



IndianOil

इंडियन ऑयल कॉर्पोरेशन लिमिटेड  
(असम ऑयल डिवीजन) तकनीकी सेवाएं विभाग  
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**Indian Oil Corporation Limited**

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**Ref. No:HSE :193-714/15**

11<sup>th</sup> December, 2015

To  
**The Joint Director (S)**  
Ministry of Environment & Forests,  
North East Regional Office,  
Lumbatngen, Law-U-Sib,  
Shillong - 793021

Dear Sir .

**Sub.: Submission of the Half-Yearly Compliance Report on Environmental Stipulations  
pertaining to Projects at Digboi Refinery including Digboi Marketing Terminal Project**

**Ref :** Environmental Clearance No. J-11011/12/87-1A, dated – 19-10-1987  
Environmental Clearance No. J-13011/3/1987-1A dated -18-06-1987  
Environmental Clearance No. J-11011/8/89-1A dated 26-07-1989  
Environmental Clearance No. J-11011/41/97-1A.II(I) dated -05-3-1998  
Environmental Clearance No. J-11013/71/99-1A(II) dated -13-05-1999  
Environmental Clearance No. J-11011/482/2007-IA II (I), dated – 18-03-2008  
Environmental Clearance No. J-11011/ 496/2007-IAII(I), Dated – 20-03-2009

Please find herewith the compliance status on Environmental Clearance Stipulations of the Environmental Clearance letters referred to above as on **1<sup>st</sup> December, 2015**.

Thanking you.

Yours sincerely,

  
(J. Borgohain)  
Deputy General Manager(HS&E)  
Digboi Refinery  
For General Manager

CC: The Member Secretary, Pollution Control Board, Assam, Guwahati.  
: The Environmental Engineer, North Eastern Zonal Office, CPCB, Shillong

**ENVIRONMENTAL CLEARANCE (J-11011/12/87-1A, dated – 19-10-1987) FOR DIGBOI  
REFINERY MODERNISATION PROJECT  
(STATUS AS ON 1<sup>st</sup> December, 2015)**

SL. NO	STIPULATIONS	STATUS
1.0	The concentration levels of all the parameters of the effluent (gaseous & liquids) discharged must comply with MINAS and in the light of MINAS, the Assam oil, Digboi must review the entire effluent generation, routing, treatment and disposal system.	<p>The concentration levels of all the parameters of effluent after treatment at ETP meets MINAS specification. Digboi Refinery had also carried out a study by a competent consultant for further Upgradation of ETP. Based on this study the following new facilities have been added in Phase-I:</p> <ul style="list-style-type: none"> <li>• TPI separator installed and commissioned in Feb, 2005.</li> <li>• Six nos. Dual Media Filters installed &amp; commissioned in October'2005.</li> <li>• Dissolved Air Flotation system installed and commissioned on 30-05-09.</li> </ul> <p>As per revised CPCB guideline, Digboi Refinery meets the stipulations for all 21 parameters of effluent. Study on up gradation of ETP Operation of Digboi Refinery has been carried out by M/s National Environmental Engineering Research Institute, Nagpur from January 2014-October 2014. Implementation of NERI recommendations are being completed in phase wise.</p>
2.0	Monitoring with respect to physical, chemical and biological parameters must be carried out for effluent discharged as well as for the samples of river waters where effluents are discharged.	These tests are carried out regularly and reports submitted to Pollution Control Board, Assam. Monitoring of receiving water bodies is also carried out every month, report submitted to Pollution Control Board, Assam. Reports are also submitted to MoEF once in Six month.(Anneure-1)
3.0	The sludge drains must be properly covered to avoid land and water pollution during incessant rains.	All OWS systems at DRMP are completely covered.
4.0	The sludge dumping area should be made impervious so that ground water is not affected due to leaching and seepage of associated water containing pollutants.	<p>All accumulated acid sludge recovered, treated through bioremediation. This exercise has been completed in July '08. Generation of fresh acid sludge stopped since 2002. Recovered area is being developed as a green belt. One HDPE lining concrete oily sludge storage tank of 400m<sup>3</sup> capacity was constructed in 2014 to prevent leaching and seepage of oil to ground water.</p> <p>Oily sludge is being treated at oily sludge treatment facility to recover oil and the residual sludge are bio-remediated. About 10000 m<sup>3</sup> treated in 2006-07, 14000 m<sup>3</sup> in 2007-08 &amp; 2008-09 and 10000 m<sup>3</sup> in 2011-12. Treatment of another 10,000m<sup>3</sup> of oily sludge started under Phase-IV from July, 2013 and 7362 m<sup>3</sup> is treated till October 2014. Approximate 1,000m<sup>3</sup> of Residual Oily sludge and 1500 m<sup>3</sup> of Acidic Sludge have been Bio-remediated by M/S TERI. Another 1000m<sup>3</sup> of oily sludge is under the process of Bio remediation at ETP.</p> <p>Secured land fill (SLF) at ETP was commissioned in March 2007 for Bio remediation of Oily Sludge / Residual Sludge.</p>

SL. NO	STIPULATIONS	STATUS
5.0	The ambient air around Refinery should be monitored at least at four monitoring stations for SPM, SO <sub>x</sub> , NO <sub>x</sub> , Hydrocarbons and H <sub>2</sub> S.	Four nos. of Ambient Air quality monitoring stations have been installed around Digboi Refinery. Ambient air quality monitoring is being carried out on regular basis and reports submitted to Pollution Control Board, Assam. One no. of Continuous Ambient Air Quality Monitoring Station installed and commissioned in September 2012 and is in service. In addition to these a CPCB approved agency has been working on measuring Ambient Air quality around Refinery.
6.0	The stack emission from processes, power generating units and Boilers must be regularly monitored and proper type of stack monitoring/instruments must be procured and installed.	Monitoring of stack emissions is carried out with the help of portable monitoring kit. Fixed on-line monitors are also installed in AVU, DCU, CPP, CRU,SDU, HDT, HGU and MSQU. Apart from own monitoring, external agencies are also employed to conduct stack emission analysis on regular basis.
7.0	Fugitive emissions arising during handling and storage of low boiling petroleum fractions and from effluent treatment plant, leakage through valves and flanges must also be monitored regularly.	Regular monitoring of Hydrocarbons is done with GMI Gas surveyor and as well as with VOC detector in plant & offsite areas by an external CPCB approved agency.
8.0	Land filling, if any, must be done with fill material only from within battery limits of the Refinery.	Complied with.
9.0	The Assam Oil Division must take up development of green belt as proposed.	Digboi Refinery is surrounded by the Upper Dehing Reserve Forest on south and south west side, which acts as a natural Green Belt. Green belt developed with regular tree plantation around Refinery premises and township area. A garden of medicinal plants "Pathyabon" was also developed in the township. 'Arboretum' a botanical garden developed at Shillong road area of Digboi. This garden was inaugurated by the Conservator of Forest, Eastern Zone, Assam on 13-05-11. Similarly a fruits garden has been developed on 5 <sup>th</sup> June, 2011 at Shillong Road area of Digboi. Further, reclaimed area at tar pit in the Refinery is being developed as green belt area. Tree plantation is carried out from 1 <sup>st</sup> June to 31 <sup>st</sup> July every year as a part of WED program. Till March, 2015 around 52000 tree were planted in and around Digboi Refinery. During FY 2015-16 1,984 saplings have already planted

**ENVIRONMENTAL CLEARANCE (J-13011/3/1987-1A dated -18-06-1987) FOR  
CAPTIVE POWER PLANT**

(STATUS AS ON 1<sup>st</sup> December, 2015)

SL. NO	STIPULATIONS	STATUS
1.0	Only sweet natural gas will be used as feed stock.	Complied with.
2.0	Under the envisaged modernization programme for the refinery, Sulphur recovery units to be provided to reduce emission of SO <sub>2</sub> . Efforts should also be made to reduce the emissions of NO <sub>x</sub> . The existing sulphuric acid plant should be scrapped.	Digboi Refinery processes only sweet crude having average sulphur content of 0.2%. A Sulphur Recovery Unit (SRU) has been installed and commissioned in 2004 as a part of Hydrotreater Project.  Since the refinery is using natural gas, formation of NO <sub>x</sub> is very low and always remains within the prescribed limit. Further, low NO <sub>x</sub> burners are also fitted in all the new units viz. Solvent Dewaxing Unit, Hydro treater, Delayed Coking Unit and MSQ Unit.
3.0	The liquid effluent emanating from the captive power plant and the existing refinery should be treated as per the standards prescribed by the State Pollution Control Board.	Liquid effluent generated from the power plant is negligible which is also routed to ETP for further treatment.
4.0	The height of the stack should not be less than 50 meters.	Complied.
5.0	Green belt around the power plant should be raised.	Complied.
6.0	Adequate precautionary measures for preventing and controlling fire and explosion hazards should be taken up specially in the gas storage area.	Natural gas used in the plants is transported through pipeline ex M/s OIL India Ltd. There is no storage of natural gas in the Refinery. Fire fighting facilities are provided at CPP, all process plants and tank farm area for controlling fire and explosion hazards.

**ENVIRONMENTAL CLEARANCE (J-11011/8/89-1A dated 26-07-1989) FOR  
CATALYTIC REFORMER UNIT**

**(STATUS AS ON 1<sup>st</sup> December, 2015)**

<b>SL. NO</b>	<b>STIPULATIONS</b>	<b>STATUS</b>
1.0	The project authority must strictly adhere to the stipulations made by State govt. and the State Pollution Control Board.	<p>The stipulations made by the State Govt. and the State Pollution Control Board are strictly followed with regard to effluent and emission norms.</p> <p>Dissolved Air Flotation system at ETP installed and commissioned on 30-05-09.</p> <p>As per revised CPCB guideline, Digboi Refinery meets all parameters of effluent.</p>
2.0	The project authority will not increase the throughput capacity of the refinery from the existing level.	Complied.
3.0	The project authority must submit a rapid EIA report within a month and a comprehensive EIA report within 15 months to the Ministry for review.	Complied.
4.0	Gaseous emissions of SO <sub>2</sub> , Hydrocarbons and oxides of Nitrogen should not exceed the prescribed standard stipulated by Central/State Pollution Control Board. At no time the emission level should be beyond the stipulated standard. In the event of failure of any pollution control system adopted by the unit, the respective unit should be put out of operation immediately and should not be restarted until the control systems are rectified to achieve the desired efficiency.	Complied.
5.0	The project authority must explore the possibility of maximum recycling of effluent either as a process water or for afforestation.	Treated effluent from ETP is recycled to refinery as Fire water tank make up, cleaning and gardening purposes at ETP. Treated effluent is re used as make up for coke cutting water at delayed coking unit since August'11. Scheme for re use of Treated Effluent for its further increase through use as Make up at Wax Sector Cooling Tower is commissioned on 28-03-2014. Efforts are on for further increase of re use of Treated Effluent from ETP through implementation of different schemes..

SL. NO	STIPULATIONS	STATUS
6.0	<p>The entire quantity of liquid effluent coming out of the complex should strictly conform to MINAS both in terms of quantity and quality before discharge in to the drainage system. The process plant effluent should be discharged through pipeline/closed channel.</p>	<p>Effluent is meeting MINAS specification both in quality and quantity. The process plant effluent is discharged through pipeline/closed OWS channels.</p> <p>Six monthly compliance Report on Quantum Limit in Kg/1000 MT Crude processed is attached in Annexure -2</p>
7.0	<p>The project authorities must set up minimum of four air quality monitoring stations at different location of the plant and in the nearby areas. The air quality will be monitored as per standard procedure. The monitoring of gaseous emissions should also include oxides of nitrogen and hydrocarbons. All the stacks of the plant must be provided with continuous automatic air quality monitoring equipment and stacks emission levels must be recorded. Reports should be submitted to Pollution Control Board once in three months and to this Ministry once in six months.</p>	<p>Four nos. of air quality monitoring stations have been installed around Digboi Refinery. Ambient air quality monitoring is being carried out on regular basis and reports submitted to Pollution Control Board, Assam.</p> <p>One no. of Continuous Ambient Air Quality Monitoring Station, installed and commissioned in September 2012.</p> <p>Monitoring of stack emissions is carried out with the help of portable monitoring kit. Fixed on-line monitors are also installed in AVU, DCU, CPP, CRU and in the new units SDU, HDT and MSQU. Apart from own monitoring, external agencies are also employed to conduct stack emission analysis on regular basis.</p> <p>Six monthly Sox &amp; NOx emission attached in Annexure-3 Ambient Air Quality attached in Annexure-4</p>
8.0	<p>The liquid effluent quality must be ensured on daily basis. At least five water quality monitoring stations must be set up in consultation with the State Pollution Control Board. This should include the monitoring of oil content in the river. If the effluent quality exceeds the standard prescribed at any time, the corresponding units of the plant which are contributing to the excessive pollutant load shall be immediately stopped from operation till the quality of effluent discharged from the units are brought down to the required level.</p>	<p>Liquid effluent quality from ETP outlet is monitored regularly on daily basis. Quality of Treated Effluent is also regular tested by CPCB approved outside agency. In addition to this, test of sample from receiving water bodies has been carrying out regularly.</p>
9.0	<p>The project authority must monitor the aquatic life(like fish, tortoise etc.) and report should be submitted to the Ministry once in six months.</p>	<p>Study on aquatic life was covered in the EIA. Apart from this monitoring of aquatic life in receiving water bodies were also carried out through Guwahati University and report submitted to CPCB &amp; MOEF. Study on aquatic life has been carried out in 2007 by M/s KLG-ESS.</p>
10.	<p>The project must start construction only after the approval of the Chief Controller of Explosives and a copy of the consent letter should be made available to this Ministry.</p>	<p>Complied.</p>

SL. NO	STIPULATIONS	STATUS
11.	The project authority must provide oil separator in the nullah and the effluents should be discharged through covered drains.	Complied.
12.	No change of stack should be made without the prior approval of the State Pollution Control Board. Alternate pollution control system and/or proper design (steam injection system) of the stacks should be made to minimize hydrocarbon emission due to failure in the flare system in the plant.	Complied.
13.	The project authority must submit the Disaster Management Plan incorporating worst accident scenario and its probable consequence duly approved by the nodal agency of the State Govt. within 3 months.	Disaster Management Plan duly approved by DC, Tinsukia. Copy of the plan submitted to CIF, Guwahati. Offsite drills are carried out regularly, once in a year, along with District Administration, Mutual Aid Partners & NGOs. Onsite Disaster Mock drills are carried out once in a quarter with different scenarios. Emergency response & Disaster Management Plan (ERDMP) of Digboi refinery as per guidelines of PNGRB has been drawn up and certified by DMI, Bhopal.
14.	The Project authority must ensure that the effluent plant fully operational within the next 3 months.	ETP is fully operational since its inception in 1989.
15.	The project authority must set up laboratory facilities in the existing premises for testing and analyzing gaseous emissions and water quality.	Already exists.
16.	The project authority must provide necessary infrastructural facilities to the construction workers during construction.	Provided as per requirement.
17.	The project must submit a revised green belt design for the plant and township to this Ministry within three months for approval. The green belt should have minimum tree density of 1000 trees per acres.	Complied.
18.	Additional area under the control of project which is not being used for the plant utilities should be afforested and fund for this should be suitably provided.	Complied.
19.	A separate environmental management cell with suitably qualified people to carry out various functions related to environmental management should be set up under the control of a senior technical person who will directly report to the head of the organization.	Environmental cell headed by General Manager (Health, Safety & Environment) with DGM (HS&E) and qualified officers already exists and is functioning.
20.	Adequate fund provision (capital and recurring expenditure) so provided for environmental control measure should not be diverted to any other purpose. The implementation schedule for environmental measure must be strictly adhered to.	Complied.

**ENVIRONMENTAL CLEARANCE (J-11011/41/97-1A.II(I) dated -05-3-1998)**  
**FOR SOLVENT DEWAXING UNIT**

**(STATUS AS ON 1<sup>st</sup> December, 2015)**

<b>SL. NO</b>	<b>STIPULATIONS</b>	<b>STATUS</b>
1.0	The project authority should submit a Risk Analysis Report within a period of six months and submit the same to the Ministry.	Risk analysis has been carried out by M/s KLG-TNO in 1999 covering all the new units and report submitted to Ministry. A fresh round of Quantitative Risk Analysis (QRA) was carried out by M/s Alfa Project Services Pvt. Ltd, Vadodara in 2005. All the recommendations have already been implemented. Another Quantitative Risk Analysis study for all the units, including MSQU, completed in March, 2012 and various recommendations for further risk reduction are under study for implementation. A fresh Quantitative Risk Assessment for Wax Palletisation Unit completed on August 2013 by ZEEPINE SYSTEM INDIA Pvt. Ltd

**ENVIRONMENTAL CLEARANCE (J-11013/71/99-1A(II) dated -13-05-1999)**  
**FOR HYDROTREATER UNIT**

**(STATUS AS ON 1<sup>st</sup> December, 2015)**

<b>SL. NO</b>	<b>STIPULATIONS</b>	<b>STATUS</b>
1.0	The Company must take all other Central/State Govt. approvals as required under the law, including NOC etc. from State Pollution Control Board.	Complied



**ENVIRONMENTAL CLEARANCE (J-11011/482/2007-IA II (I), DATED – 18-03-2008) FOR M S  
QUALITY IMPROVEMENT PROJECT AT DIGBOI REFINERY.**

**(STATUS AS ON 1<sup>st</sup> December, 2015)**

SN	Stipulations	Status
1	The company shall comply with new standards/norms that are being proposed by the CPCB for petrochemical plants and refineries.	Being complied.
2	The process emissions (SO <sub>2</sub> , NO <sub>x</sub> , HC, VOCs and Benzene) from various units shall conform to the standards prescribed by the Assam State Pollution Control Board from time to time. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.	Emission standards meets the norms as prescribed by PCBA and the readings are communicated to Assam State Pollution Control Board on monthly basis. The emission standards are within prescribed limit.
3	Ambient air quality monitoring stations. [SPM, SO <sub>2</sub> , NO <sub>x</sub> and NMHC, Benzene] shall be set up in the Refinery complex in consultation with SPCB 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 Continuous on-line stack monitoring equipment should be installed for measurement of SO <sub>2</sub> and NO <sub>x</sub> .	<p>Four nos of Ambient Air Quality monitoring stations are already in operation in the Refinery premises as per direction of Pollution Control Board, Assam.</p> <p>Continuous Ambient Air Quality Monitoring Station procured, installed and commissioned on 01.09.2012 and is in operation.</p> <p>On line stack monitoring equipment already installed in AVU, CRU, DCU, HDT, HGU, SDU and also at the stacks of the Captive Power Plant (CPP) of Digboi Refinery for monitoring stack emissions</p>
4	Quarterly monitoring of fugitive emissions shall be carried out as per the guidelines of CPCB by fugitive emission detectors and reports shall be submitted to the Ministry's regional office at Shillong. For control of fugitive emission all unsaturated hydro carbon will be routed to the flare system and the flare system shall be designed for smoke less burning.	Quarterly monitoring of fugitive emission is being carried out regularly and II quarterly monitoring was carried out during September, October & November 2015. Next quarterly survey is in progress. Average emission of Quarter- I & Quarter- II annexed as Annexure-5

SN	Stipulations	Status
5	Fugitive emissions of HC from product storage tank yards etc must be regularly monitored. Sensors for detecting HC leakage shall also be provided at strategic locations. The company shall use low sulphur fuel to minimize S02 emission.	<p>Quarterly monitoring of fugitive emission is being carried out and last done in November 2015. Next quarterly survey is in progress.</p> <p>HC detectors are already provided at the strategic locations at plants and tank farm areas. HC detectors are maintained by the vendors on quarterly basis. HC detector also provided at MS Quality up gradation unit.</p> <p>Digboi Refinery is using sweet natural gas which contains sulphur level below 2 ppm.</p>
6	The company shall strictly follow all the recommendation mentioned In the charter on corporate responsibility for environmental protection (CREP).	Being followed strictly.
7	The Company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed. At place of ground flaring. the overhead flaring stack with knockout drums shall be installed to minimize gaseous emissions during flaring.	<p>Modern fire fighting system and hydrant network system has been provided and it meets OISD – 116 standard. Fire fighting facility at MSQ project is as per OISD-116. Remote HVLR System has been commissioned in October 2013. Installation of Rim Seal Fire Protection System of Fire Water network commissioned for Tank nos. 001, 607 &amp; 560 and up gradation job is completed for tank no.452.</p> <p>At Digboi Refinery, flaring is done at the height of 108 mtrs through flare stack. Knockout drums are provided in the flare system.</p>
8.	To prevent fire and explosion at oil & gas facility, potential ignition should be kept to a minimum and adequate separation distance between potential ignition sources and flammable materials shall be in place.	Separation distance between potential ignition sources and flammable materials are maintained as per OISD – STD-118.
9.	Occupational Health surveillance of worker shall be done on a regular basis and records maintained as per the Factory Act.	Occupational Health surveillance for employees is being carried out as per Factory Act and records maintained at Occupational Health Centre of AOD hospital.
10.	Green belt shall be developed to mitigate the effect of fugitive emission all around the plant in a minimum 30 % plant area in consultation with DFO and as per CPCB guidelines.	Already 51,388 nos. of tree saplings have been planted in and around Digboi from 2002 to 2015. During FY 2015-16 1,984 saplings have already planted.

**ENVIRONMENTAL CLEARANCE (J-11011/ 496/2007-IAII(I), Dated – 20-03-2009) FOR NEW PRODUCT DISPATCH TERMINAL AT DIGBOI REFINERY IN DISTRICT TINSUKIA IN ASSAM.**

**(STATUS AS ON 1<sup>st</sup> December, 2015)**

**Site construction activities of New Product Dispatch Terminal at Digboi Refinery have not yet fully started. However, all EC points will be complied at the time of construction and operation thereof.**

SL NO.	STPULATIONS	STATUS
i.	The company shall take adequate measures for control of fugitive emissions in the work zone environment and raw material storage area and emissions shall be regularly mentioned for all relevant parameters including HC and VOC shall be e-mailed to the RO of the Ministry / CPCB/ State Pollution Control Board. Further the date should be displayed on the gate of the refinery and important public places through sign boards.	New Dispatch Terminal at Digboi is still under construction and adequate measures for control of fugitives emissions will be taken as stipulated. Reporting of all relevant parameters including HC and VOC to statutory bodies and display on the gate of the terminal & important public places will be complied during regular operation of the terminal
ii.	Continuous Hydrocarbon Monitoring system (HC Detector) and alarms shall be installed at various risk prone location.	HC detectors & annunciation system shall be installed under Tank Automation System covering all risk prone areas.
iii.	The project authorities shall strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous chemicals Rules. 1989 as amended in 2000 for handling of hazardous chemicals. Necessary approval from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. shall be obtained. Requisite On-site and Off-site Disaster Management Plan shall be prepared and implemented. Regular mock drill shall be carried out for both On-site and Off-site plans. All necessary safety precautions shall be undertaken to prevent any accident.	Terminal Project under construction & shall strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous chemicals Rules. 1989 as amended in 2000 for handling of hazardous chemicals. Necessary approval from Chief Controller of explosives and Fire Safety Directorate (OISD) will be obtained prior to commissioning of the terminal. Implementation of On site and off site Disaster Management Plan, Regular Mock Drills for both on site and off site will be complied after commissioning as per existing practice adapted for operational terminals.
iv.	The internal floating roof tank shall be provided with double seals with minimum vapour recovery of 96%. Material of seal and construction shall ensure high performance and durability. Inspection and maintenance of storage tanks shall be carried out under strict control. For the inspection, APIRP 575 may be adopted. In service inspection with regard to seal gap shall be carried out once in every six months repair of both seals will be examined.	Aluminum internal floating roof tanks have been considered for 3 Nos. MS Tanks with double seals with minimum vapor recovery of 96%. and shall be constructed as per API Standard 650 Appendix H Section H.2.2.c. Inspection & maintenance of storage tanks shall be taken up after commissioning of tanks as per stipulated guidelines

SL NO.	STPULATIONS	STATUS
v.	The design, inspection, testing and safety aspects of operation and maintenance of terminal shall be governed by OISD – 118 guidelines.	Terminal under construction complying to stipulated OISD – 118/244 guidelines
vi.	The fire water facilities at the terminals must be designed as per OISD – 117 guidelines. However, for fighting prolonged fires, the company shall firm up a plan for assured water supply from near by ground water source / surface water source. This must be complied before commissioning the project.	FW facilities at terminal under construction complying OISD – 117 guidelines. Bore tube wells and surface water for fire water have been considered for fire water requirement
vii.	The solid waste generated shall be disposed off in the secured landfill site within the Digboi premises. The ground water quality around the secured landfill site shall be monitored regularly and data submitted to the Ministry / CPCB/SPCB.	Shall be complied after commissioning and regular operation of the terminal .

## ANNEXURE-1

### COMPLIANCE OF EFFLUENT STANDARDS (Quantum based)

(Figs. in Kg/1000 Ton Crude processed)

(April'15 - September'15)

<u>PARAMETER</u>	<u>LIMIT</u>	April	May	June	July	August	September	AVERAGE
pH	6.0 - 8.5							
Oil & Grease	5.0	1.60	2.07	1.43	0.404	0.248	0.273	1.004
BOD	15.0	3.85	4.85	3.56	0.914	0.585	0.648	2.401
COD	125.0	37.74	47.49	32.15	9.174	5.713	6.457	23.120
TSS	20.0	6.48	8.23	5.64	1.500	0.933	1.058	3.973
Phenols	0.35	0.090	0.105	0.06	0.018	0.013	0.013	0.050
Sulphides	0.5	0.008	0.010	0.007	0.002	0.001	0.002	0.005
CN	0.20	0.005	0.007	0.005	0.001	0.001	0.001	0.004
Ammonia as N	15.0	1.46	3.09	2.17	0.768	0.429	0.531	1.408
TKN	40.0	3.02	4.18	0.69	0.803	0.450	0.562	1.616
P	3.0	0.03	0.04	0.06	0.005	0.004	0.004	0.023
Cr (Hexavalent)	0.1	0.00	0.00	0.00	0.000	0.000	0.000	0
Cr (Total)	2.0	0.09	0.00	0.00	0.000	0.000	0.000	0.015
Pb	0.1	0.02	0.00	0.00	0.000	0.000	0.000	0.004
Hg	0.01	0.00	0.00	0.00	0.000	0.000	0.000	0
Zn	5.0	0.01	0.19	0.17	0.028	0.013	0.016	0.071
Ni	1.0	0.10	0.10	0.11	0.020	0.004	0.009	0.057
Cu	1.0	0.05	0.10	0.13	0.023	0.009	0.014	0.052
V	0.2	0.02	0.02	0.01	0.003	0.008	0.013	0.011
Benzene	0.1	ND	ND	ND	ND	ND	ND	ND
Benzo (a) - Pyrene	0.2	ND	ND	ND	ND	ND	ND	ND

NB:- ND ; Not Done

## Annexure-2

<b>Effluent Parameters Test Report</b>							
<b>From April to September,2015</b>							
<b>Parameters</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Augt</b>	<b>Sept.</b>	<b>Average</b>
PH	7.15	7.14	7.048	7.085	7.063	7.056	7.090
O & G	4.63	4.55	4.34	4.63	4.53	4.42	4.517
BOD	11.09	10.68	10.81	10.47	10.66	10.5	10.702
COD	108.83	104.48	97.6	105.15	104.08	104.56	104.117
Phenol	0.26	0.23	0.19	0.21	0.24	0.21	0.223
Sulphide	0.023	0.02	0.02	0.027	0.027	0.027	0.024
TSS	18.69	18.1	17.12	17.19	17	17.14	17.540
Cyanide	0.013	0.016	0.016	0.014	0.015	0.014	0.015
NH <sub>3</sub> as N	4.2	6.8	6.6	8.8	7.8	8.6	7.133
TKN	8.7	9.2	8.2	9.2	8.2	9.1	8.767
P	0.08	0.08	0.18	0.06	0.08	0.07	0.092
Cr <sup>+6</sup>	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cr(Total)	0.26	BDL	BDL	BDL	BDL	BDL	0.260
Pb	0.06	BDL	BDL	BDL	BDL	BDL	0.060
Hg	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Zn	0.34	0.42	0.51	0.32	0.23	0.26	0.347
Ni	0.28	0.23	0.32	0.23	0.08	0.14	0.213
Cu	0.14	0.21	0.38	0.26	0.16	0.22	0.228
V	0.05	0.04	0.02	0.04	0.14	0.21	0.083
C <sub>6</sub> H <sub>6</sub>	ND	ND	ND	ND	ND	ND	
alfa C <sub>6</sub> H <sub>6</sub>	ND	ND	ND	ND	ND	ND	
TDS	292.61	288.77	369	303	275.76	293.38	303.753

ANNEXURE - 3

Month	Flue Gas Velocity m/3/H	Stack Emission Data - NOx - 2015-16																		Total kg/hr
		CDU		VDU		DCU		SDU		CRU-HDT		CRU-OBSG		HDT		HGU		Avg kg/hr		
		Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr			
April	6421	40.24	0.26	40.03	0.26	31.25	0.20	0.93	0.01	27.07	0.17	29.50	0.19	17.50	0.11	30.01	0.19	0.174	1.217	
May	14664	40.33	0.59	39.97	0.59	12.72	0.19	1.24	0.02	21.83	0.14	36.55	0.54	0.35	0.01	21.83	0.32	0.298	2.243	
June	14460	40.04	0.58	38.38	0.55	74.89	1.08	43.67	0.63	63.43	0.41	72.32	1.05	73.86	1.07	92.50	1.34	0.838	6.300	
July	10476	40.04	0.42	39.83	0.42	120.37	1.26	50.83	0.53	81.96	0.86	95.68	1.00	66.93	0.70	96.79	1.01	0.776	6.206	
Aug	14844	75.56	1.12	83.04	1.23	109.62	1.63	48.83	0.72	74.36	1.10	92.84	1.38	66.92	0.99	83.26	1.24	1.177	9.417	
Sept	13265	75.54	1.00	79.31	1.05	86.08	1.14	51.24	0.68	67.12	0.89	79.44	1.05	70.12	0.93	96.90	1.29	1.004	8.035	
Oct			0.00		0.00		0.00		0.00				0.00		0.00		0.00	0.000	0.000	
Nov			0.00		0.00		0.00		0.00				0.00		0.00		0.00	0.000	0.000	
Dec			0.00		0.00		0.00		0.00				0.00		0.00		0.00	0.000	0.000	
Jan			0.00		0.00		0.00		0.00				0.00		0.00		0.00	0.000	0.000	
Feb			0.00		0.00		0.00		0.00				0.00		0.00		0.00	0.000	0.000	
Mar			0.000		0.000		0.000		0.000				0.000		0.000		0.000	0.000	0.000	
Avg	12355		0.00	26.71	0.55	36.245	0.75	16.395	0.34			33.86	0.70	24.64	0.51	35.11	0.73	3.579	5.077	

Avg Nox emission for 2015-16

Total Nox Load = 44471 Kg/Yr  
 = 44.471 MT/Yr

ANNEXURE - 3

Month	Flue Gas Velocity NM3/Hr	Stack Emission Data - SOx - 2015-16																	
		CDU		VDU		DCU		SDU		CRU-HDT		CRU-OBBSG		HDT		HGU		Avg kg/hr	
		Avg mg / NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr	Avg mg/ NM3	Avg kg/hr		
April	6421	36.68	0.24	36.30	0.23	30.59	0.20	15.48	0.10	29.47	0.19	30.59	0.20	27.49	0.18	31.50	0.20	0.19	1.34
May	14664	36.71	0.54	36.34	0.53	13.82	0.20	39.34	0.58	54.72	0.80	98.89	1.45	17.80	0.26	7.85	0.11	0.53	3.68
June	14460	36.71	0.54	36.24	0.52	10.75	0.16	32.12	0.46		0.00	65.90	0.95	17.97	0.26	24.00	0.43	0.48	3.33
July	10476	36.75	0.38	36.42	0.38	21.38	0.22	30.46	0.32	36.26	0.38	93.34	0.98	20.64	0.22	35.8	0.38	0.41	2.88
August	14844	36.69	0.54	36.38	0.54	71.91	1.07	21.96	0.33	54.72	0.81	98.89	1.47	14.03	0.21	35.70	0.53	0.64	4.68
Sept	13265	36.71	0.63	36.42	0.63	26.29	0.45	30.62	0.53	10.22	0.18	18.27	0.32	26.11	0.45	26.35	0.46	0.50	3.47
Oct			0.00		0.00		0.00		0.00				0.00		0.00			0.00	0.00
Nov			0.00		0.00		0.00		0.00				0.00		0.00			0.00	0.00
Dec			0.00		0.00		0.00		0.00				0.00		0.00			0.00	0.00
Jan			0.00		0.00		0.00		0.00				0.00		0.00			0.00	0.00
Feb			0.00		0.00		0.00		0.00				0.00		0.00			0.00	0.00
Mar			0.000		0.000		0.000		0.000				0.000		0.000			0.00	0.00
Avg	12355	36.708	0.45	36.35	0.45	29.123	0.36	28.33	0.35	30.9	0.38	67.647	0.84	20.673	0.26	26.867	0.33	0.38	3.18

Avg Sox emission (kg/hr) for 2015-16=

Total Sox Load = 27867 kg/Yr  
 = 27.867 MT/Yr



**Six Monthly Monitoring Result of Ambient Air Quality**  
**Period: April 2015 to September 2015**  
**Digboi Refinery**

Sl. No.	Pollutants	Unit	Time Weighted Average	NAAQ Standards	Monthly Average Readings						
					April	May	June	July	August	September	Average
1	SO <sub>2</sub>	µg/m <sup>3</sup>	24 hrs	80	7.67	8.95	14.56	12.18	12.1	11.16	11.10
2	NO <sub>2</sub>	µg/m <sup>3</sup>	24 hrs	80	6.41	11.23	9.15	18.55	18.66	15.79	13.30
3	PM <sub>10</sub>	µg/m <sup>3</sup>	24 hrs	100	58.7	43.1	37.64	42.56	43	40.43	44.24
4	PM <sub>2.5</sub>	µg/m <sup>3</sup>	24 hrs	60	16.91	16.37	15.41	18.99	18.24	15.63	16.93
5	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	8 hrs	100	84.9	4.71	47.85	5.58	4.21	3.64	25.15
6	Lead (Pb)	µg/m <sup>3</sup>	24 hrs	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	CO	mg/m <sup>3</sup>	8 hrs	2	0.75	0.99	1.12	0.54	0.52	0.47	0.73
8	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	24 hrs	400	5.47	5.47	38.34	BDL	BDL	BDL	16.43
9	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	Annual	5	BDL	BDL	BDL	0.64	0.38	0.3	0.44
10	Benzo(α) Pyrene	ng/m <sup>3</sup>	Annual	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Arsenic (As)	ng/m <sup>3</sup>	Annual	6	0.9	BDL	BDL	BDL	BDL	BDL	0.90
12	Nickel (Ni)	ng/m <sup>3</sup>	Annual	20	3.7	BDL	BDL	BDL	BDL	BDL	3.70

**Note:**

Test for all ambient air parameters have done by M/s NETEL India Pvt. Ltd. In April to September, 2015  
 Values are the average of all four stations.

**Fugitive Emission**

Digboi Refinery

VOC Emission	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Yearly Average
LDAR Report Generated Date	9/10/2015	17/12/2015	In progress		
Total VOC Emission  kg/day	507.116	530.879			518.997

NB:-

LDAR Survey done by M/S Envirocon,