



इंडियन ऑयल कॉर्पोरेशन लिमिटेड
बरौनी रिफाइनरी, डाकघर : बरौनी ऑयल रिफाइनरी,
जिला : बेगूसराय, बिहार - 851 114

Indian Oil Corporation Limited

Barauni Refinery, P.O. : Barauni Oil Refinery,

Distt. : Begusarai, Bihar - 851 114

वेबसाइट : www.iocl.com

ई-मेल : baraunirefinery@indianoil.in

दूरभाष : 06243-240159 / 240110

फैक्स : 06243-240150 / 240278



रिफाइनरीज़ प्रभाग
Refineries Division

ISO : 9001, 14001 & OHSAS : 18001 Certified Refinery

Ref. No. BR/HSE/1387.

Date: 26-08-2021

To,

The Member Secretary,
Bihar State Pollution Control Board,
Parivesh Bhawan, Plot No. NS-B/2,
Patliputra Industrial Area,
Patliputra, Patna (Bihar) - 800 010

Sub: Environmental Statement for the financial year ending 31st March' 2021.

Dear Sir,

Enclosed please find the Environmental Statement for 2020-21 duly filled in the prescribed Form-5 as per Environment Protection Amendment Rules 2008.

Thanking you,

(S K Bhanu)

Deputy General Manager (HSE)

Encl. As above.

CC:

1) Regional Office (Eastern Central Zone),
Ministry of Environment and Climate Change,
Bungalow no. A-2,
Shyamali Colony,
Ranchi: 834002

2) Shri S P Roy
Regional Officer,
BSPCB, Tiltrath, Begusarai
PIN: 851101

Barauni Refinery - In harmony with nature

पंजीकृत कार्यालय : जी-9, अली यावर जंग मार्ग, बान्द्रा (पूर्व), मुम्बई-400 051, महाराष्ट्र (भारत)
Regd. Office : G-9, Ali Yavar Jung Marg, Bandra (East), Mumbai-400 051, Maharashtra (India)

CIN - L 23201 MH 1959 GOI 011388

FORM – V

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING 31ST
MARCH' 2021.
PART – A

I. Name and Address of the owner/occupier of the industry, operation or process. **Ms. Sukla Mistry**
 Executive Director & Refinery Head,
 Barauni Refinery, IOCL
 Distt – Begusarai
 Bihar – 851114

II. Industry Category Major Industry

III. Production Capacity

UNIT	CAPACITY (THOUSAND MT/ANNUM)
Atmospheric & Vacuum Distillation Unit – I & II	1750 Each
Atmospheric Distillation Unit – III	2500
Delayed Coking Unit – A	600
Delayed Coking Unit – B	500
LPG Recovery Unit	200
Catalytic Reformer Unit	300
RFCCU	1400
NSU	464
DHDT	3300
HGU-1	34 TMTPA OF H2 GEN.
SRU	2 x 40 MT PER DAY
NHDT	183
ISOM	126
PRIME G+	260
HGU-2	20 TMTPA of H2 GEN.
BITUROX	150
New PRIME G+	486
NHT-CCRU	375

IV.	Year of establishment	1964
V.	Date of last environmental statement submitted	17.08.2020

PART – B

1.	Water Consumption M3 / day	
	Process (Processing whereby water gets polluted and the pollutants are easily biodegradable)	7249.78
	Cooling (Industrial cooling/ spraying in mine pits or boiler feed)	6761.63
	Domestic	6865.07

Name of products	Water consumption per unit of products	
	During the previous financial year(2019-20)	During the current financial year(2020-21)
	(1)	(2)
1. Liquefied Petroleum Gas		
2. Naphtha		
3. Motor Spirit	0.848 M3/MT**	0.975 M3/MT**
4. Superior Kerosene	CRUDE	CRUDE
5. High Speed Diesel		
6. Light Diesel Oil		
7. Low Sulphur Heavy Stock		
8. CBFS		
9. Raw Petroleum Coke		
10. Bitumen		

** The products are not separately processed and all products are obtained from the same raw material i.e. Crude oil. Hence, water consumption has been indicated as M³ / MT crude processed.

2. Raw Material Consumption

Name of raw material	Consumption in MT	Name of products	Production in MT	
			During the previous financial year (2019-20)	During the current financial year (2020-21)
CRUDE OIL	5469211	Liquefied Petroleum Gas	392058	364136
		Naphtha	527505	322360

	Motor Spirit (BS-IV)	901122	0
	Motor Spirit (BS-VI)	228022	1029842
	Superior Kerosene	478014	430611
	High Speed Diesel (BS-IV)	2720381	0
	High Speed Diesel (BS-VI)	574959	2818849
	DHDT Feed transfer	56593	0
	Bitumen & others	13192	547022
	Raw Petroleum coke	173060	162122
	Sulphur	6843	7135
	EBMS	-	4986
	M S XP 100	-	23
	CCRU Reformate	-	34
	FO	973	-6872

PART – C

**POLLUTANTS DISCHARGED TO ENVIRONMENT / UNIT OF CRUDE TPUT.
(PARAMETER AS SPECIFIED IN THE CONSENT ISSUED)**

	Pollution	Quantity of pollutants discharged	Conc. of pollutants in discharges	Percentage of variation from prescribed standards with reasons.
(a)	Water		Refer Annexure-1	
(b)	Air		Refer Annexure-2	

**PART – D
HAZARDOUS WASTES**

(As specified under the Hazardous Waste (Management and Handling) Rules, 1989)

Hazardous Wastes	Total Quantity	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
Oily Sludge		

(a) From process (Tank cleaning)	<ul style="list-style-type: none"> • Opening stock: 1113.6* m³ • Generation: 3387 m³ 	<ul style="list-style-type: none"> • Opening stock: 1159.18* m³ • Generation: 3457.9 m³
(b) From Pollution Control facilities (ETP)	<ul style="list-style-type: none"> • Processing: 3341.42 m³ • Closing stock: 1159.18 m³ 	<ul style="list-style-type: none"> • Processing: 2542.11 m³ • Closing stock: 2074.97 m³

* About 1789 m³ of old oily sludge stock not included in oily sludge inventory given here. It is being processed in confined space Bio-remediation for oil removal.

Hazardous Wastes	Total Quantity	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
Residual Oily Sludge		
(a) From process (Tank cleaning)	<ul style="list-style-type: none"> • Opening stock: 48.6 MT. • Generation: 11.0 MT 	<ul style="list-style-type: none"> • Opening stock: 25.6 MT. • Generation: 24.92 MT
(b) From Pollution Control facilities (ETP)	<ul style="list-style-type: none"> • Closing stock: 25.6 MT 	<ul style="list-style-type: none"> • Closing stock: 17.52 MT

Hazardous Wastes	Total Quantity	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
Spent Catalyst		
(a) From process	<ul style="list-style-type: none"> • Opening Stock: 1853.41 MT • Generation : 969.8 MT • Disposal: 824 MT • Closing Stock: 1999.3 MT 	<ul style="list-style-type: none"> • Opening Stock: 1999.3 MT • Generation : 52.39 MT • Disposal: 998.79 MT • Closing Stock: 1052.90 MT
(b) From Pollution Control facility	NIL	NIL

**PART – E
SOLID WASTES**

Hazardous Wastes	Total Quantity	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
Bio Sludge		
(a) From process		
(b) From Pollution Control facility (Ex Sludge Lagoons in BTP)	430 MT (Dry basis)	430 MT (Dry basis)
(c) Quantity recycled or reutilized	NIL	NIL
2. Sold	NIL	NIL
3. Disposed	430 MT (in Horticulture as manure and as Landfill)	430 MT (in Horticulture as manure and as Landfill)

PART – F

Please specify the characterizations (in terms of concentration and quantum) of hazardous as well as solid wastes and indicate disposal practice and opted for both these categories of wastes.

I. HAZARDOUS WASTES

Oily Sludge: Processed by “Mechanized Skid or Extraction Process” for recovery of 90-95% oil from oily sludge and generation of minimum quantity of residual oily sludge. Mechanical extraction method uses solvent and steam heating and then oily sludge is processed in a plant equipped with hydro-cyclones, centrifuges and decanting facility in order to recover the maximum possible oil and water. The sludge is broken down into water, oil and base sediments. Water is drained into ETP for further treatment while the recovered oil is pumped into slop oil tanks for reprocessing in refinery. The base sediments generated in this process is called residual oily sludge which is in solid state having an oil content of around 5-10 %wt.

Further, oily sludge generated from crude tank is cleaned onsite by mechanized cleaning of tanks. This methodology followed in this process is also same as mentioned above.

- a) **Pl. Refer Annexure 3 for chemical composition of Oily Sludge**
- b) **Residual Oily Sludge:** The residual oily sludge is bio-remediated using oilivorous bacteria developed by IOCL R&D in Confined Space Bio-remediation site.
Pl. Refer Annexure 4 for chemical composition of Residual Oily Sludge

c) **Spent Catalyst:**

1. RFCC Spent Catalyst: Disposed off through co-processing at Ambuja Cements, Bhatapara, CPCB approved recyclers.
2. Other Spent Catalyst: Disposed off through MSTC by e-auction to CPCB approved recyclers.

Pl. Refer Annexure 5 for chemical composition of Spent Catalyst

II. SOLID WASTES

a) **Biological sludge from Biological Treatment Plant (BTP):**

Biological sludge gets generated in the BTP from excess sludge in bio-treater. Same is processed through Thickener & Centrifuge and dry bio sludge is used as manure for the horticulture purpose & green belt development.

PART – G

Impact of Pollution Abatement measures on conservation of natural resources and on the cost of production: NA

PART-H

Additional measures / investment proposal for environmental protection including abatement of pollution, prevention of pollution,

1. Installation BELCO effluent treatment unit using bacteria for sulphur reduction

Belco unit is a flue gas scrubbing unit installed in RFCCU for removal of SO₂/SO₃ and particulate matter from flue gas. In this process, flue gas comes in closed contact with water in the form of atomized droplets. The intensive gas/liquid contacting provides effective removal of coarse particulate and desulfurization.

But the coarse particles and sulphur compounds removed from air converts the Belco effluent into a high TDS effluent. High sulphur content is difficult to use this effluent in ETP-BTP. Similarly high sulphur effluent can't be drained to open channel or natural water resources as it is very toxic for environment.

Hence to solve this problem and reducing the sulphur content in the Belco effluent, IOCL R&D developed a special type of bacteria which can consume the sulphur present in the effluent. This would subsequently help in using the Belco effluent in the ETP-BTP unit.

A pilot plant was set up using Belco effluent and the bacteria developed by IOCL R&D. The result of sulphur content of outlet effluent was tested and found out to be within satisfactory limit. After getting this positive result, a sub-unit is installed using the already existing filters at RFCCU unit. The test result has been found satisfactory.

PART – I

Any other particulars in respect of environment protection and abatement of pollution.

1. Green Belt

Barauni Refinery has imbibed the habit of regular and large scale tree plantation since long in order to preserve the environment. The critical facts pertaining to the activity of tree plantation at Barauni Refinery are as flows:

Total Area of Green Belt: about 207 Acres in all (including township and Eco park all put together)

Green Belt area in Refinery = about 34.47 Acres

Green Belt area in Township = about 82.19 Acres

No. of trees planted since 1995 in Green Belt: 1,21,343

In FY 2020-21, total 10,199 nos. of tree was planted in refinery / township.

2. Ecological Park:

Living testimony of our environment commitment the ecological park of Barauni Refinery exhibits our true commitment towards environment protection. The silent features of the ecological park are presented below:

The Garden has more than 279 plant species under 81 families including some medicinal plants both indigenous and exotic. Some important tree species planted in the park are Sissoo, Babool, subabool, Siris, Gular, Teak, Gulmohar, Jamun, Semul, Amaltas, Bamboo, Palas, Bargad, Maulshree, Muckkund, African Tulip tree and Arjun. The Ecological Park has a Rose garden with 31 varieties of roses. It also has about 37 species

of medicinal plants of well known value. A medicinal plant "Rouvolfia serpentine", which is becoming rare now- a-days, can be found abundantly in the Eco Park. Two artificial ponds (Eco Ponds) are also present in the Ecological Park. More than 1000 trees of different species are planted every year. The Ecological Park attracts about 100 species of local resident and migratory birds (water birds as well as the terrestrial birds). The park is a breeding and roosting ground for at least 20 species of birds. Thousands of migratory birds of species such as Common Teal, Mallard, Shoveller, Garganey, Pintail, White Eyed, Pied Crested Cuckoo, Coot, Green Sandpiper, Swallow, Yellow headed Wagtail etc from Siberia and other parts of globe come to ecological park every winter. The park is developed into different zones i.e Jal Vihar, Jantu Vihar, Kala Vihar, Pushpa Vihar and Prabat Vihar

During their visit to Ecological park it is highly appreciated by various dignitaries, distinguished visitors and media including the world famous birds catcher Mr. Ali Husain of Bombay Nature Society and the members of Mandar Nature Club, Bhagalpur.

Eco Park as a bird site has been mentioned in report of Bio -diversity strategy of Bihar and Jharkhand for National Bio-diversity Strategy & Action Plan (NBSAP).

Eco Park as a bird site has also been mentioned by internationally acclaimed bird watchers M. Zafar-ul Islam and Asad R. Rahmani in the following books:

- POTENTIAL AND EXISTING RAMSAR SITES IN INDIA
- DUCKS, GEESE AND SWANS OF INDIA
- IMPORTANT BIRD AREAS IN INDIA

It is matter a great pride for Barauni Refinery that many dignitaries of international stature have referred the BR ecological park "as one of best maintained by any industry in the World" in the visitor's book.

Annexure 1

SN	Parameter	Quantity of pollutants discharged (Kg/1000 MT crude) (2020-21)	Conc. of pollutants in discharges (mg/l except pH) 2020-21
1	pH	--	7.31
2	Oil & Grease	0.00	3.78
3	BOD	0.00	13.29
4	COD	0.00	69.74
5	TSS	0.00	17.93
6	Phenols	0.00	0.14
7	Sulphides	0.00	0.18
8	CN	0.00	0.05
9	Ammonia as N	0.00	14.4
10	TKN	0.00	38.6
11	P	0.00	<0.5
12	Cr (Hexavalent)	0.00	<0.01
13	Cr (Total)	0.00	<0.01
14	Pb	0.00	<0.01
15	Hg	0.00	<0.001
16	Zn	0.00	<0.01
17	Ni	0.00	<0.01
18	Cu	0.00	<0.01
19	V	0.00	<0.01
20	Benzene	0.00	<0.01
21	Benzo (a) -Pyrene	0.00	<0.01

Annexure 2

S.N O	Emission	Quantity of pollutants discharged (kg/hr)
1	SO ₂	623.75
2	NOX	375.1
3	CO	25
4	PM	70.1

Annexure-3

COMPOSITION OF OILY SLUDGE

Parameter	Unit	Oily Sludge
pH		-
Oil Content	% wt	50-60
Water	% wt	18-24
Sediment	% wt	9-12
Ash Content	% wt	8-11
Zinc	ppmw	220-260
Manganese	ppmw	12-15
Copper	ppmw	50-58
Nickel	ppmw	22-30
Lead	ppmw	10-16
Chromium	ppmw	31-48
Mercury	ppmw	0.9-2.5
Arsenic	ppmw	BDL
Vanadium	ppmw	7-9
Cadmium	ppmw	2-12
Cobalt	ppmw	5-7
Selenium	ppmw	2-4
Thallium	ppmw	-
Tellurium	ppmw	-
Antimony	ppmw	-
Tin	ppmw	-
Chloride	% wt	-
Sulphur	% wt	-
Calorific Value (as received basis)	kcal/kg	-
Loss on Ignition at 850°C	% wt	

Annexure-4

COMPOSITION OF RESIDUAL OILY SLUDGE

Parameter	Unit	Residual Oily SLUDGE
pH		7-8
Oil Content	% wt	5-10
Water	% wt	10-15
Sediment	% wt	19-25
Ash Content	% wt	55-70
Zinc	ppmw	160-200
Manganese	ppmw	15-25
Copper	ppmw	50-70
Nickel	ppmw	30-45
Lead	ppmw	9-15
Chromium	ppmw	29-40
Mercury	ppmw	0.8-2
Arsenic	ppmw	BDL
Vanadium	ppmw	4-10
Cadmium	ppmw	2-10
Cobalt	ppmw	3-6
Selenium	ppmw	3-6
Thallium	ppmw	-
Tellurium	ppmw	-
Antimony	ppmw	-
Tin	ppmw	-
Chloride	% wt	-
Sulphur	% wt	-
Calorific Value (as received basis)	kcal/kg	2000-2300
Loss on Ignition at 850°C	% wt	-