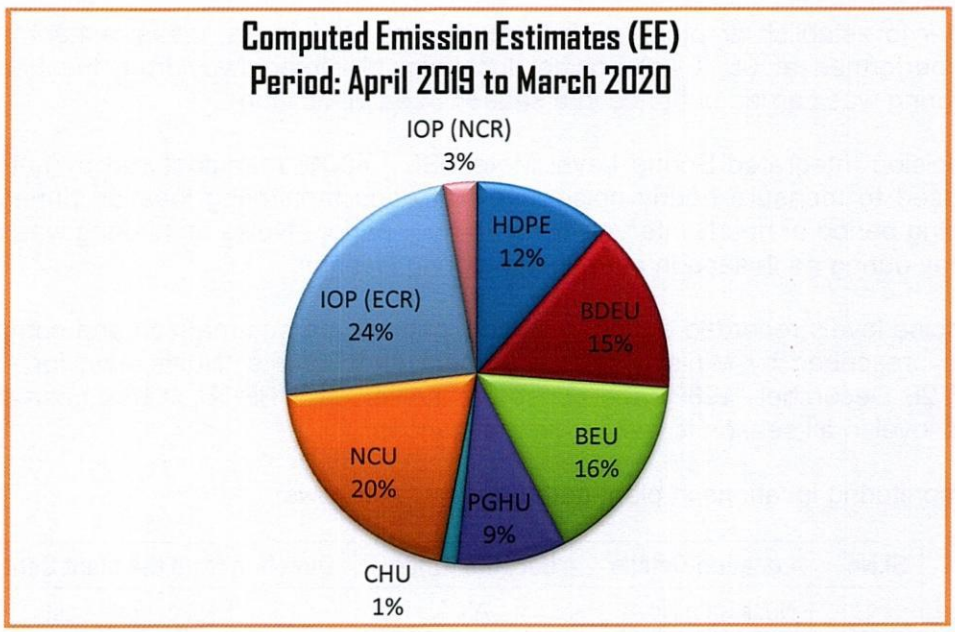
Reference: USEPA Handbook on Control Techniques for Fugitive VOC Emissions from Chemical Process Facilities. EPA/625/R-93/005, March 1994.

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 HDPE, NCAU (BDEU, BEU, PGHU, CHU), NCU, IOP-ECR & IOP-NCR.

Location	Computed Emission Estimates (EE) Unit – Ton/Annum	Computed Emission Estimates (EE) in 100%
HDPE	0.040	11.53
BDEU	0.051	14.70
BEU	0.056	16.14
PGHU	0.032	9.22
CHU	0.005	1.44
NCU	0.070	20.17
IOP (ECR)	0.083	23.92
IOP (NCR)	0.010	2.88
TOTAL	**0.347**	**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 2019		July 2019		November 2019		January 2020	
	Day	Night	Day	Night	Day	Night	Day	Night
Near Gate No-1	55.3	53.9	54.1	53.4	55.5	53.0	52.1	53.9
Near Gate No-3	67.0	68.5	65.8	66.0	67.3	68.2	67.9	68.1
Near South Gate	52.6	52.3	53.1	52.9	53.1	52.7	62.0	54.0
Near CPP Security Office	67.4	66.2	68.2	68.0	68.7	68.2	58.3	54.0
Near North Gate	55.4	54.5	54.5	53.8	56.7	53.2	68.0	69.1

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 2020 – 2021** work to approx. **Rs. 24.32 Crores.**

1. Environmental Monitoring Cost [Rate Contract for Environmental & Process Monitoring Job at HPL Complex]	:	**Rs. 76.00 lacs**
2. Greening Drive Activities [Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]	:	**Rs. 130.0 lacs**
3. Statutory Fees & Insurance Expenses [Analysis charges, Hazardous Waste Authorisation fees]	:	**Rs. 1.80 lacs**
4. Environmental Awarness Progamme [Celebration of World Environment Day, Workshop Seminar]	:	**Rs. 4.2 lacs**
5. Hazardous Wastes Disposal Expenses	:	**Rs. 66.0 lacs**
6. Operational, Maintenance & Installation Cost of Environment protection system:		
6.1 Operational cost of WWTP	:	**Rs. 421.5 lacs**
6.2 Operational cost of Flare Stack Emission System	:	**Rs. 1597.0 lacs**
6.3 Operation cost of Incinerator	:	**Rs. 103.45 lacs**
6.4 Operation cost of Benzene Recovery Unit	:	**Rs. 0.90 lacs**
6.5 CMC for the Hydrocarbon Analyser, AAQMS	:	**Rs. 15.92 lacs**
6.6 CMC for Online Effluent & Stack Monitoring system	:	**Rs. 9.8 lacs**
6.7 Other Expenses (Calibration, Spares & Consumables)	:	**Rs. 4.0 lacs**
7. Training/Workshop/Seminar/Subscription	:	**Rs. 1.25 lacs**
		Total Rs. 2431.82 lacs

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

Environmental Expenditure details (actual) during April'19 to March'20 are given below:

1. Environmental Monitoring Cost [Rate Contract for Environmental & Process Monitoring Job at HPL Complex]	:	**Rs. 71.59 lacs**
2. Greening Drive Activities [Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]	:	**Rs. 107.41 lacs**
3. Statutory Fees & Insurance Expenses [Analysis charges of WBPCB + Environmental Relief Fund of PLI Policy]	:	**Rs. 0.79 lacs**
5. Environmental Awarness Progamme [Celebration of World Environment Day, Inter-school Environment Quiz & Extemper speech competition]	:	**Rs. 2.67 lacs**
5. Hazardous Wastes Disposal Expenses	:	**Rs. 55.15 lacs**
6. Operational, Maintenance & Installation Cost of Environment protection system:		
6.1 Operational cost of WWTP	:	**Rs. 421.5 lacs**
6.2 Operational cost of Flare Stack Emission System	:	**Rs. 1597.0 lacs**
6.3 Operation cost of Incinerator	:	**Rs. 103.45 lacs**
6.4 Operation cost of Benzene Recovery Unit	:	**Rs. 0.85 lacs**
6.5 CMC for the Hydrocarbon Analyser, AAQMS	:	**Rs. 12.42 lacs**
6.6 CMC for Online Effluent & Stack Monitoring system	:	**Rs. 6.92 lacs**
6.7 Other Expenses (Calibration, Spares & Consumables)	:	**Rs. 0.12 lacs**
7. Training/Workshop/Seminar/Subscription	:	**Rs. 1.94 lcs**
		Total Rs. 2381.81 lacs

All above-mentioned annual expenditure of funds for Environmental Safeguards under various heads during 2019-20 works to approx. **Rs. 23.81 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 MoEF & CC.

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 31st March 2019

Sl. No.	Description of plants	Zone- 1	Zone-2	Zone-3	Zone-4	Total
1	Casurina	4352	512	195	984	**6043**
2	Azadirachta (Neem)	1145	472	380	195	**2192**
3	Arjun	4400	350	1012	720	**6482**
4	Acacia	9102	900	512	1732	**12246**
5	Lagerstroemia (Jarul)	5935	112	632	376	**7055**
6	Alstonia(chatim)	896	13	225	40	**1174**
7	Jaman (Jam)	26	25	68	62	**181**
8	Bottle brush	2155	112	430	565	**3262**
9	Karamja	26300	4832	8102	6050	**45284**
10	Cassia renigera	1880	55	245	7350	**9530**
11	Putranjiva (Bakul)	2466	150	207	806	**3629**
12	Spathodea	122	0	0	914	**1036**
13	Peltophorum (Khiris)	15	47	25	22	**109**
14	Caesalpinia – Flava (Radha chura)	16402	740	4555	19700	**41397**
15	Nerium (Karabi)	77	4	32	0	**113**
16	Bombax (Simul)	165	118	52	38	**373**
17	Dalbergia (Sisu)	452	35	40	17	**544**
18	Albizzia (Sirish)	50	5	5	21	**81**
19	Habal	154	22	35	432	**643**
20	Polyalthia (Debdaru)	12	35	340	150	**537**
21	Others(Ficus benjamina, Leucaena (subabul), Babla, Tal, Bel Etc.	1245	1025	518	240	**3028**
	TOTAL	**77351**	**9564**	**17610**	**40414**	**144939**

In addition, 3000 nos. of saplings were planted inside green belt.

Annexure - 1: Consumption & Production Data 2019-20

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	
	2018-19	2019-20		2018-19	2019-20	2018-19	2019-20
Naphtha	1724885	1896096	Ethylene	596547	649180	3.21	3.20
			Propylene	301135	336399	6.37	6.17
LPG Recycle	80304	52776	RPG	435385	477549	4.40	4.35
			C4 Mix	169022	190247	11.34	10.92
C5 Recycle	61928	72833	CBFS	70098	71879	27.35	28.90
			Hydrogen	12232	14076	156.76	147.55
C6 Raffinate	50365	55311	Propane	9174	12293	209.02	168.95

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	
	2018-19	2019-20		2018-19	2019-20	2018-19	2019-20
RPG	434809	477634	Py Gas (High Sulfur)	146529	161446	3.00	2.99
Hydrogen	4750	5159	Benzene Heart Cut	182413	192287	2.41	2.51
			Cyclopentane	6253	6209	70.30	77.75

2. PGDS

Py Gas (High Sulfur)		116407	Py Gas (Low Sulfur)		116276.519		1.00
Hydrogen		511					

3. BEU:

Benzene Heart Cut	182331	192393	Benzene	124362	131176	1.47	1.47
			C_6 Raffinate	50468	55211	3.61	3.48

4. BDEU:

C_4 Mix	189557	190247	Butadiene	73953	83297	2.56	2.28
			C_4 raffinate	85742	96745	2.21	1.97

5.CHU:

C_4 Mix	0	714	C_4 LPG	80188	29002	1.11	3.42
C_4 raffinate	85492	96820	Semi Hydrogenated C4 raffinate		100724		0.98
Hydrogen	3790	1594					

6. Butene-1:

Semi Hydrogenated C4 raffinate		100690	Butene-1		21214		6.09
Methanol		28547	MTBE		77704		1.66

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	
	2018-19	2019-20		2018-19	2019-20	2018-19	2019-20
Ethylene	296924	303677	HDPE Granules	299054	305802	1.003	1.003
Propylene	228	216					
Butene - I	2650	2620					
Hydrogen	195	202					

2. Poly Propylene (PP)

Ethylene	8773	11561	PP Garanules	288875	322082	1.043	1.049
Propylene	292508	326291					
Hydrogen	56	68					

3. Linear Low Density Polyethylene(LLDPE):

Ethylene	290001	332522	LLDPE Granules	303568	345712	1.010	1.010
Propylene	9063	10297					
Butene - I	7274	6058					
Hydrogen	329	350					

Note: Production of PGDS & Butene-1 plant started in Fy 2019-20

Annexure - II

	Soild waste Generation (Non-Hazardous)			
Sl. No.	**Name of the solid waste**	**Unit**	**2019-20**	**Management & Disposal**
1	ALUMINIUM SCRAP	MT	NIL	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	NIL	
6	M.S SCRAP (ROLLING & MELTING SCRAP)	MT	332.06	
7	SS SCRAP	MT	NIL	
8	RUBBISH- SCRAP	MT	382.12	
9	WOODEN SCRAP (LOCAL)	MT	NIL	
10	WOVEN SACKS-TORN	MT	NIL	
11	EMPTY HDPE CARBOYS (25 KG)	No	NIL	
12	EMPTY HDPE DRUMS LARGE (220 L)	No	NIL	
13	EMPTY HDPE DRUMS SMALL (25/30 KG)	No	NIL	
14	EMPTY MS DRUMS OPEN LID (60/80 KG)	No	595	
15	EMPTY MS DRUMS OPEN LID (220 L)	No	892	
16	EMPTY MS DRUMS SMALL LID(180L/200 L)	No	260	
17	CANTEEN FOOD WASTE	MT	4.38	Sent to Haldia Municipality

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, 2020

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 2019-20

Dear Sir,

We are pleased to submit the Annual Return (Form IV) for Hazardous Wastes handled at our end for the financial year 2019-20 as per the provisions of the Hazardous Wastes and Other Wastes (Management Handling and Transboundary Movement) Rules, 2016. The same has been submitted online into the web site https://wbocmms.nic.in.

We enclosed the corresponding white manifest copies of the disposed hazardous waste.

Trust the above is in line with your requirement.

Thanking you,

Yours very truly,

Ashok Kumar Ghosh
EVP & Head - Plant

Encl.: As above

FORM 4

[See rules 6(5), 13(8), 16(6) and 20(2)]

FORM FOR FILLING ANNUAL RETURNS

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

(Period: APRIL 2019 to MARCH 2020)

1. Name and address of the facility:	Haldia Petrochemicals Limited P.O & P.S.: Durgachak, Post Box No. : 12, Haldia Purba Medinipur - 721 602	
2. Authorisation No. and date of Issue	Memo no. 59/2S(HW) – 294/99 – 2000 (Pt-I) dated 23/02/16.	
3. Name of the authorised person and full address with telephone, fax number and e-mail::	Ashok Kumar Ghosh EVP & Head Plant P.O & P.S.: Durgachak, Post Box No. : 12, Haldia Purba Medinipur - 721 602 Tel: (03224)274400 Fax: (03224)274861 e-mail: ashok.ghosh@hpl.co.in	
4. Production during the year (product wise), wherever applicable	**Products**	**Quantity in MT**
	HDPE	305801.93
	LLDPE	345712.45
	PP	322082.40
	Benzene	131176.32
	Butadiene	83296.50
	Cyclopentane	6209.42
	CBFS	71879.17
	PY Gas	161316.00
	Butene-1	21214.31
	MTBE	77704.09
	Mixed Butene	29002.28

Part A. To be filled by hazardous waste generators

1. Total quantity of waste generated category wise	**Types of Hazrdous Wastes**	**Quantity in MT**	**Previous Year Stock in MT**	**Total Stock in MT**
	Used Oil (5.1)	45.45	126.42	171.87
	Waste Oil (5.2)	236.91	127.92	364.83
	Tank bottom sludge (3.3)	73.8	Nil	73.8
	Oil Impregnated Coke (5.2)	12.99	11.69	24.68
	WWTP Sludge (35.3)	195.03	Nil	195.03
	Incinerator Ash (37.2)	38.03	27.89	65.92
	Waste Resin (35.2)	5.04	0	5.04
	Spent Catalysts (1.6)	26.41	5.04	31.45
	Spent Molecular Sieve (1.6)	0	112.57	112.57
	Oil Contaminated Cotton Waste (33.2)	2.28	6.77	9.05
	Waste Oil Filter (3.3)	1.88	0.26	2.14
	Butadiene polymeric material mixed with hydrocarbon (Popcorn) (5.2)	1.8	Nil	1.8
2. Quantity Dispatched	**Types of Hazrdous Wastes**	**Quantity in MT**		
(i) To disposal facility				

M/s. WBWML Srikrishnapur, Sutahata Haldia, WB	Waste Oil	204.76
	Tank bottom sludge	37.84
	Oil Impregnated Coke	8.52
	Incinerator Ash	12.95
	Waste Filter	2.14
	Oil Contaminated Cotton Waste	0.49
(ii) To recycler or reprocessor or pre-processor		
M/s. N.K.Company. J.R.Industrial Estate, Haren Molla Road, 24 Parganas (South), Pin - 700137	Waste Oil	43.26
M/s. Bristol Petroleum Pvt. Ltd. Budge Budge, 24 PGS (S), WB	Waste Oil	116.8
M/s. Inspec Oils Ltd Kalyani, Nadia, WB	Used Oil	7.56
M/s. Ganesh Steel & Alloy Steel. 14 Netaji Subhash Road, Kolkata-700001	Spent Catalysts (1.6)	5.83
M/s. Surchem Chemicals Pvt Ltd. B403 Jyoti Plaza, S.V Road, West Mumbai-400067	Spent Catalysts (1.6)	6.62
(ii) Others	**Types of Hazrdous Wastes**	**Quantity in MT**
Own Captive Incinerator	WWTP sludge	195.03
	Waste Resin	3.24
	Oil Impregnated Coke	7.45
3. Quantity utilised in-house, if any	**Nil**	
4. Quantity in storage at the end of the year	**Types of Hazrdous Wastes**	**Quantity in MT**
	Used Oil	164.31
	Waste Oil	Nil
	Tank bottom sludge	35.96
	Oil Impregnated Coke	8.71
	WWTP sludge	Nil
	Incinerator ash	52.97
	Waste Resin	1.8
	Oil Contaminated Cotton Waste	8.56
	Waste Oil filter	Nil
	Spent Catalysts	19.0
	Spent Molecular Sieve	112.57
	Butadiene polymeric material mixed with hydrocarbon (Popcorn)	1.8

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

Part C. To be filled by Recyclers or co-processors or other users: NA

Date: 30.06.20
Place: Haldia

Signature of the Occupier or Operator of the disposal facility

A. K. GHOSH
Head Plant & Executive Vice President
Haldia Petrochemicals Ltd.
Haldia