



रिफाइनरीज प्रभाग
Refineries Division

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



ISO : 9001, 14001 & OHSAS : 18001 Certified Refinery

Ref. No. TS/HSE/07

Date: 26-07-2019

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' 2019.

Dear Sir,

Enclosed please find the Environmental Statement for 2018-19 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 Dinesh Kumar
Regional Officer,
BSPCB, Tilrath, 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' 2019.

PART – A

- I. Name and Address of the owner/occupier of the industry, operation or process. **Ms. Sukla Mistry**
Executive Director,
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

- IV. Year of establishment

1964

- V. Date of last environmental statement submitted

06.09.2018

PART – B

1. Water Consumption M3 / day	
Process (Processing whereby water gets polluted and the pollutants are easily biodegradable)	7598.36
Cooling (Industrial cooling/ spraying in mine pits or boiler feed)	6267.38
Domestic	9283.35

Name of products	Water consumption per unit of products	
	During the previous financial year (1)	During the current financial year (2)
1. Liquefied Petroleum Gas		
2. Naphtha		
3. Motor Spirit		
4. Superior Kerosene	0.829 M3/MT**	0.814 M3/MT**
5. High Speed Diesel	CRUDE	CRUDE
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 (2017-18)	During the current financial year (2018-19)
CRUDE OIL	6661191	Liquefied Petroleum Gas	325146	401929
		Naphtha	522019	508061
		Motor Spirit	881838	1071723
		Superior Kerosene	612679	640529
		High Speed Diesel	2875752	3402272

	DHDT Feed transfer	105039	26959
	Bitumen	7185	20700
	Raw Petroleum coke	160884	182255
	Carbon Black feedstock	-2222	-497
	Sulphur	7331	7050
	FO	9361	211

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 (2017-18)	During the current financial year (2018-19)
Oily Sludge		
(a) From process (Tank cleaning)	<ul style="list-style-type: none"> Opening stock: 1126.31* m³ Generation: 3480 m³ 	<ul style="list-style-type: none"> Opening stock: 1313.10* m³ Generation: 3100 m³
(b) From Pollution Control facilities (ETP)	<ul style="list-style-type: none"> Processing: 3393.21 m³ Closing stock: 1313.10 m³ 	<ul style="list-style-type: none"> Processing: 3299.51 m³ Closing stock: 1113.6 m³

* About 2250 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 (2017-18)	During the current financial year (2018-19)
Residual Oily Sludge		
(a) From process (Tank cleaning)	<ul style="list-style-type: none"> • Opening stock: 142.3 MT. • Generation: 14.0 MT 	<ul style="list-style-type: none"> • Opening stock: 156.3 MT. • Generation: 9.0 MT
(b) From Pollution Control facilities (ETP)	<ul style="list-style-type: none"> • Closing stock: 156.3 MT 	<ul style="list-style-type: none"> • Closing stock: 48.6 MT

Hazardous Wastes	Total Quantity	
	During the previous financial year (2017-18)	During the current financial year (2018-19)
RFCCU Spent Catalyst		
(a) From process (ex RFCCU)	<ul style="list-style-type: none"> • Opening Stock:7661.77 MT • Generation : 1980.8 MT • Disposal: 2513 MT • Closing Stock: 7129.45 MT 	<ul style="list-style-type: none"> • OpeningStock:7129.45 MT • Generation : 1976.2 MT • Disposal: 7252 MT • Closing Stock: 1853.41 MT
(b) From Pollution Control facility	NIL	NIL

**PART – E
SOLID WASTES**

Hazardous Wastes	Total Quantity	
	During the previous financial year (2017-18)	During the current financial year (2018-19)
Bio Sludge		
(a) From process		
(b) From Pollution Control facility (Ex Sludge Lagoons in BTP)	430 MT (Dry basis)	425 MT (Dry basis)
(c) Quantity recycled or reutilized	NIL	NIL
2. Sold	NIL	NIL
3. Disposed	450 MT (in Horticulture as manure and as Landfill)	425 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

- a) **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 3-8 % wt. Further, oily sludge generated from crude tank is cleaned onsite by mechanized cleaning of tanks. The methodology followed in this process is also same as mentioned above.

Pl. Refer Annexure 3 for chemical composition of Oily Sludge

- b) **Residual Oily Sludge**: The residual oily sludge generated by processing sludge through mechanized skid process is bio-remediated using oilivorous bacteria developed by TERI as well as Confined Space Bio-remediation.

Pl. Refer Annexure 4 for chemical composition of Residual Oily Sludge

- c) **Spent Catalyst**: With the kind permission and support of BSPCB and JSPCB, a trial run was successfully conducted in March 2011 in collaboration with ACC cements in its Chaibasa, Jharkhand Plant for co-processing of RFCCU spent catalyst in cement industry. Based on the trial run report, CPCB had granted permission to ACC for regular co-processing of RFCCU spent catalyst. So we had lined up ACC for co-processing of RFCCU spent catalyst in cement industry. Subsequently, on expiry of above work order, M/s Ambuja Cement was lined up for the same job with necessary authorisation. Thus, disposal & co-processing as environment friendly manner is going on since Jan'16.

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:

1. Implementation of 6 Nos. of Rain Water Harvesting Schemes

6 (two) numbers of roof top rain water harvesting schemes is implemented in the refinery in year 2017-18 to recharge ground water at the following locations:

- Substation no. 9
- Substation no. 28
- Substation no. 29
- Fire vehicle shed
- Canteen
- QC Lab

PART-H

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

1. Installation of Confined Space bio-remediation

Furthering its commitment to environmental protection, Barauni Refinery has constructed a Confined space Bio-remediation facility near ETP for bio-remediation of residual oily sludge generated after processing of oily sludge.

Confined space bio-remediation will replace earlier practice of bio-remediation in which residual oily sludge was bio-remediated in an open lined pit. The earlier system took 8-10 months for remediation while the same amount can be bio-remediated in confined space bio-remediation in 3-4 weeks. This will enable faster remediation and better management of residual oily sludge which is a hazardous waste.

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 148.39 Acres

Green Belt area in Township = about 82.19 Acres

No. of trees planted till date in Green Belt: about 1,94,980

In FY 2018-19, total 6100 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:

It is spread over an area of 75 acres. 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) (2018-19)	Conc. of pollutants in discharges (mg/l except pH) 2018-19
1	pH	--	7.47
2	Oil & Grease	0.00	3.48
3	BOD	0.00	13.34
4	COD	0.00	83.25
5	TSS	0.00	13.71
6	Phenols	0.00	0.11
7	Sulphides	0.00	0.13
8	CN	0.00	0.05
9	Ammonia as N	0.00	13.52
10	TKN	0.00	36.17
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-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	-

Annexure-5

TYPICAL CHEMICAL COMPOSITION OF RFCCU SPENT CATALYST

SN	Constituent	% Weight (Range)	% Weight (Avg.)
1.	Al ₂ O ₃	40.0 - 48.0	45
2.	SiO ₂	45.0 - 52.0	47
3.	Rare Earth Oxides	2.0 - 2.9	2.6
4.	Fe ₂ O ₃	0.4 - 1.0	1.0
5.	CaO	0.4 - 0.5	0.45
6.	Sodium	0.25 - 0.41	0.29
7.	Carbon	0.01 - 0.11	0.04
8.	MgO	0.5 - 1.5	1.0
9.	P ₂ O ₅	0.10 - 0.60	0.35
10.	Antimony, Sb	0 - 75 ppm	0 ppm
11.	Cu	0 - 1 ppm	0 ppm
12.	Nickel, Ni	2200 - 4500 ppm	3100 ppm
13.	Vanadium, V	5400 - 10000 ppm	7600 ppm
14.	Loss on Ignition	0.4 - 1.0	0.5