

**HALF YEARLY COMPLIANCE
REPORT OF THE CONDITIONS OF THE
ENVIRONMENTAL CLEARANCE FOR
700 KTA ETHYLENE CAPACITY**

PERIOD: April 2021 to September 2021

J-11011/176/2007-IA II (I)



**HALDIA PETROCHEMICALS LTD
P.B.NO. - 12
P.O - DURGACHAK, HALDIA
DIST - PURBA MEDINIPUR
PIN - 721602
WEST BENGAL**

Sl No.	MoEF CONDITIONS	STATUS
<p>Name of the Project: Expansion of proposed increase in Ethylene Production Capacities from 5,20,000 TPA to 7,00,000 TPA at Haldia Petrochemicals Limited, Haldia, District PurbaMedinipur, West Bengal by M/s. Haldia Petrochemicals Limited (HPL) - Environmental Clearance reg.</p> <p>Clearance Letter No.: J-11011/176/2007-IA II (I) dated 24/08/07 and 28/06/07</p> <p>Period of Compliance Report: April'21 to September'21</p> <p>Specific Conditions:</p>		
i	<p>The gaseous emissions (SO₂, NO_x, HC, NMHC and Benzene) from the various process units shall conform to the standards prescribed under Environment (Protection) Rules, 1986 or norms stipulated by the SPCB whichever is more stringent. At no time, the emission level should go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.</p>	<p>HPL has been monitoring the gaseous emissions from stacks as well as vent emissions from various process units. The emission level is well within the prescribed standard. (Annexure – 1)</p> <p>There won't be any point source emission of Non-Methane Hydrocarbon (NMHC) from any other stacks, although the presence of NMHC in ambient air is being monitored continuously by on-line Hydrocarbon analyser. HPL re-affirms its commitment to take immediate corrective action whenever the emission level goes beyond set limit.</p> <p>FULL COMPLIANCE.</p>
ii	<p>Requisite numbers of ambient air quality monitoring stations, [SPM, SO₂, NO_x, HC, NMHC and Benzene] shall be set up in the Petrochemicals in consultation with SPCB, based on occurrence of maximum ground level concentration and down-wind direction of wind i.e. maximum impact zone. The monitoring network must be decided based on modeling exercise to represent short-term GLCs. Continuous on-line stack monitoring equipment shall be installed for measurement of SO₂ and NO_x. Data on VOC shall be monitored and submitted to the SPCB / Ministry.</p>	<ul style="list-style-type: none"> HPL has been monitoring PM₁₀, PM_{2.5}, SO₂, NO_x, and C₆H₆ at ambient air monitoring stations identified in consultation with WBPCB. In addition, an on-line Ambient Air Quality Monitoring Station (AAQMS) was installed in February 2008 at South Control Room for continuous monitoring of the ambient air quality. The system was upgraded with new analysers (PM_{2.5}, Ozone, Ammonia, CO & Benzene) in 2018 (Annexure – 2) For Benzene monitoring in ambient air, the locations were decided in consultation with WBPCB and periodic monitoring was started in all On-site & Off-site locations. (Annexure – 2) VOC (Methane, Non-Methane & Total Hydrocarbon) were monitored in ambient air by online HC Analysers and data submitted to SPCB/MoEF& CC periodically. (Annexure – 2) The old online stack monitoring systems installed in Auxiliary Boilers & HRSGs were replaced with new

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		<p>systems in March, 2017. M/s. Environnement S.A installed the online SO_x, NO_x& CO monitoring system and M/s ICE installed the PM monitoring system in both the Auxiliary Boilers and HRSGs. The integrated system was commissioned and since then the real-time emission data was being sent to the servers of CPCB/ WBPCB. In the heaters of our Naphtha Cracker Unit (NCU) & Pyrolysis Gasoline Hydrogenation Unit (PGHU) sulfur-free fuel gas (RFG-mixture of methane and hydrogen) generated in the plant itself is used as fuel using low-NO_x burners. The NCU heater stacks have on-line analyzers for continuous monitoring of excess oxygen and the calorific value of the fuel.</p> <ul style="list-style-type: none"> The VOC (Benzene, Butadine& Hexane) analysis was conducted in BEU, BDEU & HDPE plant. <p>(Annexure – 3) FULL COMPLIANCE.</p>
iii	<p>Measures for fugitive emissions control shall be taken by installation of internal floating tanks for storage of light liquid HCs and provision of double mechanical seals to all pumps handling high vapour pressure materials, sensors for detecting HC/toxic gas leakages at strategic locations, regular inspection of floating roof seals, maintenance of valves and other equipments and regular skimming of separators/equalization basin.</p>	<p>Various design and engineering control measures were installed in the design stage itself for the said expansion project in order to ensure that –</p> <ul style="list-style-type: none"> Internal & External floating roofs were provided for various liquid hydrocarbons to minimize fugitive emissions. Pumps handling hydrocarbons were provided with double mechanical seals. Canned pumps were used in PGHU & BDEU. Gas detecting sensors were provided at strategic locations, as per requirement, to detect any hydrocarbon leak. Tanks are periodically inspected to ensure that roof seals are in healthy conditions. Various types of valves are regularly inspected and maintained periodically. Inspection schedule for various types of valves are in place followed by proper maintenance schedule. <p>FULL COMPLIANCE</p>

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iv	The Company shall install vapor collection system for all pressurized hydrocarbon loading and benzene recovery unit for collection of benzene vapor during loading and extraction of benzene. Further, company shall lay dedicated pipeline for ship loading of benzene and butadiene.	<p>Vapor collection system was already provided for loading of all pressurized hydrocarbons. Also, Benzene Recovery Unit (BRU) was provided for safe loading of Benzene into tankers.</p> <p>We also provided dedicated pipeline for ship loading of Benzene and Butadiene.</p> <p>FULL COMPLIANCE</p>
v	All new standards/norms that are being proposed by the CPCB for petrochemical plants shall be applicable for the proposed naphtha cracker and downstream polymer units. The company shall conform to the proposed process vent standards for organic chemicals including non-VOCs and all possible VOCs i.e. TOCs standard and process vent standards for top priority chemicals. The company shall install online monitors for VOC measurements. Action on the above should be taken during the detailed design stage of the NCU. The project authorities shall take necessary measures to comply with the above proposed emission norms including monitoring facilities and intimate the same to this Ministry.	<p>As per the proposed guidelines vent monitoring was already in place for high priority chemicals like Benzene in Benzene Extraction Unit. The monitoring reports have been enclosed in the Half Yearly Reports submitted to MoEF&CC. The company is committed to fulfill all applicable requirements vis-à-vis CPCB guidelines for Petrochemical Industry.</p> <p>On-line Hydrocarbon Analyzer was set up in our Central Laboratory and AAQMS at SCR for monitoring THC, CH₄ & NMHC in ambient air and the same is being continuously monitored since 2007. (Annexure – 2)</p> <p>FULL COMPLIANCE</p>
vi	M/s. HPL shall adopt Leak Detection And Repair (LDAR) programme for quantification and control of fugitive emissions.	<p>The LDAR is in practice since it was adopted under CREP for petrochemical industry. We are using Photo Ionization Detector (PID) based analyzers for conducting this exercise in the plant as periodically. We have completed the LDAR program in BEU, BDEU, PGHU, Butene1 & PGDS units during the period of April'21 to September'21. (Annexure – 4)</p> <p>FULL COMPLIANCE</p>
vii	To mitigate NO _x emissions, the company shall install low NO _x burners.	<p>The NCU, PGHU furnaces & Boilers in Captive Power Plant (CPP) are equipped with low NO_x burners. FULL COMPLIANCE</p>
viii	The wastewater effluent shall not exceed 3070 m ³ /d. The wastewater shall be segregated in different streams at the source. The treated effluent after primary, secondary and tertiary treatment shall comply with the standards stipulated by WBPCB/Central Pollution Control	<p>The average wastewater generated from process plant for the period April'21 to September'21 was 2725 m³/day. The treated effluent is finally discharged into the greenbelt canal (GBC) after conforming to the prescribed standards of WBPCB. The greenbelt canal ultimately goes to the river Hooghly.</p>

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	Board. The plant regenerate, cooling tower blow tower and DM plant regenerate shall also be treated in ETP. The treated effluent shall be discharged into the river Hooghly after conforming effluents to the prescribed standards.	<p>The CTBD & DM regeneration effluent are stored in WWTP for aerial oxidation & mixed as diluents with the treated effluent prior to discharge.</p> <p>The online effluent monitoring system was installed & successfully commissioned by M/s. Forbes Marshal in treated effluent discharge line for monitoring of Flow, pH, TSS, BOD & COD. The online data is sent to CPCB/WBPCB server. FULL COMPLIANCE</p>
ix	The company shall install incinerator for incineration of ETP sludge, Oily sludge and Waste Oil. The gaseous pollutants in the flue gas from the incinerator shall be scrubbed with caustic scrubber. The spent effluent from the scrubber shall be routed through wastewater treatment plant for further treatment.	<p>The incinerator was installed and commissioned in Aug, 2004. It was designed to incinerate mainly the ETP sludge along with provision of small quantity of oily sludge and waste oil. The incinerator was provided with droplet catcher and caustic scrubber to wash the acidic gases from the flue gas. The spent caustic effluent was sent to Wastewater Treatment Plant for subsequent treatment and disposal.</p> <p>FULL COMPLIANCE</p>
x	Green belt shall be provided to mitigate the effects of fugitive emissions all around the plant in an area of 103 ha in consultation with DFO as per CPCB guidelines.	<p>A green belt covering 103 hectares all around the HPL Complex as per the approval of MoEF&CC was developed since 1995. A census of greenbelt trees was conducted and it was found that around 1.20 lacs of trees are available in the surrounding green belt as on March'21. Selection & diversity of plant species for green belt development were considered as per the guideline stated in the Environmental Clearance letter. (Annexure –5)</p> <p>FULL COMPLIANCE</p>
xi	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	<p>The periodic medical examination (PME) was conducted for 688 nos. of contractual employees from April'21 to September'21 as per the Factories Act. The records are maintained in our Occupational Health Center (OHC).</p> <p>FULL COMPLIANCE</p>
GENERAL CONDITIONS:		
I.	No further expansion or modernization in the plant should be carried out without prior approval of the Ministry of Environment & Forests.	<p>HPL will not carry out any modernization or expansion activity without prior approval of MoEF/SPCB.</p> <p>FULL COMPLIANCE</p>

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II.	At no time, the emissions should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the units, the respective unit should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved.	HPL always ensures that the emission level is maintained below the prescribed standards all the times. In case of any failure or abnormalities in plant, we always inform to the concerned authorities and shutdown the plant if required unless the corrective actions are taken suitably at our end. FULL COMPLIANCE
III.	All the recommendations made in the EIA / EMP report and risk assessment report should be implemented.	HPL has complied with all necessary recommendations made in EIA/EMP report and risk assessment report. (Annexure –6A/6B) FULL COMPLIANCE
IV.	The overall noise levels in and around the plant area should be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz 75 dBA (day time) and 70 dBA (night time).	The noise level is measured at various work locations. Various noise control measures are in place to ensure that noise level is maintained in the workzone within the prescribed standards of OSHA (90 dBA for 8 hrs. exposure). The workers' porta cabins were provided at locations where the noise level impact is minimum. The ambient noise level is also measured periodically and the level is well below the limit (75 dBA – Daytime and 70 dBA – Night time). (Annexure –7) FULL COMPLIANCE
V.	The project authorities must strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended in 2000 for handling of hazardous chemicals etc. Necessary approvals from Chief Controller of Explosives must be obtained before commission of the project.	Necessary commissioning approval was obtained from CCoE. FULL COMPLIANCE
VI.	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collections/treatment/storage/disposal of	HPL has complied with the applicable rules and regulations regarding handling, storage and disposal of hazardous wastes. FULL COMPLIANCE

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	hazardous wastes.	
VII.	The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	The budgeted funds for environmental activities are solely utilized for implementing the conditions stipulated by MoEF&CC/WBPCB. These funds are not diverted to any other job or activities. (Annexure – 8) FULL COMPLIANCE
VIII.	The stipulated conditions will be monitored by the Regional of this Ministry at Bhubaneswar /Central Pollution Control Board/State Pollution Control Board. A six monthly compliance report and the monitored data should be submitted to them regularly.	The six monthly compliance report along with monitoring data (soft copy) is mailed to MoEF & CC at Bhubaneswar/Kolkata as well as CPCB & WBPCB at Kolkata respectively. FULL COMPLIANCE
IX.	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board / Committee and may also be seen at Website of the Ministry of Environment and Forests at http // www envfor.nic in . This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional Office.	Advertisement published in two local newspapers in English and vernacular language (Bengali). A copy of the same was sent earlier as a proof of compliance. FULL COMPLIANCE
X.	The Project Authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Not Applicable. The Capacity enhancement didn't require any land development work.

Stack Monitoring Results (April 2021 to September 2021):

Naphtha Cracker Unit (NCU):

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)
2F - 201	5.35	22.50	3.2
2F - 202	4.67	23.55	3.4
2F - 203	5.12	20.54	4.2
2F - 204	4.69	22.81	4.0
2F - 205	6.56	22.59	4.4
2F - 206	4.99	26.04	3.6
2F - 207	6.10	23.71	4.2
2F - 208	5.21	23.67	3.8
2F - 209	5.58	23.14	3.8
Standards as per Consent to Operate	50	350	NA

All values Calculated to 3% O₂ dry basis.

Pyrolysis Gasoline Hydrogenation Unit (PGHU):

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)	PM (mg/Nm ³)
4F - 101	13.06	61.53	33.0	6.28
Standards as per Consent to Operate	50	350	NA	10

All values Calculated to 3% O₂ dry basis.

Pyrolysis Gasoline De Sulphurisation Unit (PGDS):

Furnace Heater No.	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)	PM (mg/Nm ³)
4F - 101	9.83	58.10	28.0	3.90
Standards as per Consent to Operate	50	250	NA	5

All values Calculated to 3% O₂ dry basis.

Incinerator:

Furnace /Heater Name	Results in mg/Nm ³							ngTEQ/Nm ³
	SO ₂	NO _x	CO	PM	TOC	HCL	HF	Dioxin & Furan
Incinerator	10.07	47.0	29.0	32.14	2.21	15.68	0.42	<0.1
Standards as per CPCB	200	400	100	50	20	50	4	0.1

All values Calculated to 11% O₂ dry basis.

Captive Power Plant (CPP):

Furnace /Heater Name	SO ₂ (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)	PM (mg/Nm ³)
Auxiliary Boiler #1	5.21	24.30	4.0	10.60
Auxiliary Boiler #2	5.10	20.37	4.0	12.09
GT & HRSG #1	5.36	35.98	5.0	15.26
GT & HRSG #2	5.14	41.52	5.0	12.79
Standards as per Consent to Operate		188 mg/Nm³ (100 ppm) at 15% excess O₂	11500 mg/Nm³ (1% V/V)	50 mg/Nm³

	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	Pb(µg/m ³)	NH ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	BaP(ng/m ³)	As(ng/m ³)	Ni(ng/m ³)	CO(mg/m ³)
e	47.98	23.65	19.31	22.59	28.61	0.135	8.24	1.70	0.23	4.28	12.09	0.551
e	39.23	19.34	13.58	16.91	25.65	0.079	5.91	1.33	0.05	2.21	8.09	0.362
ds WA (s)	100	60	80	80	100 (8 Hrs. avg)	1.0	400	5	1	6	20	100 (8 Hrs. avg)

Off-Site Locations (06 nos.): Nandarampur, Basudevpur, Haldia Bhavan near CPT Hospital, Hatiberia Swati Complex, IOC Township, Manaharpur.

Total rain fall in the period of April'21 to September'21: 3201.30 mm

Sl. No.	Name of Off-Site Locations	Direction from HPL Complex	Distance from HPL Complex (km)
1.	Nandarampur	North	2.6 Km
2.	Basudevpur	North- East	5.0 Km
3.	CPT Hospital	South	6.0 Km
4.	Hatiberia (Swati Complex)	South of South-West	4.0 Km
5.	IOC Township	South	5.0 Km
6.	Manaharnur	West of North-West	3.5 Km

Location	PM ₁₀ (µg/m³)	PM _{2.5} (µg/m³)	SO ₂ (µg/m³)	H ₂ S (µg/m³)	NOx (µg/m³)	NH ₃ (µg/m³)	Ozone (µg/m³)	Benzene (µg/m³)	CO (µg/m³)	THC (PPM)	CH ₄ (PPM)	NMHC (PPM)
SCR	44.69	19.00	9.83	15.63	24.85	14.65	44.18	1.63	0.58	3.03	1.39	1.25
	WS (m/s)	Wind Degree	Temperature(°C)	RH (%)	Pressure (mbar)							
	1.55	312.56	28.82	72.25	726.82							
	THC (PPM)	CH ₄ (PPM)	NMHC (PPM)									
Central Lab	2.90	1.94	0.95									

Work Zone Monitoring Results (April 2021 to September 2021)

Plant	Benzene Extraction Unit		Butadiene Extraction Unit			High Density Poly-Ethylene	
Parameter	BENZENE		BUTADIENE			HEXANE	
Location	5P – 02 A & B Hurt cut Feed Pump (BEU)	Benzene Sampling Point (050-SP-108) & 5P-07 A & B (BEU)	Butadiene Loading Gantry	In Front of Vessel No.-581	Butadiene product sampling point	V- 2405 Draining Point	Flaker House (Ground Floor)
April 21	0.061	0.211	0.039	0.147	0.224	8.12	11.58
July 21	0.038	0.188	0.059	0.172	0.209	8.04	12.36
Sept. 21	0.046	0.206	0.042	0.156	0.216	9.04	10.66
Standards as per OSHA	1.0		1.0			500	

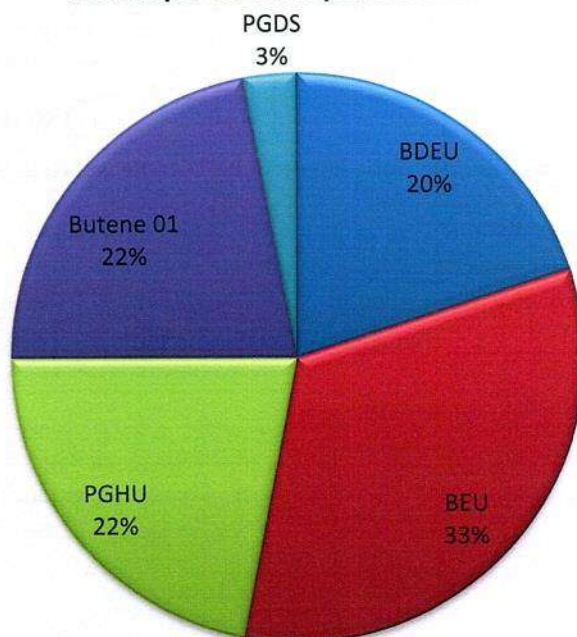
All results are in ppm

Estimated VOC emission under LDAR (April 21 to September 21)

Location	Computed Emission Estimates (EE) Actual Unit – Ton/Annum	Computed Emission Estimates (EE) in 100%
BDEU	0.020	20.00
BEU	0.033	33.00
PGHU	0.022	22.00
Butene1	0.022	22.00
PGDS	0.003	3.00
Total	0.100	100.00

Computed Emission Estimates (EE)

Period: April 2021 to September 2021



Total VOC emission from BDEU, BEU, PGHU, Butane 01 & PGDS

1. Total VOC emission from BDEU (Butadiene Extraction Unit) measured in April 2021:

No of points checked: 500

No of leaking (VOC>1ppm) points: 25

No of non leaking points: 475

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	7	0	0	0.00196
	Heavy liquid	0	0	0	0
Flange	All	18	0	0	0.00036
Total					0.00232
					1.67 (kg/month) / 0.020 (Ton/Annum)

2. Total VOC emission from BEU (Benzene Extraction Unit) measured in May 2021:

No of points checked: 500

No of leaking (VOC>1ppm) points: 30

No of non leaking points: 470

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	1	0	0	0.00198
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	5	0	0	0.0014
	Heavy liquid	0	0	0	0
Flange	All	24	0	0	0.00048
Total					0.00386
					2.78 (kg/month) / 0.033 (Ton/Annum)

3. Total VOC emission from PGHU (Pyrolysis Gasoline Hydrogenation Unit) measured in June 2021:

No of points checked: 500

No of leaking (VOC>1ppm) points: 23

No of non leaking points: 477

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	8	0	0	0.00224
	Heavy liquid	0	0	0	0
Flange	All	15	0	0	0.0003
Total					0.00254
					1.83 (kg/month) / 0.022(Ton/Annum)

4. Total VOC emission from Butene 01 Unit measured in July 2021:

No of points checked: 636

No of leaking (VOC>1ppm) points: 26

No of non leaking points: 610

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	8	0	0	0.00224
	Heavy liquid	0	0	0	0
Flange	All	18	0	0	0.00036
Total					0.0026
					1.87 (kg/month) / 0.022 (Ton/Annum)

5. Total VOC emission from PGDS (Py-gas Desulfurisation Unit) measured in July 2021:

No of points checked: 68

No of leaking (VOC>1ppm) points: 3

No of non leaking points: 65

Number of Source Screened(ppmv)					Computed Emission Estimates (EE)
Source	Service	0-1000	1001-10000	Over 10,000	Per Source Type(kg/hr)
Pump	Light liquid	0	0	0	0
	Heavy liquid	0	0	0	0
Valve	Gas/Vapor	0	0	0	0
	Light liquid	1	0	0	0.00028
	Heavy liquid	0	0	0	0
Flange	All	2	0	0	0.00004
Total					0.00032
					0.23 (kg/month) / 0.003(Ton/Annum)

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

Greenbelt 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 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 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	2863	125	6232	10640
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	224
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 (Karamja, Casurina, Akacia, Arjun)	10132	0	0	0	10132
	TOTAL	71830	27033	6527	14665	120055

Compliance Status of the Environment Management Plan (EMP) as per the EIA Report of 700 KTA Ethylene Capacity

Sl. No.	Environment management Plan	
8.2	PRESENT MONITORING PROGRAMME	
8.2.1	<p>Ambient Air Quality</p> <p>Monitoring of ambient air quality is being carried out at eleven (11) locations. 5 locations are inside the plant and 6 locations are outside the plant. Monitoring is undertaken at a frequency of twice a week with minimum 104 measurements in a year taken 24-hourly at uniform intervals at all inside locations. For outside locations, the monitoring is done on rotational basis. Parameters include SPM, RPM, SO₂, NO_x, CO and Total Hydrocarbons.</p>	<p>Full compliance</p> <p>Parameters measured: PM₁₀, PM_{2.5}, SO₂, NO_x, O₃, Pb, NH₃, C₆H₆, BaP, As, Ni & CO</p>
8.2.2	<p>Stack Emissions</p> <p>Stack emissions are monitored for all the existing stacks including the incinerator, particularly to ascertain that emissions are within the design level. Monitoring is undertaken at a frequency of once a month. Parameters include SO₂, NO_x and CO.</p>	<p>Full compliance</p> <p>Parameters measured (monthly): SO₂, NO_x, CO, PM Parameters measured (quarterly for incinerator): TOC, HCl, HF, Dioxine & Furan</p>
8.2.3	<p>Work Zone Air Quality</p> <p>Work Zone Air Quality is monitored once in a month at Benzene Extraction Unit (BEU), Butadine Extraction Unit (BDEU) and HDPE Unit.</p>	<p>Full compliance</p> <p>Hydrocarbon (Benzene, Butadiene & Hexane) are monitored every month inside NCAU and HDPE respectively. Vent emission from NCAU (BEU) is also measured on monthly basis (Ref. Half-yearly Data Generation Report) In addition, work zone air (SO_x, NO_x, SPM, RPM, Benzene, Budadiene & Hexane) and noise are also measured in other plants including bagging area in periodical manner by an external agency, duly recognized by Inspector of Factories</p>
8.2.4	<p>Liquid Effluents</p> <p>Final Effluent from WWTP is collected on daily basis and analysed in accordance with the relevant parameters to ensure that the effluent quality meets the stipulated standards for discharge into inland surface waters. Parameters monitored are pH, TSS, BOD, COD, oil & grease, phenol, sulphide, cyanide, fluoride, total chromium and hexavalent chromium. Besides, the additional parameters like free chlorine, copper, iron, zinc and phosphate are analysed on monthly basis.</p>	<p>Full compliance</p>
8.2.5	<p>Noise Levels</p> <p>Noise level is monitored at 25 (twenty five) nos. of main noise generation units of the process area inside the plant for spot noise level measurement and at 4 (four) locations near the boundary wall on hourly basis for 24 hours, with the frequency of once in a season at each location.</p>	<p>Full compliance</p>

8.2.6	<p>Solid Waste</p> <p>One homogeneous sludge (solid waste) sample is collected once in every month for its detailed composition and chemical analysis for the identification of the categories of Hazardous Wastes as per the schedule Rules-3(I), 3(N) 4 dt. 28th August 1989 under the Hazardous Wastes (Management & Handling) Rules, 1989 and amendments thereafter.</p> <p>Annual Monitoring Plan for different environmental attributes has been tabulated in Table - 8.2.</p>	<p>Full compliance</p> <p>Details composition and chemical analysis of hazardous wastes (solid) were carried out by external agency (M/s WBWML) and accordingly its disposal routes (landfill/incineration) were determined. Since there were no changes in our internal processes, the characteristics of these hazardous wastes remain unchanged, hence monthly monitoring of the same was omitted.</p>
8.3	<p>PROPOSED MONITORING PROGRAMME</p> <p>After the proposed development, there will be 2 (two) additional stacks, attached to the existing Naphtha Cracker Unit, which will contribute to the additional emissions. These stacks will be monitored for the same parameters and with the same frequency as the existing stacks.</p> <p>Besides, the existing monitoring schedule for the respective parameters will continue with the proposed development. Monitoring schedule will be sufficient to meet the future requirement.</p>	<p>Full compliance</p>
8.4	<p>GREENBELT DEVELOPMENT</p> <p>The potential value of vegetation in controlling air pollution has been well recognised. Trees can filter particulates and are effective as sink of pollutants. Vegetation also reduces noise level and regulates the oxygen balance in the area by consuming released carbon dioxide. Development of green belt is, therefore, nowadays imperative around industrial complexes.</p> <p>In order to improve the aesthetic look of the area and enhance the land use as well as to compensate for any loss in ecology during construction, adequate plantation programmes around the project site have been planned and adopted.</p> <p>Green Belt of approx 90-hectare area and 50-100 m width around the HPL Complex has been developed. 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. The salient features of Green Belt are as follows:</p> <ul style="list-style-type: none"> ✓ Selection and diversity of plant species as per the guidelines of Ministry of Environment & Forest (MOEF). ✓ Plantation of more than 1.65 lacs trees and its maintenance. ✓ Development of more than 15,000 sq. meter of lawn area on-site. <p>The plants add beauty and act sink for carbon dioxide and</p>	<p>Full compliance</p> <p>The greenbelt area was extended for 103 hectare area. There are around 1.20 lacs of trees as on March 2021</p> <p>Fresh plantation of 10000 nos. of saplings was done inside the greenbelt as on 31.03.21</p>

	<p>reduces the physical impact outside the premises, in case of any on-site emergency.</p> <p>Horticultural Development Activities</p> <p>Since the year 2000, HPL started its Horticultural Activities inside the HPL premises under the beautification scheme. Till date, 30,000 sq. meters of area has already been developed under this scheme that includes all control room area, all service centres, AEC Building, Central Laboratory, HSE & F Building etc. There is a program to cover 30,000 sq. meters more open areas inside the plant complex in near future. Since last year, the horticulture activities were/ are being undertaken at WWTP area and the two plants ISBL area namely NCU & PP under the yearly program. All major building front lawns have already been converted into natural lawns with some hedges.</p> <p>Nursery Development Activities</p> <p>More than 3500 nos. of seasonal flowerpots has been developed for indoor and outdoor beautification of various office places.</p>	
8.5	OCCUPATIONAL HEALTH	
8.5.1	<p>HPL continues to lay great store in the health of its employees. In-line with the company's HSE vision and policy, HPL has set up a good and well-equipped Occupational Health Centre (OHC) at Haldia Plant to provide effective and proper first-aid to all its employees when needed as well as to cater to any medical emergencies that may occur. Periodic Medical Examination (PME) as a proactive and preventive measure is also being put in place for all its personnel.</p>	Full compliance
8.5.2	<p>Identified occupational health risks within HPL</p> <p>The main occupational health risks, which have been identified till now are:</p> <p>Skin disorders from chemical Exposure</p>	<p>Full compliance</p> <p>Since commissioning we have not found any skin disorders due to chemical exposure in our complex. The main occupational health risks, which have been identified during more than last 10 years are:</p> <p>(a) Noise induced hearing problem and (b) Biological exposure to benzene</p> <p>Till now, after repeated monitoring, not a single case of occupational diseases from this two hazards are identified</p>
8.5.3	<p>Occupational Health Management Strategy</p> <p>Occupational health strategy in HPL has been developed in a 2-step fashion. The first is preventive and the second is curative. In the preventive side, all the potential health hazards have been identified and periodic medical examinations are done on employees to check the effects of</p>	<p>Full compliance</p> <p>Since there were no occupational diseases identified in our plant since its inception, so we have not done in epidemiological studies. However, in future we may carry out the study, if required</p>

<p>these hazards on the body. These tests are done on 6 monthly basis for personnel working in the plant and on annual basis for non-plant personnel. Non-plant personnel are also examined as they may be exposed to health hazards in the air and the surrounding environment. As the company is young and as there is not enough data, the future epidemiological studies are also planned to find out cause and effect relationship between various chemicals being used in the company and their health hazards. These studies will be guided by the disease prevalence in the factory site. During periodic medical examination, a full body examination is done and all organ systems are checked. Skin is examined under lighted conditions after stripping. Non-invasive examinations carried out are:</p> <ul style="list-style-type: none"> a) Audiometry b) X-Ray c) Lung Function Tests d) Peripheral Blood Smear to detect changes in the blood cells <p>Biological monitoring of all concerned employees for possible exposure to benzene is also done at OHC.</p> <p>Second stage is curative where the treatment is aimed at reducing morbidity and mortality. A well-developed minor OT exists in the OHC where all minor surgeries are carried out. Burns patients are also treated here under sterile conditions.</p> <p>Treatment of work injury is carried out locally unless the injury is such that the patient requires urgent treatment in Kolkata. Hospitalisation will be as per company guidelines. In case, the need arises, HPL has tied –up with various hospitals in Kolkata, which are capable of giving tertiary care and rehabilitation.</p> <p>The OHC is designed to provide regular treatment and emergency treatment to serious cases. The OHC has its own ventilator, monitors, ECG machine etc. to monitor the condition of a serious patient. The state of art ambulance is equipped to transport serious patients from Haldia to Kolkata.</p> <p>Training has already been provided to more than 50% of the employees by St. Johns ambulance to ensure that during emergency, adequate first aid members are present at site. Different precautionary measures adopted in HPL for prevention of occupational health diseases are:</p> <p>Periodic Medical Examination of Workers once in six months for plant employees and once in a year for non-plant employees.</p> <p>✓ Biological monitoring of employees handling</p>	<p>Training on different module of Health for contractual and own employees was suspended temporarily due to COVID19 pandemic.</p> <p>The periodic medical examination (PME) was conducted for 688 of contractual employees from April'21 to September'21 as per the Factories Act. The records are maintained in our Occupational Health Center (OHC).</p>
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	<p>benzene</p> <ul style="list-style-type: none"> ✓ Audiometry test for workers exposed to high noise area ✓ Vision check of drivers working for HPL on regular basis ✓ Neurological examination of workers exposed to hexane ✓ First Aid Training for HPL employees and Associates 	
8.6	<p>ENVIRONMENT MANAGEMENT CELL</p> <p>Environmental management in HPL works with some defined roles at different positions. The Environmental management is seen as a part of HSEF (Health, Safety, Environment & Fire) related activities. Head HSEF has direct access to Chief Executive. A team leader on environment reports to HSEF and the Leader is assisted by a Senior environment engineer and by laboratory services.</p> <p>Thus, a dedicated Pollution Control Cell consisting of experienced and qualified engineer's co-ordinates all the activities related to environment management in the plant. This cell appraises day-to-day performance as well as develops plans for future improvement in the existing facilities.</p> <p>Similarly, there is a full-fledged Pollution Control Laboratory having modern and sophisticated equipment and manned by qualified personnel to test and monitor performance on a day-to-day basis.</p> <p>The Functional structure of the cell is shown as Figure-8.1.</p>	<p>Full compliance.</p> <p>Revised functional structure of EMC is mentioned against Figure 8.1</p>
8.7	<p>REPORTING OF ENVIRONMENTAL PERFORMANCE</p> <p>HPL believes in a two-way communication between the employees and the management on reporting on environmental performance. Environmental performance is reported on various forums as:</p> <ul style="list-style-type: none"> ✓ HSE Committee Meetings ✓ Reporting of Environmental Performance Reports ✓ Presentation to Head – Plant and Chief Executive ✓ Presentation to Board HSE Committee ✓ Daily Environmental Status Reporting ✓ Display of Environmental Performance Data at Entrance 	<p>Full compliance.</p>
A	<p>HSE COMMITTEE MEETINGS</p> <p>HSE Committees are regarded as best means of communication on HSE aspects. Environmental performance reporting is made on this forum to apprise the employees and associates. In HPL, five tiers of HSE Committees have been constituted. These are:</p> <p>HSE Committee – Board of Directors: The meeting is held once in a quarter and is attended by non-executive directors nominated for HSE sub committee. Presentation</p>	<p>Full compliance.</p>

	<p>on Health, Safety and Environmental issues are made in front of the sub committee.</p> <p>HSE Committee – Site Management: The meeting is held once in a quarter. All team leaders are members of this committee. It discusses the HSE related issues.</p> <p>Environmental Performance reporting is a part of the agenda. The meeting is headed by Head – Plant.</p> <p>Central HSE Committee (CSC): This is a statutory body as per Factories Acts and Rules and is represented by a member and a SG – 09 grade employee of each department. It contains an environmental performance review as a part of the agenda. The meeting is held once in a quarter and Head – Plant, heads the committee.</p> <p>Team HSE Committee (TSC): Every team member from process and maintenance is a part of the committee. It also contains discussion on the environmental performance as a part of the agenda. The Team Leader of the individual plants heads the committee.</p> <p>Contracts HSE Committee (CoSC): The aim of this committee is to spread awareness about HSE performances and requirements. Every contractor supervisor is a member of this committee being headed by Team Leader – HR and A.</p>	
B	<p>REPORTING OF ENVIRONMENTAL PERFORMANCE REPORTS</p> <p>Environmental performance report is circulated to all the team leaders on monthly basis. It contains monitoring results related to treated effluent quality, ambient air quality, work zone air quality, stack emission monitoring, drinking water quality and noise level monitored inside the plant and at the plant battery limit. Any excursions are also reported to the team leaders if violation is made to any of the environmental parameters. A copy of this is also displayed on the HSEF Intranet for information to all employees and associates (All Employees and Associates have access to HSEF Intranet.)</p>	<p>Full compliance.</p>
C	<p>PRESENTATION TO HEAD – PLANT AND CHIEF EXECUTIVE</p> <p>In Haldia Petrochemicals Limited, Head – HSEF makes a presentation in front of Head – Plant and Chief Executive on HSEF performance on monthly basis. All managers and senior management attend this presentation. A copy of this is also displayed on the HSEF intranet for information to all the employees and associates.</p>	<p>Full compliance.</p>
D	<p>PRESENTATION TO BOARD HSE COMMITTEE</p> <p>Quarterly HSEF performance is reported to Board level HSE committee by Head – HSEF which consists of performance on environmental issues, resource conservation measures, waste minimization measures besides other HSEF related</p>	<p>Full compliance.</p> <p>Board HSE Committee Meeting is held in a year.</p>

	performance reports.	
E	DAILY ENVIRONMENTAL STATUS REPORTING Environmental monitoring status is reported on daily basis to Plant Manager and Senior Management team on daily basis by email. It consists of treated effluent monitoring results and any significant event occurring on that day.	Full compliance.
F	DISPLAY ON ENVIRONMENTAL PERFORMANCE DATA AT ENTRANCE As per the recent directives of Supreme Court, HPL has started displaying environmental performance at the entrance of the premises to apprise the visitors, contractors and employees of the major highlights of environmental performance of the company within a month. This board is updated on monthly basis.	Full compliance.
8.8	LEGAL AND STATUTORY COMPLIANCE HPL is meeting all statutory requirements. Yearly clearances from the State Pollution Control Board for liquid, gases and hazardous wastes disposal are obtained. Specific information in prescribed forms is submitted as per Water (Prevention & Control of Pollution) Act, Air (Prevention & Control of Pollution) Act, Hazardous Waste (Management & Handling) Rules, Manufacture, Storage & Import of Hazardous Chemicals Rules etc. All requirements under these acts and rules are fully complied with. In addition, Environmental Statement for each financial year is also submitted to comply with Environment (Protection) Act.	Full compliance.
8.9	DOCUMENTATION AND QUALITY ASSURANCE All the environmental and health related data are stored in systematic manner so that the specific records are easily available, whenever required. HPL is already certified with ISO-14001/OHSAS 18001 Quality Management System. Under the same, a quality assurance plan has been developed which includes all reference methods for monitoring, relevant analytical technique, calibration of equipment, standardization of reagents, collection and presentation of results, frequencies of monitoring etc. Data reporting and system audit plan have also been included.	Full compliance.
8.10	ENVIRONMENTAL SOCIAL RESPONSIBILITY AND AWARENESS CAMPAIGNS	Partial Compliance Awareness campaigns and other environmental activities could not be conducted fully due to the current COVID19 pandemic. However following programs were conducted/organized: 1. we celebrated World Environment Day 2021 by plantation program at the main gate. 2. Virtual Seminar on Sustainable Development & GHG Emission was conducted by CII during celebration of World Environment Day for the employees 3. Inter DQT Environment Quiz and Junior Environment

		Quiz was conducted for own employees and their children by professional Quiz Master during celebration of World Environment Day 2021 throughout the month. 4. Distribution of 400 nos. of saplings to Haldia Vigyan Mancha for distribution in local schools
8.11	CORPORATE RESPONSIBILITY The status report on implementation of the Charter on Corporate Responsibility and Environmental Protection Frame by the Ministry of Environment & Forest (MoEF) and Central Pollution Control Board (CPCB), Govt. of India has been given in Table-8.1.	Full Compliance

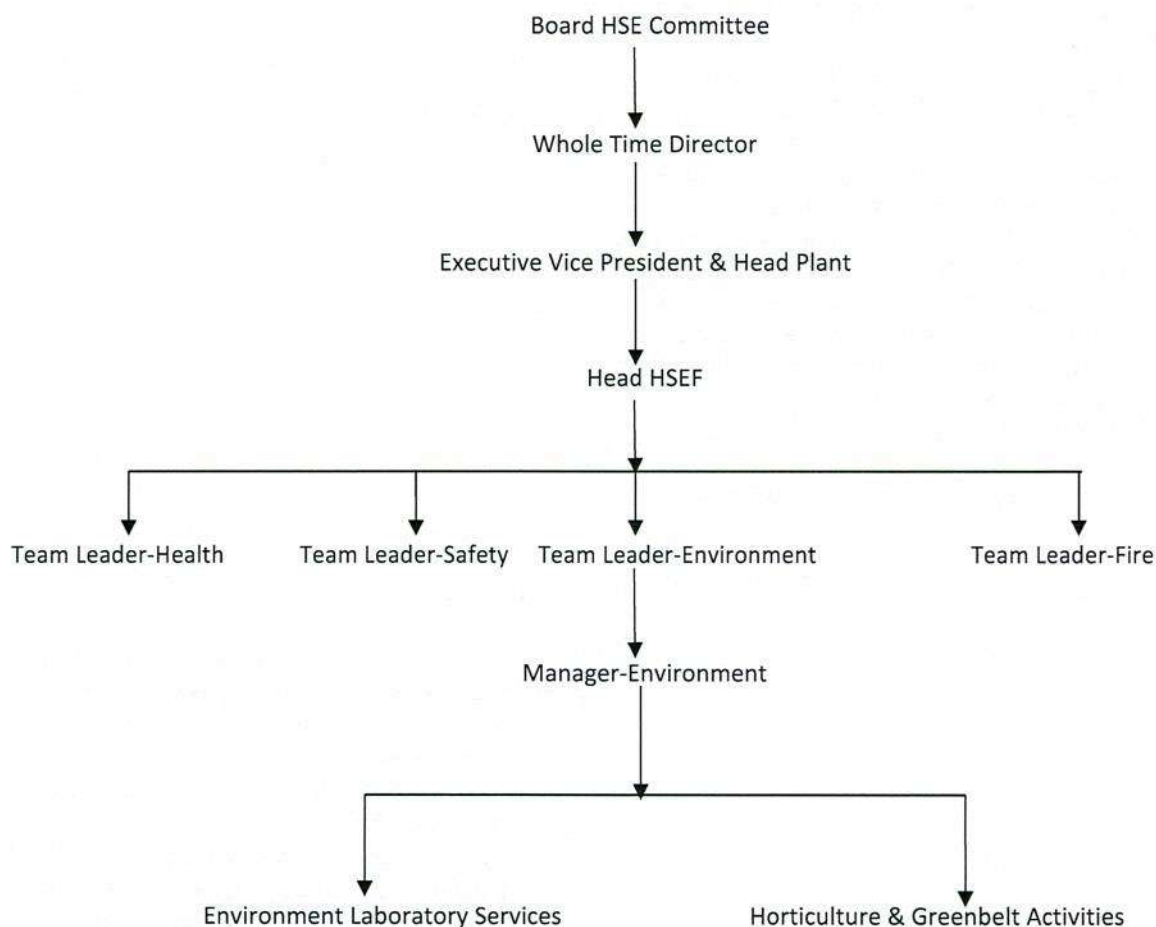
FIGURE-8.1
FUNCTIONAL STRUCTURE OF ENVIRONMENTAL CELL


TABLE – 8.1
MONITORING FREQUENCY FOR ENVIRONMENTAL PARAMETRS
(1) AMBIENT AIR QUALITY MONITORING
A. AMBIENT AIR QUALITY MONITORING – ONSITE LOCATIONS; Status – Full Compliance

Sl. No.	Location	Parameters	Frequency
1.	Roof Top, Central Laboratory	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , O ₃ , Pb, CO, NH ₃ , C ₆ H ₆ , BaP, As & Ni	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , Pb, NH ₃ , C ₆ H ₆ , BaP, As & Ni - Twice a week for 24 hour duration; O ₃ & CO – Twice a week for 8 hours duration
2.	Roof Top, Gate No.1		
3.	Roof Top, South Control Room		
4.	Roof Top, PP Warehouse		
5.	Roof Top, CPP Security Gate		

PM₁₀- Particular Matter (10 micron); PM_{2.5} - Particulate Matter (2.5 micron); SO₂-Sulphur dioxide;
NO_x – Oxides of Nitrogen; O₃ – Ozone; Pb-Lead; CO- carbon monoxide; NH₃-Ammonia; C₆H₆-Benzene;
BaP-Benzo(a)Pyrene; As-Arsenic; Ni-Nickel

B. AMBIENT AIR QUALITY MONITORING – OFFSITE LOCATIONS; Status – Full Compliance

Sl. No.	Location	Parameters	Frequency
1.	Nandampur	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , O ₃ , Pb, CO, NH ₃ , C ₆ H ₆ , BaP, As & Ni	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , Pb, NH ₃ , C ₆ H ₆ , BaP, As & Ni-Twice a week for 24 hour duration; O ₃ & CO – Twice a week for 8 hours duration
2.	Basudevpur		
3.	Haldia Bhavan/Near CPT Hospital		
4.	Hatiberia (Swati Complex)		
5.	IOC Township		
6.	Manoharpur		

(2) WORK ZONE AIR QUALITY & NOISE MONITORING: Status – Full Compliance

Sl. No.	UNIT DESCRIPTION	NO. OF LOCATIONS	PARAMETERS	FREQUENCY	REMARKS
1	Benzene Extrction Unit (BEU)	2	Benzene, Butadiene & Hexane	Once in a month	Monitoring result of Benzene, Butadiene & Hexane and ambient noise are reported and submitted to WBPCB/MoEF&CC periodically.
2	Butadine Extraction Unit (BDEU)	3			
3	HDPE	2			
4	Ambient noise is monitored in 5 location surrounding the plant on quarterly basis				

(2) STACK EMISSION MONITORING; Status – Full Compliance

Sl. No.	LOCATION	PARAMETERS	FREQUENCY
1	Naphtha Cracker Unit – 9 nos.	SO ₂ , NO _x , CO	Once a month
2	Pyrolysis Gasoline Hydrogenation Unit – 1 nos.	SO ₂ , NO _x , PM, CO	Once a month
3	Auxiliary Boiler – 2 nos.	SO ₂ , NO _x , PM, CO	Twice a month
4	Gas Turbine & Heat Recovery & Steam Generators – 2 nos.	SO ₂ , NO _x , PM, CO	Twice a month
5	Incinerator – 1 no.	SO ₂ , NO _x , PM, CO, TOC	Once a month
		HCl, HF & Dioxine & Furan	Once in a quarter

(4) WASTE WATER QUALITY MONITORING

A. TREATED EFFLUENT QUALITY; Status – Full Compliance

Sl. No.	PARAMETER	FREQUENCY
1.	PH	Daily
2.	TSS	Daily
3.	COD	Daily
4.	BOD ₃	Daily
5.	Oil and Grease	Daily
6.	Phenol	Daily
7.	Sulphide	Daily
8.	Cyanide	Daily
9.	Fluoride	Daily
10.	Total Chromium	Daily
11.	Hexavalent Chromium	Daily
12.	Copper	Monthly
13.	Zinc	Monthly
14.	Phosphate	Monthly
15.	Iron	Monthly
16.	Free Residual Chlorine	Weekly
17.	Temperature	Weekly

B. STORM WATER QUALITY MONITORING; Status – Full Compliance

Sl. No.	Location	Parameter	Frequency
1.	NCU Outlet	pH, COD	Daily
2.	NCAU Outlet	pH, COD	Daily
3.	PP Outlet	pH, COD	Daily
4.	DM Plant and Cooling Tower Area Outlet	pH,	Daily
5.	Near NCR	pH,	Daily
6.	HPL Outfall	pH, TSS, COD, BOD ₃ , Sulphide, Oil and Grease, Phenol, Cyanide, Fluoride, Total Chromium, Hexavalent	Daily

		Chromium	
		Free Residual Chlorine,	
		Temperature	Weekly
		Copper, Zinc, Phosphate, Iron	Monthly

**B. INTERNAL MONITORING IN WASTEWATER TREATMENT PLANT FOR PROCESS CONTROL;
Status – Full Compliance**

Sl. NO.	LOCATION	PARAMETERS	FREQUENCY
1	DWF Outlet (Influent to WWTP)	pH, COD, Oil and Grease	Twice a day
3	Aeration Tank Outlet	pH, MLSS, MLVSS, SVI, DO	Daily for both compartments; DO-Weekly
4	Clarifier Outlet	pH, COD, Sulphide	Twice a day
5	Treated Effluent Disposal	17 parameters as listed above	11 parameters - Daily 2 parameters - Weekly 4 parameters - Monthly
6	Guard Pond	pH	Daily

TABLE – 8.2

Status Report on Implementation of the Charter on Corporate Responsibility for Environmental Protection (CREP) Frame by the Ministry of Environment & Forests (MoEF) and Central Pollution Control Board (CPCB), Govt. of India

Sl. No.	Action Points	HPL Status (As on Date)	Remarks
1.	Adoption of state-of art technology:	HPL is the latest petrochemical complex in the country with state-of-the-art technology provided by global leaders like ABB-Lumus, Mitsui etc. Proper care was taken to adopt appropriate technologies followed by sound environmental practices. Same principles were followed during expansion of the plant capacity.	Full Compliance
2.	Management of storm water:	All hydrocarbon storage tanks were provided with dyke walls, which can hold initial rainfall. At the outlet of dyke wall, 2-valve pit arrangement was provided so that, in case of contamination, rainwater could be transferred to WWTP through a dedicated U/G RCC Oily Water Sewerage (OWS) system. Process areas in the plants were provided with slope such that rain falling over them got collected in effluent pits. Also, in NCU, 2-valve pits were provided at various locations to divert	Full Compliance

Sl. No.	Action Points	HPL Status (As on Date)	Remarks
		<p>contaminated rainwater to plant effluent pit.</p> <p>In WWTP, surge pond was provided to hold the rainwater collected through OWS system. The capacity was enough to hold worst possible rain (100-year basis) for 2 hours. Facility to treat this contaminated water was provided in WWTP itself before disposal.</p> <p>In our case, surge pond in WWTP and tank dykes are the buffer storage and sized adequately for worst possible rain in the complex. Hence no further buffer was required.</p> <p>In addition, Sluice gates were also provided at identified strategic locations in the storm water channel to hold up contaminated rainwater and/or any spillage and transfer it to OWS by pumping.</p>	
3.	Effective detoxification and wastewater treatment scheme:	Necessary pre-treatment facilities like sulfide removal, free oil removal etc. were provided in concerned plants to prevent any toxic effect on biological system in the centralized WWTP.	Full Compliance
4.	Control of emission from combustion:	<p>Mercaptane free LPG is used as a fuel during start-up of heater. Sulfur free fuel gas ($\text{CH}_4 + \text{H}_2$) is used during normal operation of plant.</p> <p>Low NO_x burners were provided in NCU to prevent formation of NO_x during the firing operation.</p> <p>On-line stack analysers at CPP continuously monitor the SO_x, NO_x, CO & PM level of the flue gases emitted from the Auxiliary Boilers & HRSGs and also real time data is sent to the server of CPCB/WBPCB. On-line analyzer with indication on DCS was provided in heater stacks for continuous monitoring of oxygen, temperature and calorific value of the fuel gas.</p> <p>Efforts are given to source naphtha (main raw material) with low sulfur content in order to minimize emission of SO_x during cracking of naphtha in heaters.</p>	Full Compliance
5.	Proper functioning of point source emission control systems:	Not applicable for HPL Complex except for the Incinerator whereas an alkaline wet scrubber was installed prior to the stack of adequate height. The emission parameters measured out of this stack supports the proper functioning of the scrubber, an emission control system.	Full Compliance
6.	Leak detection and repair (LDAR) programme:	Leak Detection and Repair (LDAR) programme was adopted for all hydrocarbon handling facilities in plant area. We prepared a procedure	Full Compliance

Sl. No.	Action Points	HPL Status (As on Date)	Remarks
		and included it in our HSE Manual. The month-wise measurement records are maintained and being circulated to concerned plants for repairing of leaks on periodical/opportunity basis. Reports on LDAR are being sent to MoEF/WBPCB on half-yearly/annual basis.	
7.	Handling halogenated organics:	Not applicable for HPL complex.	Full Compliance
8.	Control of fugitive emissions of carcinogenic compounds:	<p>Proper care was taken during the design of hydrocarbon storage tanks to prevent any fugitive emissions. Nitrogen padding was provided over the tanks to prevent such emissions.</p> <p>Vents of all pressurized hydrocarbons handling equipment were routed to flare.</p> <p>Sampling points of all pressurized hydrocarbons handling area were routed to flare.</p> <p>All PSVs and TSVs discharges and seal vents were routed to flare system for pressurized hydrocarbons.</p> <p>Critical sections of Benzene Plant operate under vacuum preventing release of benzene.</p> <p>Pumps handling Butadiene rich streams were totally enclosed canned pumps.</p> <p>Hydrocarbon pumps in critical area were fitted with double mechanical seals.</p> <p>All valves in butadiene services were of bellow-seal type.</p> <p>Benzene loading system was provided with a vapor recovery system. Nowadays tanker loading of benzene is avoided in order to load it directly in the ship through u/g pipe. This change of operational practice reduces the human exposure to a great extent.</p> <p>Vapor return circuits were provided for Butadiene loading and other pressurized loading/unloading systems.</p> <p>Benzene system was provided with a closed blow-down vessel to contain any spillage etc.</p> <p>Above all Periodical Work zone monitoring is also carried out for checking purpose. PME is</p>	Full Compliance

Sl. No.	Action Points	HPL Status (As on Date)	Remarks
		conducted for all employees in the plant once in a year. Persons working in Benzene plant are subjected to PME for twice a year.	
9.	Management of solid waste:	<p>Procedure for management of solid and hazardous waste is already in practice. Different categories of wastes were being segregated at the source of generation and disposed of as per the procedure.</p> <p>Secured on-site disposal pit was made to dispose the WWTP sludge. Incinerator was installed for burning of WWTP Sludge.</p> <p>Agreement was made with M/s WBWML, Haldia for secured land-filling of hazardous solid wastes (incinerator-ash, molecular sieve etc.) as well as incineration of combustible solid/semi-solid wastes (oil impregnated coke, quench oil, resin etc.) at their site.</p> <p>Used oils were sold to MoEF authorized recyclers</p> <p>Catalysts containing heavy metals were sent to MoEF approved authorized recyclers for heavy metal removal and safe disposal.</p> <p>Relevant Statutory documents were maintained during disposal of hazardous wastes outside the plant</p> <p>E-wastes are also periodically disposed to a recycler, duly authorized by WBPCB</p>	Full Compliance
10.	Proper operation of incinerator:	<p>The dual-chamber incinerator is in operation and feeding of bio-sludge into it is being done for two shifts. The temperatures at PCC & SCC are maintained at 850 deg C and 1050 deg C respectively. Venturi Scrubbers and Caustic wash facility have been provided for flue gas to remove suspended particles and toxic content before being emitted through a 30 m high stack. EPA approved sampling port was provided for collection of sample for emission monitoring. The flue gas is being monitored every month by a laboratory, duly recognized both by WBPCB & MoEF&CC and also complies the emission standards of WBPCB.</p>	Full Compliance
11.	Optimizing the inventory of hazardous chemicals:	<p>We have an on-line facility to monitor the inventory status of hydrocarbons in storage tanks & spheres.</p> <p>This is being quarterly submitted to Inspector of Factories as per MSIHC Rules, 1989.</p> <p>The inventory status is also being displayed in the form of "Environmental Status" on monthly basis at entrance of main gate.</p>	Full Compliance
12.	Self-regulation by industry through regular monitoring	M/s. Scientific Research Laboratory, Kolkata, a 3 rd party duly approved by NABL &	Full Compliance

Sl. No.	Action Points	HPL Status (As on Date)	Remarks
	and environmental auditing:	<p>MoEF&CC/WBPCB, is carrying out all Environmental Monitoring jobs independently and preparing Monthly, Half-yearly & Annual Data Generation Reports, which HPL periodically submits to the WBPCB/MoEF&CC.</p> <p>HPL is an ISO-14001: 2015 certified company and periodic audits are conducted by Internal Auditors as well as External Auditors like DNV for Environmental Management System. Besides this, HPL submits Environmental Statement (Audit Report) every year as per Environment Protection Acts and Rules, 1986.</p>	
13.	Organizational restructuring and accreditation of environmental manager of industry:	<p>HPL is having a separate HSEF Department reporting to EVP & Head-Plant. The operational responsibility for Environment lies with Sr. GM & Head-HSEF who holds the authority associated with high status. He is being supported by one well experienced Dy. General Manager – Environment Services and one Manager-Environment Services.</p> <p>Above all, all HSEF activities are also being monitored by a sub-committee of HPL Board, which meets half yearly/yearly to review various HSE issues for improvement of HSE conditions.</p>	Full Compliance

Status report on Risk analysis recommendations

Sr. No.	Recommendations	Present status
1	<p>For the individual risk contour</p> <p>The 100 chances of death per million per year contour cover parts of NCU, HDPE unit, LLDPE unit and PGHU and there is no operator's cabin in this region.</p> <p>Central Control Room, NCU service building, medical aid center, canteen, fire station and firewater pump house are located in region of 30 or less chances of deaths per million per year which is considerably low. However, Polymer control room and Polymer service building are located in comparatively high risk area (between thirty and one hundred chances of deaths per million people per year) and so the occupancy level should be maintained at a minimum and these should be blast proof to a suitable level.</p>	<p>Minimum occupancy level is maintained in Polymer control rooms & Polymer service building in all shifts.</p> <p>All polymer plant control rooms are made of blast proof in design. Polymer service building is located beyond the high risk area as action is already taken to reduce the size of Butene-1 vessel from 14.7 m³ to 8.1 m³. So PSB is not made of blast proof in design .</p>
1a	<p>The 1 chances of death per million per year contour extends outside the boundary of HPL on the north side. This may be considered acceptable level of individual fatality risk as it compares favorably with other involuntary risks undertaken by an individual. Moreover, a green belt of 100-metre width all around the complex has been provided. Therefore, it can be conclude that the risk to outside population due to HPL complex is within acceptable</p>	<p>No action required as the risk is within acceptable limit.</p>
2	<p>Risk of death to an individual working within the unit is little higher. This is to be expected and normal. This risk value depends on the plant and area of deployment. Risk contour plot for overall complex will help in deciding location of continuously manned stations within the plant and administrative / plant offices within the complex. The comparatively higher value of risk to an operator, as mentioned above, is acceptable when compared against general industry risk or other voluntary human risk.</p>	<p>No concrete cabin is located inside the plant for operators.</p>

3	<p>For the 5-psi risk contour:</p> <p>The HDPE control room is in region having 100 chances of fatality, Central Control Room and PP Control Room are falling under region having chances of fatality between 10 – 30 fatalities per million per year. The medical aid center and canteen fall under region having fatality chances between 10 and 5 fatalities per million people per year. It is recommended that these control rooms should be of blastoff design.</p>	<p>HDPE control rooms, PP control room & CCR is made of blast proof design.</p> <p>However the main canteen & Medical center is not blast proof. There is provision of auxiliary medical center which is located inside Captive power plant. Satellite canteens are available inside all control rooms.</p>
4	<p>For the scenarios, which have potential to cause devastating damage and destruction within and outside the plant boundary limit, however, have very low frequency of occurrence. Detailed emergency planning (onsite and offsite) is needed to be evolved for these scenarios to respond to an emergency.</p>	<p>On-site emergency & off site emergency management plan are in place to response to an emergency.</p>
5	<p>The hazard distances coming out from fire scenarios of the large product tanks like Naphtha, C5-C6 cut, RPG, etc are confined within the plant boundary limit and the outside population is not affected by any tank fire scenarios.</p>	<p>No action required</p>
5a	<p>All the product storage tanks falling within a radius of 8 KW/m² shall be provided with either passive thermal protection (in form of insulation or increased inter tank distance) or active thermal protection (by way of providing water sprinkler / shell cooling deluge system on uninsulated tanks.) For most cases radiation intensity exceeds the permissible limits of 8 KW/m² in the event of adjacent tank on fire. Firewater quantity should take into account the requirement of water for cooling the adjoining tankage in addition to the tank on fire.</p>	<p>Plant layout is made as per OISD-118. Intertank distance is maintained as per Petroleum rules and OISD-116 guidelines is followed for adequate fire fighting equipments like water spray & deluge systems etc. and ensures availability of enough fire water for cooling the adjacent tank if the nearby tank is on fire.</p>
6	<p>Periodic health check and maintenance of all equipment and plant piping are required to be carried out. Periodic calibration and testing of alarms, trips, interlocks should be given due attention. The failure rates of equipment and pipelines are influenced by the maintenance practices followed, particularly so when the plant starts ageing. Standard design norms and codes coupled with good engineering practices should be followed in design, construction, inspection, operation, and maintenance of the facility.</p>	<p>Preventive Maintenance of all equipment & plant piping are carried out as per preventive maintenance schedule prepared by respective engineering department.</p>

Ambient - Noise monitoring (April 2021 to September 2021):

LOCATION	April 2021		July 2021	
	Day	Night	Day	Night
Near Gate No-1	54.61	54.29	56.0	54.8
Near Gate No-3	66.04	67.20	66.1	65.5
Near South Gate	56.03	55.68	66.1	65.6
Near CPP Security Office	54.60	53.92	67.9	65.6
Near North Gate	64.84	65.96	55.9	53.7
Norms of CPCB For Industrial Area	75	70	75	70

Note: Sound Pressure Level in leq dB (A)

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

1.Environmental Monitoring Cost [Rate Contract for Environmental & Process Monitoring Job at HPL Complex]	:	Rs. 36.20 lacs
2. Greening Drive Activities [Green Belt Development & Upkeepment Cost Beautification (Horticultural) Work (inside plant)]	:	Rs. 47.61 lacs
3. Statutory Fees & Insurance Expenses [Analysis charges of WBPCB]	:	Rs. 0.42 lacs
4. Hazardous Wastes Disposal Expenses	:	Rs. 19.04 lacs
5. Operational, Maintenance & Installation Cost of Environment protection system:		
5.1 Operational cost of WWTP	:	Rs. 255.1 lacs
5.2 Operational cost of Flare Stack Emission System	:	Rs. 1058.5 lacs
5.3 Operation cost of Incinerator	:	Rs. 36.3 lacs
5.4 Operation cost of Benzene Recovery Unit	:	Rs. 0.45 lacs
5.5 CMC for the Hydrocarbon Analyser, AAQMS	:	Rs. 7.96 lacs
5.6 AMC for the Online Effluent & Stack Analysers	:	Rs. 1.25 lacs
6. Training/Workshop/Seminar/Subscription/WED Celebration	:	Rs. 2.21 lcs
		<hr/>
		Total Rs. 1465.04 lacs

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