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Ref: HSE/GPCB/2018

Date: 29.09.18

The Member Secretary
Gujarat Pollution Control Board
Paryavaran Bhavan
Sector 10-A,
Gandhinagar – 382 010.

Sub: Environment Statement for the year 2017-18

Dear Sir,

Pleased find enclosed, the Environment Statement of Gujarat Refinery for the financial year ending 31st March 2018. The report has been compiled as per Form-V of Central Pollution Control Board.

Thanking you,

Yours faithfully,

(S. Ray Choudhuri)
Deputy General Manager (HSE)
Gujarat Refinery

SOUMITRA RAY CHOUDHURI
उप महाप्रबंधक (एच.एस.ई.)
Deputy General Manager (HSE)
गुजरात रिफ़ाइनरी, आई.ओ.सी.एल., वडोदरा
Gujarat Refinery, IOCL, Vadodara

Encl: As above.

CC: **The Regional Officer**
Gujarat Pollution Control Board
GERI Compound, Race Course
Baroda–390007.

FORM – V
(See Rule 14)

From:
Gujarat Refinery
Indian Oil Corporation Limited
PO : Jawaharnagar
Vadodara – 391 320
Gujarat

To,
Gujarat Pollution Control Board
Paryavaran Bhavan
Sector 10-A
Gandhinagar – 382 010.

Environmental statement for the financial year ending on 31st Mar'18.

PART – A

i)	Name & address of the owner/ Occupation of the industry, Operation or process.	Shri Sudhir Kumar Executive Director Gujarat Refinery PO: Jawaharnagar Baroda – 391 320.
ii)	Industry category	Primary
iii)	Production capacity	13.7 million metric tons of crude oil per annum.
iv)	Year of establishment	1965
v)	Date of the last Environmental Statement submitted.	26th Sep'17

PART – B

Water and Raw Material Consumption			
		2016-17	**2017-18**
		Water consumption,m3/day	Water consumption,m3/day
1	Process/Service	5435	5338
2	Cooling	7806	8081
3	Domestic (Refineries area only)	6846	6355
4	DM Plant	9630	7128
5	Fire water from freshwater	2947	6105
	TOTAL	**32664**	**33008**

Process water consumption per unit of crude processed	
2016-17	**2017-18**
0.92 M3 per MT of crude	0.88 M3 per MT of crude

(2) Raw Material Consumption			
SN	**Name of Raw material**	**2016-17, MT**	**2017-18, MT**
1	Crude Oil	13936189	13811403
2	Methanol	10666	10418
3	Benzene	46307	54765

PART – C

[illegible] / unit of output
(Parameters as specified in the consent issued)

Pollutants For Effluent	Quantity of Pollutants Discharged (Kg/day)	Concentration of pollutants in discharges (mg/lit)	Percentage of variation from prescribed standards with Reasons
Oil	19	5	Always remained within prescribed limits.
Phenol	2.54	0.7	-- do --
BOD	41.5	12	-- do --
Sulfide	2.49	0.7	-- do -
TSS	55.2	14	-- do --

Other parameters for effluents (other than mentioned above) are given below

Parameters	Limit(mg/l) except pH)	Typical value(mg/l, except pH)	Percentage of variation from prescribed standards with Reasons
pH	6.5—8.5	7.29	Well within limit
Ammonical Nitrogen	50	1.10	-- do --
Cyanides	0.2	B.D.L	--
Total chromium	2	0.03	Well within limit
Hexavalent chromium	0.1	B.D.L	-- do --
Zinc	5	0.03	-- do --
Fluoride as F	1.5	0.79	--
Mercury as Hg	0.01	B.D.L	--
Copper as Cu	3	0.04	Well within limit
Lead as Pb	0.1	0.02	-- do --
Nickel as Ni	3	0.02	-- do --

S.N.	Stack	Fuel Burnt (type wi[illegible])		Concentration in mg / Nm3 unless stated			
				[illegible]		N[illegible]	
				[illegible]		Limit [illegible]	
		FUEL OIL %	FUEL GAS %	mg/m3	mg/m3	mg/m3	mg/ m3
1	AU-I F-1	61.1	38.9	539.1	160.5	311.1	93 .2
2	AU-I F-2	61.1	38.9	539.1	122.1	311.1	73 .1
3	AU-I F-3	61.1	38.9	539.1	97.4	311.1	76 .7
4	AU-I F-4	61.1	38.9	539.1	112.2	311.1	77 .6
5	AU-I F-5	61.1	38.9	539.1	110.6	311.1	81 .7
6	AU-II F-1	38.8	61.2	360.5	130.7	288.8	95.2
7	AU-II F-2	38.8	61.2	360.5	115.6	288.8	76.9
8	AU-II F-3	38.8	61.2	360.5	111.2	288.8	76.6
9	AU-II F-4	38.8	61.2	360.5	62.3	288.8	50
10	AU-II F-5	38.8	61.2	360.5	95	288.8	69.1
11	CRU 21 -F-01	82.5	17.5	710	95	332	89.2
12	CRU 21-F-02	82.5	17.5	368.4	96.2	289.8	73.6
13	CRU 22-F-01	82.5	17.5	368.4	92.1	289.8	71.1
14	CRU F1	82.5	17.5	178.8	50.2	266.1	65.8
15	AU-III F-2	39.4	60.6	365	129.2	289	77.8
16	AU-III F-3	39.4	60.6	365	109	289	64.9
17	MSQ 15 F-01-04	0	100	50.0	16.8	250.0	69.4
18	MSQ 14 F01	0	100	50.0	18.9	250.0	72.1
19	MSQ 15 F05	0	100	50.0	24.6	250.0	79
20	MSQ 15 F01	0	100	50.0	35.6	250.0	69.3
21	LAB Hot oil 2063 F-01	53.7	46.3	479.6	390	303.7	81.4
22	LAB 2061 F-001	53.7	46.3	479.6	176.9	303.7	51
	LAB 2071 F-01	0	0	50.0	0	250.0	0
23	UDEX	0	100	50.0	41.9	250.0	81.5
24	AU-5	60.8	39.2	536.4	150.3	310.8	82.8
25	FPU-1	63.6	36.4	558.8	114.4	313.6	69.6
26	FCC Charge Heater	0	100	50.0	47	250.0	90.6
27	CO Boiler	100	0	850.0	112.6	350.0	102
28	HGU-1	0	100	50.0	36.6	250.0	74.4

	HGU-1	0	100	50.0	0	250.0	0
29	HGU-2	[illegible]	93.7	100.4	0	256.3	0
	[illegible]		93.7	[illegible]4	0	256.3	0
					[illegible]	[illegible]	0[illegible]
					[illegible]	[illegible]	0[illegible]
32	HCU-2&2	[illegible]	46.5	[illegible]0.0	343.9	303.5	86.3
33	HCU 3&4	53.5	46.5	478.0	343.8	303.5	93 .8
34	FPU-2 03FF 001	84	.16	722.0	331.5	334.0	91 .4
35	AU-IV	71.1	28.9	618.8	164.5	321.1	93 .8
36	VDU	73.1	26.9	634.8	308.9	323.1	83
37	VBU	0	100	50.0	0	250.0	0
38	CDU-E	71.1	28.9	618.8	308.9	321.1	81
39	CDU-W	71.1	28.9	618.8	126.5	321.1	82
40	BBU F-1	21.9	78.1	225.2	81.5	271.9	62.8
41	BBU F-2	21.9	78.1	225.2	71.5	271.9	66.3
42	TPS -B1	87.5	12.5	750.0	142.3	337.5	99.6
	TPS -B2	87.5	12.5	750.0	118:9	337.5	97
	TPS -B3	87.5	12.5	750.0	91.2	337.5	78.1
	TPS -B4	87.5	12.5	750.0	139.6	337.5	77.1
43	HRSG-1 CGP-I	0	100	50.0	15.4	250.0	49.2
44	HRSG-2 CGP-I	0	100	50.0	18.3	250.0	51.9
45	HRSG -3 CGP-I	0	100	50.0	15.1	250.0	45.3
46	HRSG-4 CGP-II	0	100	50.0	15.6	250.0	42.5
47	HRSG-5 CGP-II	0	100	50.0	13.1	250.0	33.6
48	DHDS	0	100	50.0	72.3	250.0	89.5
49	DHDT	0	100	50.0	33.5	250.0	62.8
50	ISOM F-01	0	100	50.0	44.6	250.0	76.3
	ISOM F-02	0	100	50.0	0	250.0	0
51	SRU-I	0	100	50.0	0	250.0	0
52	SRU-II	0	100	50.0	0	250.0	0
53	SRU-III	0	100	50.0	143.2	250.0	85.7
54	VGO _HDT F01	0	100	50.0	49	250.0	85.5
	VGO _HDT F02	0	100	50.0	0	250.0	0
55	DCU F01	29	71	282.0	85.1	279.0	88.5
56	DCU F02	29	71	282.0	75.8	279.0	55.1

NB: The limits mentioned for fuel oil and fuel gas are based on CPCB standards.

HAZARDOUS WASTES

As specified under Hazardous Wastes (Management and Handling) Rules,2008

SL.NO	Hazardous waste	2016-17 (MT)	2017-18 (MT)
a	From Tank Bottom	1250	1400
b	From CETP		
c	Spent Catalyst	684	1195
d	No. of Ethyl Mercaptan Drums/Empty Drums	4117	7330

PART – E

SL.NO	Solid wastes	2016-17 (MT)	2017-18 (MT)
a	From Process	Nil	Nil
b	From Pollution Control Facility (Bio-Sludge)	6000	4400
1	Quantity recycled or reutilized within unit	Nil	Nil
2	Solid (bio-sludge) Disposed (in green belts as manure)	6000	4400

PART – F

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

1. Oily Wastes:

Characteristics of oily sludge are tabulated below:

Sr. No.	Parameters	Value
1	Sediment (%)	89
2	Total Halogens (PPM)	NA
3	Polynuclear aromatic Hydrocarbon (PAH), %	Absent
4	Polychlorinated biphenyls (PCB)	Absent
5	Heavy metals, mg/kg	
	Cadmium	0.001
	Chromium	N.D
	Nickel	0.06
	Lead	0.02
	Arsenic	B.D.L

Presently M/s Plant Tech Mid continental Pvt. Ltd. has been engaged for processing of oily sludge for recovery of oil. A sludge processing Unit (SPU) was installed by the Vendor which process oily sludge on continuous basis. SPU basically uses Tricantor which separates Oil, Water and sludge. Oily sludge after heating with steam fed to unit and some solvent like slop oil is added for better mixing. This residual sludge after oil recovery is bio remediated.

Gujarat Refinery has Oily waste is treated in the refinery premises by bioremediation. It is bacteriological treatment with bacteria developed by IOCL,R&D. In this process, oily waste is converted into harmless components like CO_2, Water and fatty acid. Presently confined space fast bioremediation is taking place in bioreactor.

2. Spent catalyst:

Spent catalyst is generated from refinery processes due to its deactivation. Authorization is obtained from Gujarat Pollution Control Board to dispose the spent catalysts to the secured landfill developed by Nandesari Environment Control Limited (NECL) at Nandesari.
Also MoEF approved agency was lined up for complete disposal of catalyst for metal recovery.

2. Bio-sludge:

At present, bio-sludge is dried in sludge drying beds after centrifuging. This dried bio-sludge is used as manure in green belt.
Characteristics of bio-sludge are tabulated below:

Sl No.	Parameter	Value
1	Nitrogen	11.25
2	Phosphorus (P2O5)	0.11
3	Potash (K2O)	0.12
4	Organic Matter	72.9
5	Fe	B.D.L
6	Mn	0.10
7	Zn	0.13
8	Cu	0.00
9	Cd	0.0014
10	Co	0.01
11	Ni	0.07
12	Cr	B.D.L
13	Pb	B.D.L

PART – G

(Impact of the pollution control measures on conservation of natural resources and consequently on the cost of production)

1. Treated effluent from CETP is mostly recycled in Cooling Towers and in RO plant. After commissioning of RO Plant, CETP treated water is totally diverted to RO Plant. Permeate from RO is used in DM plants and the remaining in cooling towers and firewater network. RO Reject after proper dilution is discharged via VECL. The reuse from RO Plant is around 88% and the remaining 12%(120-150 m3/hr) is discharged via VECL.

2. Bioremediation of oily sludge by cultured bacteria developed by IOCL (R&D) is being done continuously. This eco-friendly disposal of oily waste solved the long pending disposal problem. Bioreactor for fast confined space bioremediation is presently being used for bioremediation of oily sludge.

3. Spent Caustic Treatment Plant with state-of-the-art technology was set up in Gujarat Refinery CETP, where reactive sulfide is converted into less harmful soluble sulfate by wet-air-oxidation process. This facility has reduced the generation of chemical waste in the Gujarat Refinery.

For removal of H_2S from the fuel gas itself, Refinery has set up amine treating units for fuel gas. MDEA is being used for absorbing H_2S from the fuel gas. H_2S from the rich amine is being stripped off in amine regenerator.

A sulfur recovery unit uses off gas from amine regeneration unit as feed and converts gaseous H_2S into liquid elemental sulfur, thereby reducing SO_2 emission from the refinery.

5. Methyl Tertiary Butyl Ether (MTBE) plant for addition of MTBE in MS in place of TEL for boosting octane number has been set up.

6. Side entry mixers and also jet mixers have been installed in crude oil tanks for reduction of tank bottom sludge in the crude oil. The oily sludge of crude oil tanks is now treated in Sludge Processing Unit(SPU) installed by M/s Plant Tech Mid continental Pvt. Ltd. where the oil extracted from bottom sludge is reused & processed in Refinery and the solid waste after oil recovery is bio-remediated.

7. Loss prevention and energy conservation measures:

- Installation of combustion control system in furnaces for reduction of excess air in order to increase the efficiency of furnaces which in turn reduces fuel consumption.

- All lighter product tanks are provided with floating roofs to minimize the evaporation loss. Lighter product tanks have also been provided with Secondary seals.

- By optimum utilization of Hydrogen generation capacity and consumption, one Hydrogen unit was stopped.

- By optimum utilization of HRSG steam generation capacity and consumption of HP/MP steam, one Boiler was stopped.

PART – II

Additional investment proposal for environmental protection including abatement of pollution) scheme approved / job in progress:

1) Revamp of existing units under BS-IV Project is being carried out to supply fuel of BS-IV standards. Already revamp has been carried out for Diesel Hydro Desulphurisation Unit(DHDS) and Diesel HydroTreatreating Unit(DHDT) to meet BS-IV norms.

2) In order to minimize the effluent discharge through VECL, RO Reject is going to be utilized in Pet Cokeyard for Dust Suppression System(DSS). Approximately 450-500 m3/day is expected to be utilized through this scheme.

3) VOC LDAR programme is in practice to reduce HC loss.

4) Total 57 Rain harvesting schemes commissioned during the Financial year 2017-18 under Rain Water Harvesting Policy of IOCL out of which 45 are inside the refinery battery limit and the remaining RWH systems are in Township. Total 78 RWH system has been commissioned till date in Gujarat Refinery.

5) To control and minimize the fugitive emissions, VOC system of around 50 crores is proposed for all primary units in CETP. The fugitive emissions shall be routed to Activated Carbon Filter and the clean air from filter shall be vented out in atmosphere.

6) To improve the efficiency of CETP, 2 nos. of floating aerator in Aeration Tank(3rd Compartment) is proposed which in turn will improve the DO level in Aeration Tanks.

7) For the year 2017-18, 5500 trees were planted in and around Gujarat Refinery to sequester the carbon dioxide generated and made the major events organized during the year 17-18 Carbon Neutral Event.

PART - I

(Any other particulars for improving the quality of the environment)

1) Environment Management System at Gujarat Refinery is at par with International standard. For effective environment management system, refinery declared an environment policy, which aims to comply & excel the statutory limit and norms of pollution control & prevention.

The efforts of the refinery towards environment management system was recognized by internationally reputed third party M/s DNV, Netherland and certified with the prestigious ISO-14001 certificate on 3rd July, 1997. In every six months surveillance audit is conducted to verify whether the system meets the standard. Recently, periodic Audit has been conducted by M/s. ICS in Jun'16. Gujarat Refinery has been recertified for OHSAS 18001: 2007, ISO-14001:2004 & ISO-9001:2008 on Jan'17. It is valid up to 3rd Jan'2020 which will be further revalidated

2) Gujarat Refinery recognizes the importance of a structured and comprehensive mechanism to ensure that the refinery activities and products do not cause adverse effects on the environment. Thus, yearly environment audit is being conducted by GPCB approved schedule –I auditors.

3) World Environment Day, energy conservation fortnight were celebrated with involving employees contract labours and nearby villagers to inculcate awareness towards Environment and energy conservation.

Date: 29.09.2018

Name: S. Ray Choudhuri
Designation: DGM (HSE)
Address: Gujarat Refinery
PO: Jawaharnagar
Vadodara - 391 320

SOUMITRA RAY CHOUDHURI
Deputy General Manager (HSE)
Gujarat Refinery, IOCL, Vadodara