

FORM – V
(See rule 14)
Environmental Statement for the Financial Year ending 31.03.2022

PART – A

(i) Name and address of the Owner/Occupier of industry Operation or process: Mr. Nayan Kumar Barua, CGM & Refinery Head.
Indian Oil Corporation Ltd. (Bongaigaon Refinery)
Dhaligaon, Dist. Chirang
ASSAM – 783385

(ii) Industry category: Primary (STC Code) -----
Secondary (SIC Code) -----

(iii) Production Capacity: **Units**

Refinery Units	Capacity	Technology	Year of Commissioning
Crude Distillation Unit-I (CDU-I)	1.35 MMTPA	EIL, India	1979
Crude Distillation Unit-II (CDU-II)	(1.00+0.35) MMTPA	EIL, India	1995
Delayed Coking Unit-I (DCU-I)	0.5 MMTPA	EIL, India	1981
Delayed Coking Unit-II (DCU-II)	0.5 MMTPA	EIL, India	1996
Coke Calcinations Unit (CCU)	75,000 MTPA	EIL, India	1981(Not in operation)
LPG Bottling Plant	22,000 MTPA	EIL, India	2003
Catalytic Reformer Unit (CRU)	(0.16+0.032) MMTPA (Naphtha processing)	AXENS, France	1985
Diesel Hydro Treatment Plant (DHDT)	(1.20+0.60) MMTPA	IOCL R& D, EIL-Delhi	2011
HGU	30KTPA	Linde	2011
MS Quality Improvement Project	0.429 MMTPA	IOCL R& D and EIL	2011
IndMax	740KTPA	IOCL R& D and EIL	2020
IndMax Gasoline De-sulphurisation Unit (Prime G+)	312 KTPA	AXENS, France	2020
Sulphur Recovery Unit	10 TPD	IOCL R& D and EIL	2012
Sulphur Recovery Unit(New)	20 TPD	IOCL R& D and EIL	Yet to commissioned

*(MMTPA : Million Metric Ton Per Annum , TPD :Ton per Day,)

(iii) Year of establishment: 20.02.1974

(v) Date of submission of last Environmental statement: 28.08.2021

PART – B

1.11. Water consumption (M³/day)	2020-21	2021-22
Process	1286.07	2008.5
Boiler Feed Water	2268.11	2344.9
Cooling	231.0	162.8
Service Water	2740.3	2436.2
Domestic Water	5477	5001.6
Project Construction	416.8	283.7
Total Water Consumed	12419.28	12237.7

1. WATER AND RAW MATERIAL CONSUMPTION:

Name of products/ Raw materials	Process Water consumption per unit of product (Figures include process and service water consumption)	
	2020-21	2021-22
(i) Water consumed m³/T Crude processed	0.555	0.550
(ii) Water consumed m³/MWH power generated	2.14	1.18

Note:

1. The water consumption figures per MT of product include Process Water and proportionate Service Water consumption in units of the complex.
2. Service Water network in the complex caters to the water requirement for sanitary purpose, service/maintenance activities and cleaning, washing and chemical preparation activities in the complex.
3. Refinery Section consists of two Crude Distillation Units, two Delayed Coker Units and one Coke Calcinations Unit. Water consumption as per convention is expressed in terms of M³/Ton of Crude throughput.
4. Conventional Refinery Units produce multiple products and it is not possible to segregate product-wise water consumption.
5. PSF plant/CCU unit remained under shutdown due to economic reason.

1.2 Raw Material Consumption:

1.2.1: Refinery Section:

Name of Raw Material(21-22)	Name of Products	Consumption of raw materials per unit of out put	
		2020-21	2021-22
Crude Oil (2638.509TMT)	Liquefied Petroleum Gas (LPG)	24.04	16.48
	Aviation Turbine Fuel (ATF)	1190.69	0.00
	Motor Spirit (MS)	7.41	7.08
	Superior Kerosene Oil (SKO)	63.95	204.01
	High Speed Diesel (HSD)	1.69	1.81
	Light Diesel Oil (LDO)	448.72	92.46
	Naphtha	26.25	23.74
	Low Sulphur Heavy Stock (LSHS)/LVFO	49.49	347.17
	Raw Petroleum Coke (Net Basis)	21.89	23.21
	Petrosol	0.00	0.00
	Calcined Petroleum Coke (CPC)	0.00	0.00
	Bonmax	0.00	0.00
	Coke dust	15315.30	0.00
	HDTF	448.72	0.00
Sulphur Recovery	1607.91	1573.35	

1.2.2: Petrochemical Section:

PSF plant is shut down since November, 2005.

PART - C
POLLUTION GENERATED
(Parameters as specified in the Consent issued)

1.3 WATER POLLUTION:

Sl. No	Parameter	Concentration Value		Quantum Value (Kg/TMT of Crude processed)	
		(mg/l except pH)		Limit	Actual
		Limit	Actual		
1	pH	6.0 – 8.5	7.25	--	-
2	Oil & Grease	5	3.95	2	0.00
3	BOD (3 days at 27°C)	15	9.25	6	0.00
4	COD	125	32.40	50	0.00
5	Suspended Solids	20	14.00	8	0.00
6	Phenols	0.35	0.20	0.14	0.00
7	Sulphides	0.5	0.25	0.2	0.00
8	CN	0.2	0.06	0.08	0.00
9	Ammonia as N	15	3.30	6	0.00
10	TKN	40	9.20	16	0.00
11	P	3	0.52	1.2	0.00
12	Cr (Hexavalent)	0.1	BDL	0.04	0.00
13	Cr (Total)	2	BDL	0.8	0.00
14	Pb	0.1	BDL	0.04	0.00
15	Hg	0.01	BDL	0.004	0.00
16	Zn	5	0.13	2	0.00
17	Ni	1	BDL	0.4	0.00
18	Cu	1	0.27	0.4	0.00
19	V	0.2	BDL	0.8	0.00
20	Benzene	0.1	BDL	0.04	0.00
21	Benzo (a) - Pyrene	0.2	BDL	0.08	0.00

NOTE: No treated water is discharged to outside the complex. Treated Water is 100% re-used as Fire Water makeup, Cooling Water makeup and Service water after Tertiary Treatment. The effluents after Secondary Treatment are treated in the Tertiary Treatment Plant before reuse.

1.3.1 Air Pollution for (Avg. of all six Ambient Air Quality Monitoring Stations):

Pollutants	Unit of Measurement	NAAQS 2009	Average Value (2020-21)	Average Value (2021-22)	% Deviation from Prescribed standard with Reasons (from Average)
Sulphur Dioxide (SO ₂)	µg/m ³	50/80	8.74	13.44	NIL
Nitrogen Dioxide (NO ₂)		40/80	12.78	18.70	NIL
Particulate Matter (PM-10)		60/100	54.53	63.79	NIL
Particulate Matter (PM- 2.5)		40/60	27.67	31.79	NIL
Ammonia (NH ₃)		100/400	10.83	13.90	NIL
Ozone (O ₃)		100/180	20.37	25.64	NIL
Lead (Pb)		0.5/1.0	BDL	BDL	NIL
Benzene (C ₆ H ₆)		05	0.285	0.28	NIL
Arsenic (As)	ng/m ³	06	BDL	BDL	NIL
Nickel (Ni)		20	1.77	BDL	NIL
Benzo (a) Pyrene		1.0	BDL	BDL	NIL
Carbon Mono-Oxide (CO)	mg/ m ³	2/4	0.195	0.23	NIL

PART – D

HAZARDOUS WASTE

{As specified under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016}

Hazardous Wastes	Total Quantity	
	Year 2020 - 21	Year 2021 - 22
OILY SLUDGE: (a) From process unit/tank cleaning 1. Waste category No. 4.1 (Oil containing sludge/emulsion under petroleum, refining/ re-refining of used oil/recycling of waste oil under serial # 4 of schedule - I. 2. Waste category No. 4.3 (Slop oil under petroleum, refining/ re-refining of used oil/recycling of waste oil under serial # 4 of schedule-I 3. Waste category No. 5.1 (used /Spent lube oil/ oil, (Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications) serial # 5 of schedule-I	Generated: 2730.00 MT Processed: 3091.00 MT	Generated : 9921.00 MT Processed : 5383.00 MT
	Generated : 26,344.7 MT Processed : 28,635.8 MT	Generated : 27752.5 MT Processed : 28121.0 MT
	Generated : 12.0 MT Processed : 27.0 MT	Generated : 4.0 MT Processed : 4.0 MT
(b) From Pollution Control Facilities (ETP) 1. Waste category No. 34.4 (Purification process for air and water under serial # 34 of schedule-	NIL	NIL

Note: Generated Oily sludge as mentioned above is stored in concrete lagoons within the complex for further oil recovery and processing

PART – E

SOLID WASTE

	Total Quantity	
	Year 2020-21	Year 2020-21
(a) From process	NIL	NIL
(b) From Pollution Control Facility, (Bio-sludge from wastewater treatment plants)	650 KL	500 KL
(c) (1) Quantity recycled or re-utilised within the unit. (2) Solid (3) Disposed* (Bio-sludge)	NIL NIL 650 KL	NIL NIL 500 KL

- Dried and composted Bio-sludge is used for Green Belt Development/Gardening, inside the complex and rest is stored in sludge drying bed for further disposal.

PART – F

Please specify the characteristics (in terms of composition and quantum) of Hazardous as well as solid waste and indicate disposal practice adopted for both these categories of wastes.

Quality and disposal methods are furnished below:

S I. No	Hazardous waste / Solid waste	Method of Disposal	Quantity Available	Characteristics
Hazardous waste as per Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016				
1	Slop oil	Entire slop oil generated in the complex is reprocessed in the refinery.	Continuously processed in the units	Oil = 5 - 95%
2.	Oily sludge	i) Stored in concrete/ brick lined Lagoons for further processing.	Total quantity of Oily sludge available as on 01.04.2022 is 6694.00 MT.	Oil (% wt) = 21.4% BS&W %V = 0.80%
3.	Spent Lube oil / Used oil	As used Lube oil is composed of hydrocarbon, it is processed in the Refinery with slop oil.	Continuously processed in the Refinery.	Hydrocarbons = 100%
Other Solid waste (Non Hazardous):				
1.	Bio- sludge from Waste Water Treatment Plant.	Bio-sludge generated in Waste Water Treatment Plant is non-hazardous and is used for green belt development inside the plant area.	Nil.	pH of 1% sol (*) : 6.0 O & G % wt. : 0.42 Phenol in ppm : 0.34 Sulphide in ppm : 0.48 Loss on ignition : 85.4% @ 650 ° C (**) Conductivity of 1% : 37.0 Solution, micro S

NB: (*) pH of DM water used was 6.5, (**) Loss on ignition @ 650 °C includes total organic content.

PART – G

Impact of Pollution Control measures taken on conservation of natural resources and on the cost of production:

- (a) The pollution control facilities have been designed to meet the requirement for mitigating pollution control and existed right from inception. The complex has a Tertiary Treatment Plant (TTP) to further polish the treated effluent from ETP. Treated water from TTP is reused as make up water in cooling towers, for housekeeping/horticulture and is also used for firewater system make up. This has resulted in reduced withdrawal of ground water.
- (b) Leak Detection and Repair (LDAR) programme is conducted quarterly. During the year **2021-22**, **59410** potential points were surveyed and **231** leaky points were detected. By timely detection and repairing of leaks, BGR could not only avoid potential loss of **392.04 MTA (approx.)** but also could prevent as much emission to the atmosphere. Further it also helped in keeping healthy work environment in the plant complex.
- (c) Effluent reused during the year **2020-2021** was **100 %** of the total effluent treated which includes Plant effluents as well as Township sewage. Presently Cooling Water Make up, to all the units, for housekeeping and Fire water make-up in its network, is carried out with TTP treated effluent
- (d) An Eco-Park developed and maintained with a large earthen lagoon inside the plant complex. The surface drainage/storm water is routed through this large lagoon for natural purification and thus improves the quality of drains/storm water. It also attracts migratory birds during the winter months. . Water from the Eco-Park lagoon used in plant through TTP treatment as and when required, especially during dry season to minimized ground water withdrawal.
- (e) As a part of creating environment awareness as well as understanding the implications of various Rules and Regulations on environment and responsibility of employees, regular training is imparted to targeted employees by in-house faculties.
- During the year **2021-22**, **170** nos of employees were imparted training on Environment awareness & responsibility by faculties from HSE department.
- (f) As a measure of conservation of natural conventional energy sources, Bongaigaon Refinery has implemented Grid connected Solar P V panels of 2380 KWp at roof top of different buildings inside the complex and Township to increase use of renewable energy. In the FY **2021-22** around **2654.69** MWH Solar Power generated.
- (g) The traditional Electrical bulbs replaced by energy efficient LED bulbs in Plant units and in BGR Township. In the year **2019-20**, around **2083** nos. of bulbs replaced with LED bulbs which are 18% of total bulbs available. Cumulative total replaced in plant + township till financial year **2019-20** is **32192** nos. This is **82.61%** of total bulb available in plant and BGR Township. In the year **2020-21**, **3624** nos and in 2021-22, **3624** nos. of bulbs replaced with LED bulbs. Total Replacement is **37554** nos (revised) out of total **38965**, Cumulative Total Replacement is **96.37 %** as on 31.03.2022

PART – H

Additional investment proposal for environment protection including abatement of pollution:

1. Online analysers are provided for treated effluent monitoring the parameters- pH, BOD, COD, TSS and Flow. Further separate Server was provided at Pollution Control Board of Assam at Guwahati and on line linkage is provided for CAAQMS, Stacks emissions and effluent monitoring data.
2. For further improvement of ETP performance, 2 nos. of oil Skimmer is installation in the month of May'2018 at Effluent Treatment Plant for separation of floating oil from incoming effluent to ETP.
3. As a pro-active measure for management of oily sludge, Bio remediation process developed by IOCL, R&D has been successfully installed in the month of July'17 and oily sludge processing is continued. In the financial year **2021-22**, **128 MT** of oily sludge has been processed.
4. Bongaigaon Refinery has taken up Vermicompost project in a big way for organic waste disposal, in place of Bio-methanation as a measure of solid waste management.
System has been developed to segregate plastic waste of BGR Township at source and used for road construction.
5. BGR has taken a step forward in improving carbon footprint by signing an agreement with paper recycler for recycling of waste paper generated from the unit.

PART – I

Any other particulars for improving the Quality of Environment:

- I. Six Ambient Air Monitoring Stations, including one online monitoring Station, are in operation in various locations surrounding the Unit.
- II. All major Stacks (furnaces) are fitted with online SO₂ & NO_x, PM & CO Analysers
- III. BGR is an ISO-14001, 2015, ISO- 9001:2015, ISO-45001:2018 certified Refinery Unit of Indian Oil Corporation Ltd, with a validity of the certificates up to 13.10.2024.
Bongaigaon Refinery is the first refinery in the country to implement and certified for Energy Management System as per ISO 50001-2011. Certification is valid till 19.06.2023 under ISO-50001:2018.
BGR inventories and reports the emissions of Green House Gases in line with ISO-14064-2006.
- IV. In the year **2017-18**, around **29,600 nos**, in the year **2018-19**, **30,062 nos**, in the year **2019-20**, **14,340 nos**, in the year **2020-21**, **25606 nos** tree saplings inside the plant premises as well as in township and nearby Educational Institutions.
During the year **2021-22**, BGR has planted **1,00,000 nos.** tree saplings in and around BGR complex.
- V. BGR celebrated World Environment Day 2021 in a restricted manner, due to COVID-19 protocol by conducting various awareness programmes among Employees only through online and plantation program in BGR Township.
e-Parivesh", a newsletter on Environment is published through intranet portal of BGR with an aim to increase awareness and involvement of employees as well as their families in caring for the environment.
- VI. BGR has been accorded Environment Clearance by MOEF&CC for eco-friendly BS-VI and other projects in April 2017. Most of the units under the Project are commissioned in the year 2020.