



# इंडियन ऑयल कॉर्पोरेशन लिमिटेड

रिफाइनरी प्रभाग : गुवाहाटी रिफाइनरी

नूनमाटी, गुवाहाटी-७८१०२० (असम)

**Indian Oil Corporation Limited**

Refineries Division : Guwahati Refinery

Noonmati, Guwahati- 781020, Assam.

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Guwahati Refinery

o/c

Ref.No.: GR/HSE/303/2017-18/INDMAX REVAMP/3

Date: 20.07.2017

To,  
Dr. H. Tynsong  
Scientist "C"  
Ministry of Environment & Forest  
North Eastern Regional Office  
Lumbatngen (LAW-U-SIB)  
Shillong-793021

Subject: Submission of Half-Yearly compliance report on Environment Stipulations

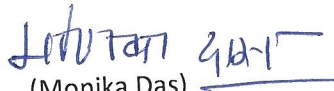
Reference : MoEF LETTER NO: J-11011/71/2012-1A II (I) dated 18.04.2008 for INDMAX REVAMP Unit

Sir,

With reference to above please find enclosed herewith the six monthly compliance report of environmental stipulations for INDMAX REVAMP units of IOCL, Guwahati Refinery for period Dec' 16 to May' 17.

With warm Regards,

Yours sincerely  
For and on behalf of Guwahati Refinery

  
(Monika Das)  
DGM (HSE) 20/7/17

Enclo : As above

- Copy to:
- 1) The Director,  
Ministry of Environment, forest & Climate change  
Indira Paryavaran Bhawan  
Jorbagh Road  
New Delhi-110003
  - 2) Member Secretary (i/c) Pollution Control Board Assam, Bamunimaidan, Ghy-21

RECEIVED

  
Pollution Control Board, Assam  
Bamunimaidam, Guwahati-21

STATUS OF ENVIRONMENTAL CLEARANCE CONDITIONS FOR

REVAMP OF INDMAX UNIT

AT GUWAHATI REFINERY, GUWAHATI BY M/S INDIAN OIL CORPORATION LIMITED

Ref: MOEF LETTER NO. J-11011/71/2012-1A II(I) dt.18/04/2016

Sl. No.	CONDITIONS	STATUS As on 1 <sup>st</sup> June,2017
A	SPECIFIC CONDITION	
i.	The environmental clearance is subject to obtaining prior clearance from wildlife angle including clearance from the Standing Committee of the National Board for Wildlife in respect of Amchang Wildlife Sanctuary.	<ul style="list-style-type: none"> <li>• Application submitted to Divisional Forest Office, Guwahati (DFO) on 25.09.2014 for permission of NBWL.</li> <li>• State Board of Wildlife (SBWL) accorded clearance vides MOM of 8<sup>th</sup> SBWL meeting held on 19.09.2015.</li> <li>• The letter Ref No FRW.18/2015/67 dated 6<sup>th</sup> June, 2016 has been dispatched from State Board of Wildlife to MoEF&amp;CC, GOI, New Delhi.</li> <li>• Online application submitted to DFO on 31.08.2016 as per MoEF directives</li> <li>• The same was cleared online in February' 2017 by DFO, Guwahati Wildlife Division and office of PCCF, Wildlife &amp; Chief Wildlife Warden, Assam in March'2017 for further action of Department of Environment &amp; Forest, GOA.</li> </ul>
ii.	Compliance to all the environmental conditions stipulated in the environmental clearance letter no. J-11011/1/2000-IA II(I) dated 24th April, 2000, J-11011/215/2007-IA II (I) dated 7th February, 2008 and J-11011/71/2012-IA II(I) dated 22nd January, 2015 shall be satisfactorily implemented and compliance reports submitted to the Ministry's Regional Office at Shillong.	<p>Compliance to all the environmental conditions stipulated in the environmental clearance letter no. J-11011/1/2000-IA II (I) dated 24<sup>th</sup> April, 2000 and J-11011/215/2007- 1A II (I) dated 7<sup>th</sup> February, 2008 is satisfactorily implemented and the compliance reports submitted to the Ministry's Regional Office at Shillong</p> <p><b>Complied.</b></p>
iii.	M/s IOCL shall comply with new standards/norms for Oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide G.S.R. 186(E) dated 18th March, 2008.	<p>Guwahati Refinery complies with all the standards/norms under the Environment (Protection) Rules, 1986 vide G.S.R 186(E) dated 18<sup>th</sup> March, 2008 and will continue to do so in future.</p> <p>Compliance data is attached as Annexure-A</p> <p><b>Complied</b></p>

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iv.	Leak detection and Repair programme shall be prepared and implemented to control HC/VOC emissions. Focus shall be given to prevent fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to. Fugitive emissions of HC from product storage tank yards etc. must be regularly monitored. Sensors for detecting HC leakage shall be provided at strategic locations.	Leak Detection and Repair programme (LDAR) carried out quarterly through external agency for control of HC/VOC emission from pumps, valves, flanges, pipelines of process units and tank farm area of the Refinery including INDMAX unit. Preventive maintenance schedule for each unit available and adhered to. HC detectors are installed at strategic location of the Refinery Fugitive emission data is enclose as Annexure-III <b>Complied</b>
v.	SO2 emissions after expansion from the plant shall not exceed 5.14 TPD.	There will not be any additional SO <sub>2</sub> emissions from the INDMAX revamp unit.  Present SO <sub>2</sub> emissions monitoring system is continued after commissioning of the unit.  SO2 emission data is enclosed as Annexure-VII <b>Complied</b>
vi.	As proposed, record of sulphur balance shall be maintained at the Refinery as part of the environmental data on regular basis. The basic component of sulphur balance include sulphur input through feed (sulphur content in crude oil), sulphur output from Refinery through products, byproduct (elemental sulphur), atmospheric emissions etc.	Sulphur balancing done on monthly basis based on sulphur input through feed and sulphur output through products, by products and emission to atmosphere etc. Sulphur balancing data for the month of May'2017 is enclosed as Annexure-VIII <b>Complied.</b>
vii.	Ambient air quality monitoring stations, (PM10, PM 2.5, SO <sub>2</sub> , NO <sub>x</sub> , H <sub>2</sub> S, mercaptan, non-methane-HC and Benzene) shall be set up in the complex in consultation with Maharashtra Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs.	Guwahati Refinery is located in Noonmati, District: Kamrup (Metro), Assam and under jurisdiction of Pollution Control Board, Assam.  Four nos of Ambient Air Monitoring stations based on downwind GLC contour and discussions with APCB are in regular operation and monitoring done through external agency as per NAAQS notified by Ministry on 16 <sup>th</sup> November 2009.  One Continuous Ambient Air Quality Monitoring (CAAQM) station is installed with connectivity to CPCB/APCB for continuous Ambient Air Quality monitoring (SO <sub>x</sub> , NO <sub>x</sub> , CO,

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		<p>O3 PM<sub>10</sub>, PM<sub>2.5</sub>, NH<sub>3</sub>).</p> <p>Compliance data for quality of ambient air is attached as Annexure-II.</p> <p>Compliance data for quality of stack emission is attached as Annexure-I.</p> <p><b>Complied</b></p>
viii.	<p>Ambient air quality data shall be collected as per NAAQS standards notified by the Ministry on 16th November, 2009 and trend analysis w.r.t past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area.</p>	<p>Ambient air quality data is regularly collected as per NAAQS standards notified by the ministry on 16th November 2009 which are well within limit.</p> <p>Guwahati Refinery has installed one station of CAAQMS with connectivity to CPCB/SPCB for daily monitoring of Ambient Air Quality. Moreover Guwahati Refinery has 4 (four) nos. of fixed stations at Admin Building, Sector-II township, WTP and Sector-III township for monitoring the Ambient Air Quality in and around the refinery</p> <p><b>Complied.</b></p>
ix.	<p>The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Besides, acoustic enclosure/silencer shall be installed wherever noise levels exceed the limit.</p>	<p>GR does not have a DG set</p>
x.	<p>Total raw water requirement from Brahmaputra River shall not exceed 291 m<sup>3</sup>/hr. Industrial effluent (183.2 m<sup>3</sup>/hr) shall be treated in the effluent treatment plant. Treated effluent (165 m<sup>3</sup>/hr) shall be recycled/reused recycled as make up for the raw water cooling tower and coke cutting water. Remaining treated effluent (65 m<sup>3</sup>/hr) will be discharged into surface water body i.e. River Brahmaputra after achieving standards prescribed. Domestic sewage shall be treated in sewage treatment plant (STP).</p>	<p>a) Total raw water requirement will be monitored for not exceeding 291 m<sup>3</sup>/hr. For 2016-17, raw water consumption is 243 m<sup>3</sup>/hr.</p> <p>b) Industrial effluent is treated in Effluent Treatment Plant. More than 95% of the treated effluent is reused as make up water for fire water/cooling towers /coke cutting water &amp; gardening &amp; balance is discharged to river Brahmaputra after achieving MINAS standards.</p> <p>c) Domestic sewage is treated in Effluent Treatment Plant.</p> <p><b>Complied.</b></p>
xi.	<p>Oil catches/oil traps shall be provided at all possible locations in rain/storm water drainage system inside the factory premises.</p>	<p>Oil catchers /Hay filters provided at all possible locations in rain/storm water drainage system inside refinery.</p>

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		<b>Complied.</b>
xii.	Treated effluent shall be passed through guard pond. Continuous online (24x7) monitoring to be installed for pH meter, TOC analyzer and flow meter and measurement of pollutants within the treatment unit. Data to be uploaded on company's website and provided to the respective RO of MEF&CC and SPCB.	<p>a) The treated effluent is passed through two nos of guard ponds at effluent treatment plant having capacity more than 6000m<sup>3</sup></p> <p>b) Installation of online analyzers for monitoring treated effluent quality (pH, TSS, COD, BOD) has been completed in Dec'15 with connectivity to CPCB/PCBA.</p> <p>Flow meter is available for daily monitoring the treated effluent quantity.</p> <p>Data for quality of treated effluent is attached as Annexure-IV.</p> <p>Complied</p>
xiii.	Oily sludge shall be treated via bioremediation process. Annual Oil sludge generation and disposal data shall be submitted to the Ministry's Regional Office and CPCB.	Oily sludge is treated via Bioremediation and also reprocessed in DCU. Oily sludge generation and disposal data submitted to APCB annually. Data of oily sludge from Dec'16-May'17 is attached as Annexure-VI.
xiv.	The company should strictly comply with the rules and guidelines under Manufacture, storage and import of Hazardous chemicals rules, 1989 as amended in October, 1994 and January, 2000. Hazardous waste should be disposed of as per hazardous waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and amended time to time.	Guwahati Refinery is strictly complying with the rules and regulations under Manufacture Storage and Import of hazardous chemicals rules, 1989 and amendments thereafter. The refinery has authorization from Pollution Control Board, Assam under Hazardous Waste (Management and Handling) Rules 2008 with validity up to 27.01.2020 and strictly adheres to the terms and conditions of the authorization.
xv.	The membership of common TSDF shall be obtained for the disposal of hazardous waste. Copy of authorization or membership of TSDF shall be submitted to Ministry's Regional Office at Bhopal. Chemical/inorganic sludge shall be sent to treatment storage disposal facility (TSDF) for hazardous waste. Spent catalyst shall be sent to authorized recyclers/re-processors.	<p>The common TSDF is at present not available in Assam.</p> <p>Hazardous oily sludge is bio-remediated through M/s The Energy &amp; Resources Institute (TERI)</p> <p>Spent catalyst is disposed to authorized recyclers by auction through MSTC.</p> <p><b>Complied</b></p>
xvi.	Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil /petroleum products and ensure regular monitoring.	Oil spillage prevention management plan already exists. Regular monitoring is done for prevention of oil spillage.

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xvii.	The company shall strictly follow all the recommendation mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).	<p><b>Complied.</b> This is adhered to.</p> <p><b>Complied.</b></p>
xviii.	To prevent fire and explosion at oil and gas facility, potential ignition sources shall be kept to a minimum and adequate separation distance between potential ignition sources and flammable materials shall be in place.	<p>This is adhered to by meeting OISD norms. Lay out of INDMAX revamp unit meets the OISD 118 guidelines.</p> <p><b>Complied.</b></p>
xix.	Green belt shall be developed at least in 33% of the plot area in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines.	<p>Because of space constraint green belt cannot be expanded inside refinery. However the tree plantation is taken up in and around refinery area.</p> <p>Because of space constraint green belt cannot be expanded inside refinery. However the tree plantation is taken up in and around refinery area.</p> <p>Because of space constraint green belt cannot be expanded inside refinery. However the tree plantation is taken up in and around refinery area.</p> <p>In the year 2014-15 tree plantation carried out by adopting Japanese Akira Miyawaki Model of Environment Forest Plantation under guidance of CPCB, Shillong. Total 2500 tree sampling planted in township areas in 2014-15 and 1000 tree in 2015-16. Plantation of total 5000 nos of trees within a stretch of 6 KM in NH 31, Amingaon, Ghy was carried out in partnership with NHAI and completed in May'2017. Under Sustainability programme Guwahati Refinery shall continuously keep on planting more and more trees in future.</p> <p><b>Complied</b></p>
xx.	All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.	<p>All the recommendations of rapid risk assessment report, disaster management plan and safety guidelines are implemented during revamp in March, 2016.</p> <p><b>Complied</b></p>
xxi.	Provision shall be made for the housing of	Project is completed and the point is

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	construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	complied with.  <b>Complied</b>
<b>B</b>	<b>GENERAL CONDITION</b>	
i.	The project authorities must strictly adhere to the stipulations made by the state Pollution Control Board (SPCB), State Government and any other statutory authority.	Stipulations of SPCB, State Government and any other statutory authority are adhered to.
ii	No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	Expansion of the unit shall not be done without approval of Ministry.  <b>Complied</b>
iii	The project authorities must strictly comply with the rules and regulations under Manufacture, storage and import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.	Prior approval from Chief Inspector Of Factories obtained vide letter Ref No KM/69/11553 dated 17.10.2015 followed by Stability certificate dated 23.09.2016  Prior approval from Chief Controller Of Explosives (CCOE), Nagpur obtained vide letter Ref No P/HQ/AS/15/845(P221799)/P-5(2)227/Refinery dated 03.02.2015  <b>Complied.</b>
iv	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	Quarterly monitoring of noise level is performed and results are well within the prescribed limits.  Compliance status is attached as Annexure-V  <b>Complied.</b>
v	A separate Environmental Management Cell equipped with full fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.	Separate environment management cell headed by GM exists. Laboratory facility is available in the refinery.  <b>Complied</b>
vi	Adequate funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures and shall be used to	Following funds is being earmarked during the year 2016-17

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	implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government alongwith the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purposes.	<p>BIOREMEDIATION : Rs 43.17 lakhs TREE PLANTATION. Rs. 79.36 lacs</p> <p>ENVIRONMENT MONITORING :Rs 14.46 LAKHS</p> <p>No funds diverted.</p> <p><b>Complied</b></p>
vii	The Regional Office of this Ministry/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	<p><b>Six monthly compliance reports of stipulated EC conditions sent to Ministry/Central Pollution Control Board/State Pollution Control as per schedule.</b></p> <p><b>Complied.</b></p>
viii	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions / representation, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	<p>The Environmental clearance for the project is available in MoEF web site.</p> <p>Publication in Local Dailies in Assamese and English language has been done on 07.02.2017.</p> <p><b>Complied</b></p>
ix	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall updated the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollution levels namely; PM10,PM2.5, SO2, NOx, HC (Methane & Non-parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	<p>Compliance of Stipulated Environmental Clearance conditions, including monitoring data are submitted to MoEF Regional Office as per schedule and being uploaded at IOCL website.</p> <p>Display of the environmental data at GR gate is available.</p> <p><b>Complied</b></p>
x	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of COCB and the SPCB. The Regional Office of this Ministry / CPCB /SPCB shall monitor the stipulated conditions.	<p>Compliance of Stipulated Environmental Clearance conditions, including monitoring data are submitted to MoEF Regional Office as per schedule.</p> <p><b>Complied.</b></p>
xi	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the	<p>Environment Statement is submitted annually to SPCB in Form-V as per Environment (Protection Rules) 1986.</p> <p><b>Complied</b></p>

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	company alongwith the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.	
xii	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.	<p><b>Noted for compliance</b></p> <p>Publication in Local Dailies in Assamese and English language has been done on 07.02.2017.</p>
xiii	Project authorities shall inform the Regional Office as well as Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	<p>Approval by IOCL Board Indmax Revamp :06/08/2012</p> <p>The date of start of land development work is not applicable as the Project works started within the existing refinery land.</p> <p>The revamp INDMAX plant was commissioned in March'2016.</p>

*Signature*

## Annexure-I

## Data on Stack Emission Monitoring at Guwahati Refinery

(Dec'16-May'17)

Stack	Month	Fuel burnt (type with %)	Concentration in mg / Nm3 unless stated					
			SO2		NOX		PM	
			Limit	Actual	Limit	Actual	Limit	Actual
CDU	Dec-16	FO/FG	1360	345	429	185	81	26
	Jan-17	FO/FG	1024	390	409	219	63	38
	Feb-17	FO/FG	1042	413	410	230	64	43
	Mar-17	FO/FG	1332	458	428	263	79	29
	Apr-17	FO/FG	1526	558	439	226	91	52
	May-17	FO/FG	1295	235	425	164	78	60
DCU	Dec-16	FO/FG	371	226	369	131	45	30
	Jan-17	FO/FG	443	195	374	159	34	30
	Feb-17	FO/FG	404	233	371	174	36	28
	Mar-17	FO/FG	401	208	371	144	35	29
	Apr-17	FO/FG	439	213	374	171	31	29
	May-17	FO/FG	345	277	368	143	26	24
HDT	Dec-16	FG	50	11	350	78	10	8
	Jan-17	FG	50	9	350	82	10	9
	Feb-17	FG	50	14	350	85	10	8
	Mar-17	FG	50	10	350	57	10	8
	Apr-17	FG	50	24	350	85	10	9

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	May-17	FG	50	12	350	129	10	8
HGU	Dec-16	Napht ha/FG	1400	19	432	57	84	11
	Jan-17	Napht ha	1700	23	450	88	100	14
	Feb-17	Napht ha	1700	17	450	83	100	17
	Mar-17	Napht ha	1700	35	450	58	100	22
	Apr-17	Napht ha	1700	53	450	99	100	19
	May-17	Napht ha	1700	28	450	46	100	21
ISOM	Dec-16	FG	50	10	350	33	10	8
	Jan-17	FG	50	10	350	33	10	8
	Feb-17	FG	50	12	350	40	10	8
	Mar-17	FG	50	13	350	42	10	7
	Apr-17	FG	50	13	350	35	10	8
	May-17	FG	50	11	350	26	10	5
INDM AX	Dec-16	FO	1700	93	450	75	100	62
	Jan-17	FO	1700	108	450	97	100	74
	Feb-17	FO	1700	60	450	104	100	73
	Mar-17	FO	Shutdown					
	Apr-17	FO	1700	45	450	116	100	57
	May-17	FO	1700	20	450	46	100	48

*Refers*

Blr-6&7	Dec-16	FO/FG	1219	474	421	193	74	71
	Jan-17	FO/FG	1394	413	431	180	83	65
	Feb-17	FO/FG	1168	421	430	215	71	68.9
	Mar-17	FO/FG	1276	512	424	142	77	58
	Apr-17	FO/FG	998	467	407	218	62	60
	May-17	FO/FG	1134	272	416	127	69	58
Blr-5	Dec-16	FO/FG	1700	279	450	141	100	42
	Feb-17	FO/FG	1091	375	413	195	67	57
	Mar-17	FO/FG	Shutdown					
	Apr-17	FO/FG	596	384	383	199	40	37
	May-17	FO/FG	1366	229	430	140	82	37

Stack	Month	Fuel burnt (type with %)	Concentration in mg / Nm <sup>3</sup> unless stated					
			CO (ppm)		Ni+V		S in Liq. Fuel, % wt	
			Limit	Actual	Limit	Actual	Limit	Actual
CDU	Dec-16	FO/FG	190	16	5	0.0271/BDL	1	0.44
	Jan-17	FO/FG	180	14	5	0.0366/BDL	1	0.43
	Feb-17	FO/FG	180	12	5	0.0477/BDL	1	0.43
	Mar-17	FO/FG	189	20	5	0.0266/BDL	1	0.50
	Apr-17	FO/FG	195	19	5	0.0471/BDL	1	0.45
	May-17	FO/FG	188	19	5	BDL/BDL	1	0.43
DCU	Dec-16	FO/FG	160	6	5	0.0124/BDL	1	0.44

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	Jan-17	FO/FG	162	6	5	0.0189/BDL	1	0.43
	Feb-17	FO/FG	161	8	5	0.027/BDL	1	0.43
	Mar-17	FO/FG	161	9	5	0.0285/BDL	1	0.50
	Apr-17	FO/FG	162	8	5	0.0202/BDL	1	0.45
	May-17	FO/FG	159	8	5	0.0242/BDL	1	0.43
HDT	Dec-16	FG	150	2	5	BDL/BDL	1	0.44
	Jan-17	FG	150	3	5	BDL/BDL	1	0.43
	Feb-17	FG	150	4	5	BDL/BDL	1	0.43
	Mar-17	FG	150	4	5	BDL/BDL	1	0.50
	Apr-17	FG	150	2	5	BDL/BDL	1	0.45
	May-17	FG	150	7	5	BDL/BDL	1	0.43
HGU	Dec-16	Napht ha/FG	191	4	5	BDL/BDL	1	0.44
	Jan-17	Napht ha	200	3	5	BDL/BDL	1	0.43
	Feb-17	Napht ha	200	3	5	BDL/BDL	1	0.43
	Mar-17	Napht ha	200	5	5	BDL/BDL	1	0.50
	Apr-17	Napht ha	200	4	5	BDL/BDL	1	0.45
	May-17	Napht ha	200	3	5	BDL/BDL	1	0.43
ISOM	Dec-16	FG	150	5	5	BDL/BDL	1	0.44
	Jan-17	FG	150	4	5	BDL/BDL	1	0.43

*Perf. adri*

SRUData:

Parameters	Limit for Existing SRU	Actual Values
Sulfur Recovery %	94	94.1
NOx, mg/Nm <sup>3</sup>	350	134.2
CO, ppm	150	7.7

\*BDL- Below Detectable Limit

\*FO- Fuel Oil

\*FG- Fuel Gas

*134.2*



## Annexure-II

## Data on Ambient Air Monitoring at Guwahati Refinery

AMBIENT AIR MONITORING REPORT						Dec'16-May-17						
AMBIENT AIR QUALITY MONITORING REPORT												
	SO <sub>2</sub>	NO <sub>2</sub>	PM 10	PM 2.5	Ozone (O <sub>3</sub> )	Lead (Pb)	CO	Ammonia (NH <sub>3</sub> )	Benzene (C <sub>6</sub> H <sub>6</sub> )	Benzene (O) Pyrene	Arsenic (As)	Nickel (Ni)
Concentration of Pollutants												
	µg/ m <sup>3</sup>	µg/ m <sup>3</sup>	µg/ m <sup>3</sup>	µg/ m <sup>3</sup>	µg/ m <sup>3</sup>	µg/m <sup>3</sup>	mg/ m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	ng/ m <sup>3</sup>	ng/ m <sup>3</sup>	ng/m <sup>3</sup>
Limit	80	80	100	60	100	1	2	400	5	1	6	20
Location : Adm Building												
Max	16.3	48.6	98.0	58.0	42.6	0.09	0.96	26.00	3.95	0.98	1.96	13.66
Min	5.8	21.2	61.0	28.0	<10.0	<0.02	0.45	<10.0	<2.08	<0.4	<1.0	<4.0
Avg.	9.9	35.2	85.0	45.3	26.6	0.04	0.72	17.56	2.64	0.64	1.34	8.33
Location : Guest House												
Max	14.7	47.3	97.0	57.0	37.4	0.08	0.96	23.40	3.96	0.98	2.03	12.87
Min	4.9	20.2	46.0	17.0	<10.0	<0.02	0.44	<10.0	<2.08	<0.4	<1.0	<4.0
Avg.	8.6	34.5	82.7	44.3	24.6	0.04	0.71	15.49	2.53	0.58	1.31	7.55
Location : Sector II												
Max	16.5	52.6	97.0	59.0	35.5	0.09	0.95	31.2	3.96	0.97	2.36	13.4
Min	4.2	18.5	48.0	21.0	<10.0	<0.02	0.32	<10.0	<2.08	<0.4	<1.0	<4.0
Avg.	8.5	34.7	83.7	43.8	24.2	0.04	0.68	15.6	2.62	0.66	1.36	7.4

*[Handwritten Signature]*

Location : WTP												
<b>Max</b>	17.3	46.5	97.0	58.0	34.2	0.04	0.86	18.6	2.38	0.99	1.7	10.4
<b>Min</b>	4.2	12.2	30.0	12.0	<10.0	<0.02	0.25	<10.0	<2.08	<0.4	<1.0	<4.0
<b>Avg.</b>	5.8	25.0	63.2	34.3	17.1	0.02	0.45	11.7	2.09	0.4	1.0	5.4
<b>Note :</b>	BDL= Below Detections Limit											

*Signature*



## Annexure-III

## Fugitive Emissions

Fugitive Emission (Dec'16-May'17)						
		In between H2U & HDT	Near Indmax	Near CDU	Near Unit No. 6 & 7	Near DCU
Dec-16	Total HC(ppm)/Benz ene(MG/NM3)	11.77/0.272	9.77/0.251	10.45/0.233	12.57/0.364	12.5/0.371
Jan-17	Total HC(ppm)/Benz ene(MG/NM3)	12.35/0.321	9.91/0.249	10.45/0.249	12.57/0.467	12.50/0.323
Feb-17	Total HC(ppm)/Benz ene(MG/NM3)	11.95/0.286	11.57/0.363	14.75/0.410	11.94/0.312	12.24/0.319
Mar-17	Total HC(ppm)/Benz ene(MG/NM3)	17.06/0.355	16.38/0.364	15.69/0.505	13.06/0.292	14.52/0.324
Apr-17	Total HC(ppm)/Benz ene(MG/NM3)	16.00/0.379	13.94/0.385	14.76/0.329	14.28/0.407	11.89/0.314
May-17	Total HC(ppm)/Benz ene(MG/NM3)	10.70/0.233	11.42/0.312	17.75/0.475	14.16/0.370	10.0/0.306

*Ref: ...*

Annexure-IV

Data on Discharged Effluent Analysis at Guwahati Refinery

Dec'16-May'17

<u>PARAMETER</u>	<u>LIMIT (mg/m3 except PH)</u>	<u>AVERAGE</u>
pH	6.0 - 8.5	7.2
Oil & Grease	5.0	3.4
BOD	15.0	9
COD	125.0	76
TSS	20.0	14
Phenols	0.35	0.28
Sulphides	0.5	0.02
CN	0.20	0.011
Ammonia as N	15.0	5.63
TKN	40.0	10.8
P	3.0	0.05
Cr (Hexavalent)	0.1	0.01
Cr (Total)	2.0	0.01
Pb	0.1	0.01
Hg	0.01	0.001
Zn	5.0	0.09
Ni	1.0	0.02
Cu	1.0	0.02
V	0.2	0.2

*[Handwritten signature]*



Benzene	0.1	0.005
Benzo (a) -Pyrene	0.2	0.0001

*Prof. ...*

Annexure – V

NOISE LEVEL MONITORING

BATTERY AREA

NOISE LEVEL MONITORING

BATTERY AREA

GUWAHATI REFINERY (Dec'16-May'17)

SL. NO.	AREA	LOCATION	AVERAGE EXPOSURE FOR AN EMPLOYEE PER SHIFT (HRS)	READING IN dBA
1	TPS	Boiler - 3	1.30 hrs	OFF
		Boiler - 4	1.30 hrs	85.0
		Boiler - 5	1.30 hrs	92.0
		Boiler - 6	1.30 hrs	91.0
		Boiler - 7	1.30 hrs	88.0
		Boiler Control Room	8.0 hrs	67.0
		TG - 3	1.30 hrs	OFF
		TG - 4	1.30 hrs	98.0
		TG - 5	1.30 hrs	92.0
		Turbine Control Room	8.0 hrs	65.0
		DM Plant Pump Area	1.30 hrs	94.0
		DM Plant Control Room	8.0 hrs	66.0

*P. S. Saha*



2	CDU	Model Pump House	1.30 hrs	95.0
		Cold Pump House	1.30 hrs	94.0
		Hot Pump House	1.30 hrs	95.0
		NSF Area	1.30 hrs	94.0
		CDU Field Control Room	8.0 hrs	66.0
3	DCU	Cold Pump House	1.30 hrs	94.0
		Hot Pump House	1.30 hrs	96.0
		Air Compressor Area	1.30 hrs	93.0
		DCU Field Control Room	8.0 hrs	67.0
4	NITROGEN	Air Compressor 013-K-01A	1.00 hr	97.0
		Air Compressor 013-K-01B	1.00 hr	98.0
		Air Compressor 013-K-01C	1.00 hr	98.0
5	INDMAX	Main Air Blower Area	1.00 hr	94.0

*P. J. ...*

		INDMAX Field Control Room	8.0 hrs	67.0
6	SRU	Main Air Blower 51A-K-01A	1.30 hrs	96.0
		Main Air Blower 51A-K-01B	1.30 hrs	OFF
		SRU Field Control Room	8.0 hrs	64.0
7	HDT	Pump Area	1.00 hr	90.0
		HDT/HGU Field Control Room	8.0 hrs	65.0
8	HGU	Pump Area	1.00 hr	93.0
		HDT/HGU Field Control Room	8.0 hrs	65.0
9	MSQU	Pump Area	1.00 hr	92.0
		MSQU Field Control Room	8.0 hrs	64.0
10	ETP	Air Blower Area	1.00 hr	97.0
		ETP Control Room	8.0 hrs	68.0

*Signature*



Permissible Noise Level For Continuous Exposure ( OISD-GDN-166, JULY 1997,)

DURATION PER DAY (HOURS)	SOUND LEVEL (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
1/2	110
1/4 or less	115

\*Boiler-4 in TPS was put off from Dec'16-Mar'17

\*Boiler-5 in TPS was under maintenance in Dec'16 and was put off in Apr'17.

\*Air Compressor 013-K-01A in Nitrogen plant was running from Jan'17-Mar'17

\*Air Compressor 013-K-01B in Nitrogen plant is running from Apr'17

\*Air Compressor 013-K-01C in Nitrogen plant was put off from Jan'17

*Refund*

Annexure-VI

Oily Sludge Details (Dec'16-May'17)

Refinery	Oily Sludge												
	GR	Opening Stock as on 01.12.16 (MT)	Generation (MT)			Total Stock (MT)	Treatment for Oil Recovery / Processing Qty. (MT)					Methodology **	
			ETP sludge	Tank bottom sludge	Any others		ETP sludge	Tank bottom sludge	Processing in DCU	ETP sludge	Tank bottom sludge		
Guwahati	Dec'16 – May'17	8	630	380	0	1018	0	380	586	Bioremediation	Steaming and processed as slop in DCU after dewatering	52	

Residual Oily Sludge						
Opening Stock as on 01.12.16 (MT)	Generation	Disposal			Closing Stock as on 31.05.17 (MT)	
	Qty. (MT)	Qty. (MT)	Methodology ***	% oil content in residual sludge		
348	595	0	Bioremediation	<10	943	

- Confine Bio-remediation was successfully completed with 123 m3 of oily sludge in April 2016. Second batch of confine bio-remediation with 220 m3 of oily sludge is in progress

*Signature*



Annexure VII

SO2 Emission In Guwahati Refinery

Unit	Stack	Feb'17
		SO <sub>2</sub> (kg/hr)
TPS	Unit No. 3&4	16.91
TPS	Unit No. 5	29.48
TPS	Unit No. 6	62.36
SRU	Stack	1.35
HDT	Furnace	0.19
CDU	Furnace	8.38
DCU	Furnace	25.33
H <sub>2</sub> U	Stack	0.61
MSQU	Furnace	0.06
INDMAX	Stack	3.48
<b>Total (kg/hr)</b>		<b>148.15</b>
<b>Total (TPD)</b>		<b>3.56</b>

- TPS Unit 3&4 have been put off since February,2017

Unit	Stack	March'17
		SO <sub>2</sub> (kg/hr)
TPS	Unit No. 6 &7	6.98
HDT	Furnace	0.13
CDU	Furnace	8.80
DCU	Furnace	21.76
H <sub>2</sub> U	Stack	1.28
MSQU	Furnace	0.06
SRU	Stack	1.64
<b>Total (kg/hr)</b>		<b>40.65</b>
<b>Total (TPD)</b>		<b>0.98</b>

- TPS Unit 5 and INDMAX were under shutdown in March, 2017.

*Refinery*

Unit	Stack	April'17
		SO <sub>2</sub> (kg/hr)
TPS	Unit No. 5	31.71
TPS	Unit No. 6 &7	67.33
HDT	Furnace	0.32
CDU	Furnace	9.38
DCU	Furnace	22.05
H <sub>2</sub> U	Stack	1.72
MSQU	Furnace	0.06
SRU	Stack	1.26
INDMAX	Stack	1.28
<b>Total (kg/hr)</b>		<b>135.11</b>
<b>Total (TPD)</b>		<b>3.24</b>

Unit	Stack	May'17
		SO <sub>2</sub> (kg/hr)
TPS	Unit No. 5	18.08
TPS	Unit No. 6 &7	38.79
HDT	Furnace	0.16
CDU	Furnace	5.46
DCU	Furnace	30.87
H <sub>2</sub> U	Stack	0.97
MSQU	Furnace	0.05
SRU	Stack	0.52
INDMAX	Stack	0.65
<b>Total (kg/hr)</b>		<b>95.54</b>
<b>Total (TPD)</b>		<b>2.29</b>

*P. Infante*



Sulfur Balance: May'17				
INPUT/OUTPUT	May'17		PPM of S	MT of S
	Qty, TMT	% WT		
<b>A. INPUT</b>				
Assam Crude intake	66	60.9	2700	178.2
Imported Crude Intake	21	19.4	2850	59.9
Mktg. MS ex BGR	8	7.0	50	0.4
Reformate_JR blended in MS	6	5.4	25	0.1
SKO	8	7.4	600	4.8
<b>Total Intake</b>	<b>108</b>	<b>100.0</b>		<b>243.4</b>
<b>B. OUTPUT</b>				
1. Finished products :				
LPG	4.26	4.11	80	0.3
SRN	2.36	2.27	50	0.1
MRN	0.36	0.35	1250	0.5
MS BS-IV	21.46	20.68	50	1.1
<b>Total light distillate</b>	<b>28.44</b>	<b>27.41</b>		<b>2.0</b>
ATF	4.53	4.37	150	0.7
SKO	7.98	7.69	500	4.0
HSD-BS-IV	56.91	54.85	50	2.8
LDO	-0.04	-0.04	2000	-0.1
<b>Total middle distillate</b>	<b>69.38</b>	<b>66.87</b>		<b>7.4</b>
CLO	0.48	0.46	7500	3.6
RPC	5.41	5.21	12500	67.6
<b>Total heavy ends</b>	<b>5.94</b>	<b>5.72</b>		<b>71.2</b>
<b>Total Sulfur in products</b>		<b>0.00</b>		<b>80.6</b>
Elemental Sulphur ex. SRU	0.05	0.05		52.1
<b>Total Finished products</b>	<b>103.76</b>	<b>100.00</b>		<b>132.8</b>
2. ISD :	-3.78	-94.02	618	-2.3
3. Own fuel :				
Oil	4.37	108.70	4300	18.8
Gas	3.30	82.02	100	0.3
<b>Total fuel</b>	<b>7.67</b>	<b>190.72</b>		<b>19.1</b>
4. Loss :				
Acid Flare	0.06	1.53	941176	57.9
SO2 Emission	0.07	1.77	500000	35.5
<b>Total loss</b>	<b>0.13</b>	<b>3.30</b>		<b>93.5</b>
<b>Total ISD and Fuel and Loss</b>	<b>4.02</b>	<b>100.00</b>		<b>110.3</b>
<b>Grand total</b>	<b>108</b>	<b>100.0</b>		
<b>Error % in Sulfur balance</b>		<b>0.16</b>		

INPUT	Sulfur in Crude	238.1 MT
	Sulfur in Reformate/Mktg. MS/S KO	5.3 MT
	<b>Total Input Sulfur</b>	<b>243.4 MT</b>

OUTPUT	Sulfur in products	80.6 MT
	Elemental Sulfur ex. SRU	52.1 MT
	Sulfur added by ISD	-2.3 MT
	Sulfur loss in FG/FO	19.1 MT
	Sulfur Loss in Acid Flare/SO2 Emission	93.5 MT
	<b>Total Output Sulfur</b>	<b>243.0 MT</b>

*P. W. J. J.*