इंडियन ऑयल कॉर्पोरेशन लिमिटेड
बोंगाइगाँव रिफाइनरी
डाकघर : घालीगाँव - 783 385
जिला : चिरांग (असम)
Indian Oil Corporation Limited
Bongaigaon Refinery
P.O. : Dhaligaon, Dist. : Chirang, Assam-783385
Phone : 03664-
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Website : www.iocl.com FAX : 03664-

रिफाइनरी प्रभाग
Refineries Division

IOC/BGR/ENV/REP/MoEF/2014-15/01 **Date: 19.05. 2015**

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 2014 to 31st March 2015) for "Refinery Expansion Project"

Dear Sir,

With reference to above, we are enclosing the Six Monthly Report for the period of **1st October 2014 to 31st March 2015** 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 2014 to 31st March 2015
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.	General conditions and Compliance status of Refinery Expansion Project	Annexure- I
2.	Six monthly Effluent Quality (Point No. VIII)	Furnished in Appendix-A1
3.	Six monthly Ambient Air Quality/ Stack Monitoring Data	Furnished in Appendix-A2
4.	Tree Plantation Data	Furnished in Appendix-A3
5	Special Information	Furnished in Appendix-A4

ANNEXURE – I

Sr. No	General Conditions	Compliance Status
1	The project authority must strictly adhere to the stipulations made by Assam State Pollution Control Board and State Government and the comprehensive EIA will be submitted within 18 months.	1. All stipulations by Pollution Control Board of Assam are strictly followed. 2. Copy of comprehensive EIA prepared for the Refinery Expansion was submitted to MOEF, New Delhi and also to MOEF Shillong vide our letter ENV/MIN/94/05 dated 15/06/94.
2	Any expansion of the plant, either with the existing product mix or new products can be taken up only with the prior approval of this Ministry.	1. All proposals for expansion requiring Environmental Clearance from MOEF are sent to the Ministry for Environment Clearance by BGR. All expansion activities are dealt as per provision of the EP Act and other applicable acts.
3	The gases emission from the various process units should conform to the standard prescribed by the concern authorities, from time to time. At no time the emission level should go beyond the stipulated standards.	1. The process units are design to meet the prescribed standards. 2. Units would be put out of operation in the event of mal functioning of pollution control practice at BGR.
4	Adequate number of (a minimum of 5) of Air quality monitoring stations should be set up in the down wind direction as well as where maximum ground level concentration is anticipated. Also, stack emission should be monitored by setting of automatic stack monitoring unit.	1. Six numbers Ambient Air Quality Monitoring Stations are operating at BGR around the complex including one continuous analyzer set up for compilation of Ambient Air Quality Standards 2. All these stations are selected based on modeling exercise representing short-term ground level concentration. 3. All major stacks in complex are monitored with continuous analyzers installed for SO2 & NOx analysis.
5	There should be no change in the stack design without the approval of State Pollution Control Board. Alternative Pollution Control system and design (steam injection system in the stack) should be provided to take care the excess emission due to failure in any system of the plant.	1. No changes are made to the stack design. 2.Steam injection facility in burners of the furnaces is provided.
6	The ambient Air Quality Data for winter season (number 90 to January 1991) should be presented by June 1991.	These data were submitted as desired during 1991.
7	The project authority should recycle the waste to the maximum extent. Recycle plan should be submitted within one year. This should include use of recycled water for green belt development plan.	BGR has installed Tertiary Treatment Plant to facilitate reuse of effluent water inside the complex as Cooling Water & Firewater Makeup. Only nominal quantity of effluent is being discharge from the complex.

Sr. No	General Conditions	Compliance Status
8	Adequate number of effluent quality monitoring stations must be set in consultation with State Pollution Control Board and the effluents monitored and should be statistically analysed and the report sent to this Ministry once in six month and State Pollution Control Board every three months.	1. Three joint sampling points for effluent are fixed in and around BGR by Pollution Control Board, Assam (PCBA) to monitor the discharge effluent quality. Joint sampling by Pollution Control Board, is conducted once a month. The samples are tested at PCBA Laboratory. 2. Beside samples are tested at BGR Laboratory as per consent condition and also on a daily basis to track effluent quality. 3. All samples conform to the prescribed MINAS standards.
9	The project authority should prepare a well-designed scheme for solid waste disposal generated during various process operations or in the treatment plant. The plan for disposal should be submitted to the ministry within six months.	1. All solid waste generated during various process operations or in the treatment plant are handled and disposed off as per laid down procedures in ISO-14001 in environmentally friendly manner. 2. All hazardous wastes are handled and disposed off as per provisions of the Hazardous Waste (Management, Handling & Trans boundary Movement) Rules, 2008 and as per directions of statutory agencies. 3. 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 already completed the processing of oily sludge from sludge lagoons. Bio- remediation process of the residual part of sludge has also been completed. 4. All statutory returns are sent to PCBA as per the provision of rule.
10	A detailed risk analysis of LPG storage facility should be carried out and a report be submitted to the ministry within six months.	Risk Analysis for LPG Storage was prepared and submitted to MOEF in 1992.
11	A detailed risk analysis based on maximum credible accident analysis should be done once the process design and layout frozen. Based on this a disaster management plan has to be prepared and after approval of the nodal agency, should be submitted to this ministry within 6 months.	Detailed risk analysis was prepared and the report was submitted to MoEF. a) On site emergency plan exists and mock drills are conducted time to time to verify effectiveness of the plan as per OISD guidelines. b) Off site emergency plan approved by District authorities exists. Mock drills are conducted time to time to verify effectiveness of the plan in co-ordination with district authorities.

Sr. No	General Conditions	Compliance Status
12	Detailed green belt development plan should be submitted within a year.	Green belt development plan was a part of the comprehensive EIA and the same is already submitted to MOEF. The plan was implemented.
13	A report on occupational health of the workers with the incidents of diseases in the past five years as per record available with the BRPL and their correlation with type of occupational health problem the environment may cause may be submitted within six months.	The report is already submitted as desired.
14	The project must setup a laboratory facility for collection and analysis sampling under the supervision of competent technical personal that will directly report to chief executive.	A well-equipped Laboratory exists in the complex. Environment Laboratory of BGR is accredited by NABL
15	A separate environmental management cell with full-fledged laboratory facilities to carry out various management and monitoring functions should be set up under the control of Senior Executive.	BGR is already having a separate environmental management cell and full fledged laboratory to carry-out environmental management and monitoring functions.
16	The funds earmarked for the environmental protection measures should not be diverted for any other purpose and year-wise expenditure should be reported to this Ministry and SPCB.	The funds earmarked for the environmental projects are used for this purpose only and not diverted or spent for other purposes.
17	The Ministry or any competent authority may stipulate any further condition(s) on receiving reports from the project authorities.	--
18	The Ministry may revoke or suspend the clearance if implementation of any of the above conditions is not satisfactory.	--
19	The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	--

APPENDIX –A1

Effluent Discharged (Figure in M^3/Hr)

(1st October 2014 to 31st March 2015)

A	Industrial Effluent M^3/Hr	**175.1**
B	Domestic Effluent from BGR Township M^3/Hr	**49.4**
C	Total Effluent Treated (A + B) M^3/Hr	**224.5**
D	Treated Effluent Reused M^3/Hr	**219.2**
E	Effluent Discharged M^3/Hr	**5.3**
F	M^3 of Effluent discharged for 1000 tons of Crude processed	**17.7 (Std. 400)**

EFFLUENT QUALITY

A. Treated Effluent Quality

(1st October 2014 to 31st March 2015)

Sl. No	Parameter	MINAS,2008	Min	Avg.	Max
1	p^H value	6.0 - 8.5	6.5	7.0	8.0
2	Oil and Grease, mg/l	5.0	1.0	1.16	2.0
3	Bio-Chemical Oxygen Demand (3 Day at 27°C), mg/l	15.0	2.0	4.2	7.4
4	Chemical Oxygen Demand (COD), mg/l	125.0	18.0	43.2	86.0
5	Suspended solids, mg/l	20.0	3.0	4.7	7.0
6	Phenolic compounds (as C6H5OH), mg/l	0.35	0.004	0.016	0.050
7	Sulphide (as S), mg/l	0.50	0.02	0.06	0.10
8	CN mg/l	0.20	BDL	BDL	BDL
9	Ammonia as N, mg/l	15.0	0.90	0.98	1.20
10	TKN, mg/l	40.0	1.00	1.11	1.36
11	P, mg/l	3.0	0.38	0.58	0.80
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 2014 to 31st March 2015)

Sl. No.	Parameter	MINAS	Min	Avg.	Max
1	p^H value	6.0 - 8.5	6.50	7.7	8.50
2	Oil and Grease, mg/l	5.0	1.00	1.36	2.40
3	Bio-Chemical Oxygen Demand (3 Days at 27° C), mg/l	15.0	2.00	4.9	8.00
4	Chemical Oxygen Demand (COD), mg/l	125.0	19.00	49.9	85.00
5	Suspended Solids, mg/l	20.0	4.000	5.3	8.00
6	Phenolic compounds (as C_6H_5OH), mg/l	0.35	0.005	0.021	0.07
7	Sulphide (as S), mg/l	0.50	0.040	0.077	0.16
8	CN, mg/l	0.20	BDL	BDL	BDL
9	Ammonia as N , mg/l	15.0	0.52	0.62	0.76
10	TKN, mg/l	40.0	0.74	0.93	1.20
11	P, mg/l	3.0	0.70	0.82	0.90
12	Cr (Hexavalent), mg/l	0.10		BDL	
13	Cr (Total), mg/l	2.0		BDL	
14	Pb, mg/l	0.10		BDL	
15	Hg, mg/l	0.01		BDL	
16	Zn, mg/l	5.0		BDL	
17	Ni, mg/l	1.0		BDL	
18	Cu, mg/l	1.0		BDL	
19	V, mg/l	0.20		BDL	
20	Benzene, mg/l	0.10		BDL	
21	Benzo (a) pyrene, mg/l	0.20		BDL	

STACK MONITORING DATA
(1st October 2014 to 31st March 2015)

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	26	300	980
CDU-II		28	348	995
DCU-I		62	304	996
DCU-II		25	204	589
CPP		103	484	950
Reformer		4	26	417
HO-1		12	73	424
Isomerisation		4	27	158
DHDT		27	66	81
HGU		58	80	108
SRU		0.3	9	95

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	14	122	500
CDU-II		17	136	322
DCU-I		26	63	104
DCU-II		26	75	160
CPP		20	107	383
Reformer		19	73	178
HO-1		12	113	193
Isomerisation		6	49	94
DHDT		1	116	328
HGU		20	22	115
SRU		No Analyser		

C. PM Emission (mg/Nm^3)

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 100 For F.G. = 10	37.0	39.7	43.0
CDU-II		28.0	28.7	29.0
DCU-I		16.0	18.3	20.0
DCU-II		24.0	26.0	28.0
CPP		20.0	21.7	24.0
Reformer		4.0	5.7	7.0
HO-1/2		BDL	BDL	BDL
Isomerisation		7.0	8.7	10.0
DHDT		8.0	8.7	10.0
HGU		BDL	BDL	BDL
SRU		11.0	12.0	13.0

STACK MONITORING DATA
(1st October 2014 to 31st March 2015)

D. CO Emission (mg/Nm^3)

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 200 For F.G. = 150	23.0	25.3	28.0
CDU-II		19.0	25.0	29.0
DCU-I		24.0	28.7	32.0
DCU-II		25.0	27.0	28.0
CPP		28.0	31.3	35.0
Reformer		13.0	14.0	15.0
HO-1/2		5.0	6.0	7.0
ISMERISATION		3.0	4.0	5.0
DHDT		5.0	5.7	6.0
HGU		13.0	14.0	15.0
SRU		11.0	11.5	12

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

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 5	BDL	BDL	BDL
CDU-II		BDL	BDL	BDL
DCU-I		BDL	BDL	BDL
DCU-II		BDL	BDL	BDL
CPP		BDL	BDL	BDL
Reformer		ND	ND	ND
HO-1/2		ND	ND	ND
ISMERISATION		BDL	BDL	BDL
DHDT		BDL	BDL	BDL
HGU		BDL	BDL	BDL
SRU		-	-	-

APPENDIX – A2

AMBIENT AIR QUALITY AROUND BGR COMPLEX
(Average of monthly sample Schedule – VII)
(1st October 2014 to 31st March 2015)

	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	SO_2 (Std. 50/80 µg/m^3)						
	Min	3.2	BDL	BDL	BDL	BDL	BDL
	Average	11.9	BDL	BDL	BDL	BDL	BDL
	Max	21.4	BDL	BDL	BDL	BDL	BDL
	No. of observation	Continuous	51	51	51	51	51
2	NO_2 (Std. 40/80 µg/m^3)						
	Min	3.2	5.0	6.0	7.0	5.0	5.0
	Average	11.9	7.8	9.5	11.1	11.9	9.4
	Max	21.4	14.0	13.0	15.0	15.0	15.0
	No. of observation	Continuous	51	51	51	51	51
3	PM-10 (Std. 60/100 µg/m^3)						
	Min	8.98	28	30	27	30	28
	Average	30.6	67.9	68.5	72.4	71.5	69.5
	Max	61.12	84	83	90	90	90
	No. of observation	Continuous	51	51	51	51	51
4	PM-2.5 (Std. 40/60 µg/m^3)						
	Min	3.52	18.0	18.0	16.0	16.0	18.0
	Average	11.16	39.3	41.7	43.8	45.2	44.6
	Max	26.86	54.0	54.0	57.0	56.0	56.0
	No. of observation	Continuous	51	51	51	51	51
5	Ammonia (Std. 100/400 µg/m^3)						
	Min	0.02	BDL	BDL	BDL	BDL	BDL
	Average	18.7	BDL	BDL	BDL	BDL	BDL
	Max	59.2	BDL	BDL	BDL	BDL	BDL
	No. of observation	Continuous	51	51	51	51	51
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		51	51	51	51	51
7	Arsenic (As) (Std. 6 ng/m3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		51	51	51	51	51
8	Ni (Std. 20 ng/m3)						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No of observation		51	51	51	51	51
9	CO (Std. 2/4 mg/m3						
	Min	0.01					
	Average	0.51					
	Max	3.84					
	No of observation	Continuous					
10	Ozone(Std.100/180 µg/m^3 for 8 hrs/1 hr)						
	Min	10.37	BDL	BDL	BDL	BDL	BDL
	Average	26.4	BDL	BDL	BDL	BDL	BDL
	Max	74.65	BDL	BDL	BDL	BDL	BDL
	No of observation	Continuous	51	51	51	51	51
11	Benzene (Std. 5 µg/m^3)						
	Min	0.01	BDL	0.5	BDL	0.8	BDL
	Average	0.01	BDL	0.6	BDL	1.4	BDL
	Max	0.01	BDL	0.7	BDL	2.2	BDL
	No of observation	Continuous	51	51	51	51	51
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		51	51	51	51	51

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	**$\mu g/m^3$**						**ng/m^3**			**mg/m^3**	**$\mu g/m^3$**	
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	**3.2**	**5**	**8.98**	**3.5**	**0.02**	**BDL**	**BDL**	**BDL**	**BDL**	**0.01**	**0.01**	**10.4**
Average	**11.9**	**9.9**	**63.4**	**37.6**	**18.7**	**BDL**	**BDL**	**BDL**	**BDL**	**0.51**	**0.68**	**26.4**
Max	**21.4**	**15.4**	**90**	**57.0**	**59.2**	**BDL**	**BDL**	**BDL**	**BDL**	**3.84**	**2.20**	**74.7**

Appendix - A3

Tree Plantation
(1st October 2014 to 31st March 2015)

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 33000 numbers bamboos in 750 no. of bamboo culms and also trees planted by BGR during 2003 to 2012. During **1st October 2014 to 31st March 2015**, BGR has planted around **500** no. of trees

Appendix – A 4

Additional Information
(1st October 2014 to 31st March 2015)

Effluent reused during the period **(1st October 2014 to 31st March 2015)** was around **97.7%** 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 2014 to 31st March 2015**, **23655** potential leaky points checked and **206** Leaky points detected and rectified. By following LDAR programme in true spirit, the company could not only avoid potential loss of **110.0** 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 2014 to 31st March 2015** Noise Survey for two quarters of 2014 -15 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.

Further two more Rain Water Harvesting (Ground Water Recharging) schemes in BGR Township have been implemented during the period.