इंडियन ऑयल कॉर्पोरेशन लिमिटेड
बोंगाइगाँव रिफाइनरी
डाकघर : धालीगाँव - 783 385
जिला : चिरांग (असम)
Indian Oil Corporation Limited
Bongaigaon Refinery
P.O. : Dhaligaon - 783 385
Dist. : Chirang (Assam)

Indian Oil

रिफाइनरीज प्रभाग
Refineries Division

IOC/BGR/ENV/REP/MoEF/2013-14/02 **Date: 21.05.2014**

To

The Chief Conservator of Forests
Regional Office, North East Region
Ministry of Environment & Forests
Law-U-SIB, Lumbatngen, Near M.T.C. Workshop,
Shillong – 793021

Subject: Half Yearly Report for the period of 1st October, 2013 to 31st March 2014 for "Refinery Expansion Project"

Dear Sir,

With reference to above, we are enclosing the Six Monthly Report for the period of **1st October, 2013 to 31st March, 2014** for your kind perusal. The reports are being sent as per EIA Rules'2006 for the "Environmental Clearances" issued by MoEF to Bongaigaon Refinery, (BGR) for "Refinery Expansion" project.

Thanking you,

Yours faithfully,

(A.K Agarwal)
Chief Manager (HSE)

Copy to:
1. Member Secretary, Pollution Control Board, Assam
   Bamunimaidam, Guwahati - 781 021

2. Zonal Officer, Central Pollution Control Board
   Eastern Zonal Office, 'TUM-SIR', Lower Motinagar,
   Near Fire Brigade H.Q., Shillong – 793014

Half Yearly Report for the period of 1st October, 2013 to 31st March, 2014 for "Refinery Expansion Project"

Environmental Clearance for Refinery Expansion, De-bottlenecking of Reformer and LPG facility vide MoEF's letter No. J.11011/24/90-IA-II dated 03/06/1991:

Plant Commissioning dates:

1. **Crude Distillation Unit - II: 09.05.95**
2. **Delayed Coker Unit - II: 06.03.96**

Sl. No	Clearance Conditions	Status
1.	Six monthly Effluent Quality (Point No. VIII)	Furnished in Appendix-A1
2.	Six monthly Ambient Air Quality/ Stack Monitoring Data	Furnished in Appendix-A2
3.	Tree Plantation Data	Furnished in Appendix-A3
4.	Special Information	Furnished in Appendix-A4

APPENDIX –A1
Effluent Discharged (Figure in M^3/Hr)

(1st October 2013 to 31st March 2014)

A	Industrial Effluent M^3/Hr	**178.0**
B	Domestic Effluent from BGR Township M^3/Hr	**52.7**
C	Total Effluent Treated (A + B) M^3/Hr	**230.7**
D	Treated Effluent Reused M^3/Hr	**225.5**
E	Effluent Discharged M^3/Hr	**5.2**
F	M^3 of Effluent discharged for 1000 tons of Crude processed	**18.7 (Std. 400)**

EFFLUENT QUALITY

A. Treated Effluent Quality

(1st October 2013 to 31st March 2014)

Sr. No	Parameter	MINAS 2008	Min	Avg.	Max
1	p^H value	6.0 - 8.5	6.5	7.3	8.5
2	Oil and Grease, mg/l	5.0	1.0	1.1	1.6
3	Bio-Chemical Oxygen Demand (3 Day at 27°C), mg/l	15.0	2.4	4.3	9.0
4	Chemical Oxygen Demand (COD), mg/l	125.0	18.0	31.4	64.0
5	Suspended solids, mg/l	20.0	3.0	4.6	9.0
6	Phenolic compounds (as C6H5OH), mg/l	0.35	0.01	0.03	0.08
7	Sulphide (as S), mg/l	0.50	0.02	0.07	0.16
8	CN mg/l	0.20	BDL	BDL	BDL
9	Ammonia as N, mg/l	15.0	0.70	1.07	1.20
10	TKN, mg/l	40.0	1.00	1.27	1.60
11	P, mg/l	3.0	0.50	0.56	0.85
12	Cr (Hexavalent), mg/l	0.10	BDL	BDL	BDL
13	Cr (Total), mg/l	2.0	BDL	BDL	BDL
14	Pb, mg/l	0.10	BDL	BDL	BDL
15	Hg, mg/l	0.01	BDL	BDL	BDL
16	Zn, mg/l	5.0	BDL	BDL	BDL
17	Ni, mg/l	1.0	BDL	BDL	BDL
18	Cu, mg/l	1.0	BDL	BDL	BDL
19	V, mg/l	0.20	BDL	BDL	BDL
20	Benzene, mg/l	0.10	BDL	BDL	BDL
21	Benzo (a) pyrene, mg/l	0.20	BDL	BDL	BDL

EFFLUENT QUALITY

B. Final Outlet (From the Complex) Effluent Quality

(1st October 2013 to 31st March 2014)

Sl. No.	Parameter	MINAS	Min	Avg.	Max
1	p^H value	6.0 - 8.5	7.0	7.8	8.5
2	Oil and Grease, mg/l	5.0	1.0	1.2	1.8
3	Bio-Chemical Oxygen Demand (3 Days at 27° C), mg/l	15.0	2.8	4.8	8.0
4	Chemical Oxygen Demand (COD), mg/l	125.0	19.0	36.0	77.0
5	Suspended Solids, mg/l	20.0	4.0	5.0	9.0
6	Phenolic compounds (as C6H5OH), mg/l	0.35	0.01	0.03	0.08
7	Sulphide (as S), mg/l	0.50	0.02	0.08	0.45
8	CN, mg/l	0.20	BDL	BDL	BDL
9	Ammonia as N , mg/l	15.0	0.55	0.64	0.87
10	TKN, mg/l	40.0	0.82	0.95	1.20
11	P, mg/l	3.0	0.78	0.85	0.90
12	Cr (Hexavalent), mg/l	0.10	BDL	BDL	BDL
13	Cr (Total), mg/l	2.0	BDL	BDL	BDL
14	Pb, mg/l	0.10	BDL	BDL	BDL
15	Hg, mg/l	0.01	BDL	BDL	BDL
16	Zn, mg/l	5.0	BDL	BDL	BDL
17	Ni, mg/l	1.0	BDL	BDL	BDL
18	Cu, mg/l	1.0	BDL	BDL	BDL
19	V, mg/l	0.20	BDL	BDL	BDL
20	Benzene, mg/l	0.10	BDL	BDL	BDL
21	Benzo (a) pyrene, mg/l	0.20	BDL	BDL	BDL

STACK MONITORING DATA

(1st October 2013 to 31st March 2014)

A. SO_2 Emission (mg/Nm^3):

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 1700 For F.G. = 50	98	418	996
CDU-II		127	534	997
DCU-I		93	645	999
DCU-II		38	312	975
CPP		23	266	967
Reformer		5	85	483
HO-1		8	190	486
Isomerisation		0.3	46	442
DHDT		22	66	352
HGU		34	77	131

B. NO_X Emission (mg/Nm^3):

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 450 For F.G. = 350	47	123	231
CDU-II		66	188	362
DCU-I		85	167	272
DCU-II		10	93	218
CPP		45	121	263
Reformer		7	87	148
HO-1		7	93	160
Isomerisation		7	33	120
DHDT		14	66	85
HGU		1	32	192

C: PM Emission (mg/Nm^3)

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 100 For F.G. = 10	14	14.5	15
CDU-II		7	20.5	34
DCU-I		8	8	8
DCU-II		6	21	36
CPP		8	11	14
Reformer		<4.0	<4.0	<4.0
HO-1/2		<4.0	<4.0	<4.0
Isomerisation		<4.0	<4.0	<4.0
DHDT		<4.0	<4.0	<4.0
HGU		<4.0	<4.0	<4.0

STACK MONITORING DATA
(1st October 2013 to 31st March 2014)

D. CO Emission (mg/Nm^3)

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 200 For F.G. = 150	21	22	23
CDU-II		27	31.5	36
DCU-I		27	29	31
DCU-II		30	34	37
CPP		29	31	33
Reformer		6	7	8
HO-1/2		11	12	13
ISMERISATION		11	12	13
DHDT		7	10	13
HGU		4	6	8

E. Ni + V Emission (mg/Nm^3) :

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 5	0.006	0.006	0.006
CDU-II		0.002	0.002	0.002
DCU-I		0.004	0.004	0.004
DCU-II		0.007	0.017	0.028
CPP		0.002	0.002	0.002
Reformer		0.002	0.002	0.002
HO-1/2		0.001	0.001	0.001
ISMERISATION		0.001	0.001	0.001
DHDT		0.004	0.004	0.004
HGU		<0.001	<0.001	<0.001

APPENDIX – A2

AMBIENT AIR QUALITY AROUND BGR COMPLEX
(Average of monthly sample Schedule – VII)
(1st October 2013 to 31st March 2014)

	Station	Continuous Monitoring Station	Near Tube Well No.14	Near LPG Bottling plant	Rural Health Centre	Bartala Rail Gate	Near TW No.7 in Township
1	SO2 (Std.: 50/80 µg/m^3)						
	Min	2.3	BDL	BDL	BDL	BDL	BDL
	Average	11.2	BDL	BDL	BDL	BDL	BDL
	Max	36.4	BDL	BDL	BDL	BDL	BDL
	No of observation	Continuous	49	49	49	49	49
2	NO2 (Std. 40/80 µg/m^3)						
	Min	3.5	5.0	6.0	7.8	8.0	6.0
	Average	6.7	11.1	9.3	10.1	11.9	11.3
	Max	7.4	16.7	12.2	13.0	18.0	16.2
	No of observation	Continuous	49	49	49	49	49
3	PM-10 (Std. 60/100 µg/m^3)						
	Min	11.6	25.0	22.0	29.0	29.0	23.0
	Average	48.2	72.1	64.8	77.0	79.6	80.4
	Max	94.1	100.0	99.0	98.0	98.0	98.0
	No of observation	Continuous	49	49	49	49	49
4	PM-2.5 (Std. 40/60 µg/m^3)						
	Min	2.1	14.0	14.0	21.0	17.0	15.0
	Average	13.5	40.0	38.2	43.6	46.1	46.9
	Max	36.4	59.0	59.0	59.0	60.0	60.0
	No of observation	Continuous	49	49	49	49	49
5	Ammonia (Std. 100/400 µg/m^3)						
	Min	4.6	BDL	BDL	BDL	BDL	BDL
	Average	4.7	BDL	BDL	BDL	BDL	BDL
	Max	4.8	BDL	BDL	BDL	BDL	BDL
	No of observation	Continuous	49	49	49	49	49
6	Pb(Std. -0.5/1.0 µg/m^3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		49	49	49	49	49
7	Arsenic (As) (6 ng/m3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL

	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		49	49	49	49	49
8	Ni (20 µg/m3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		49	49	49	49	49
9	CO (STD 2/4 mg/m3						
	Min	0.01					
	Average	0.25					
	Max	1.7					
	No of observation	Continuous					
10	Ozone_(Std. -100/180 µg/$m^{3\ for\ 8hrs./1\ hr.}$)						
	Min	13.3	BDL	BDL	BDL	BDL	BDL
	Average	24.4	BDL	BDL	BDL	BDL	BDL
	Max	49.8	BDL	BDL	BDL	BDL	BDL
	No of observation	Continuous	49	49	49	49	49
11	Benzene(Std. : 5 µg/m^3)						
	Min	0.01	BDL	BDL	BDL	BDL	BDL
	Average	0.01	BDL	BDL	BDL	BDL	BDL
	Max	0.01	3.4	BDL	0.11	0.01	0.20
	No of observation	Continuous	49	49	49	49	49
12	Benzo(a)Pyrene_(Std. : 1 ng/m^3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		49	49	49	49	49

Average of Six Stations												
PARAMETER	SO_2	NO_2	PM-10	PM-2.5	NH_3	Pb	As	Ni	Benzo(a) Pyrene	CO	C_6H_6	O_3
Unit	µg/m^3						ng/m^3			mg/m^3	µg/m^3	
NAAQ Std. 2009	50/ 80	40/ 80	60/ 100	40/ 60	100/ 400	0.5/ 1.0	Max. 6	Max. 20	Max 1	2/4	Max 5	100/ 180
Min	2.3	3.5	11.6	2.1	4.6	BDL	BDL	BDL	BDL	0.01	0.01	5.1
Average	11.2	10.1	70.2	38.1	4.7	BDL	BDL	BDL	BDL	0.25	2.7	17.2
Max	36.4	18.0	100.0	60.0	4.8	BDL	BDL	BDL	BDL	1.69	4.7	49.2

Tree Plantation

(1st October, 2013 to 31st March, 2014)

The entire area inside BGR covers with Greenery through massive plantation activities. Through massive plantation work and by giving protection to natural forest growth in side BGR premises, the entire area has become green. The entire plant area where processing plant facilities do not exist has a green cover. This helps in reduction of noise and air pollution level in one hand while on the other hand provides protection to ecological features of the area. The refinery has an excellent quality environment around its complex. Natural greenery can be seen all around the complex and in all seasons of the year.

Tree Census was done by Divisional Forest Office, Chirang. As per census, 84545 numbers of plants which includes trees including shrubs, ocular estimated(ocular) 33000 numbers bamboos in 750 nos of bamboo culms and also trees planted by BGR during 2003 to 2012.

APPENDIX – A 4

Additional Information

(1st October, 2013 to 31st March, 2014)

Effluent reused during the period (**1st October, 2013 to 31st March, 2014**) was around **95.3%** of the total effluent treated which includes plant effluent as well as BGR Township sewer.

Under the Leak Detection and Repair programme (LDAR), BGR is conducting quarterly Fugitive Emission Survey. During the period from **1st October, 2013 to 31st March, 2014**, **23369** potential leaky points checked and **213** Leaky points detected and rectified. By following LDAR programme in true spirit, the company could not only avoid potential loss of **421.7** MTA (approx.) of light Hydrocarbon to the atmosphere through fugitive sources but also able to keep healthy work environment in the plants.

To ensure work area quality and health of equipments, quarterly noise survey was conducted covering all the operating plants, control rooms and ambient surrounding the BGR. During **1st October, 2013 to 31st March, 2014** Noise Survey for two quarters of 2013 -14 has been completed and no abnormality was reported.

As a measure of Hazardous Waste Management, M/s Balmer Lawrie & Co. Limited was awarded the contract of oily sludge processing along with bio-remediation of residual solids. The party has already completed the processing of oily sludge from sludge lagoons. Bio- remediation process of the residual part of sludge is completed. The test results are bio-remediated material is awaited. .

Further two more Rain Water Harvesting (ground water recharging) schemes in BGR Township have been implemented during the period.