इंडियन ऑयल कॉर्पोरेशन लिमिटेड
एओडि - डिगबोई रिफाइनरी
पो.ओ. डिगबोई, पिन-786171, असम

Indian Oil Corporation Limited
AOD - Digboi Refinery
P. O. Digboi, PIN: 786171, Assam
Tel. : 03751-262000
Fax : 03751-269015
E-mail : aoddigboi@indianoil.in
Website : www.iocl.com

असम ऑयल डिवीजन
Assam Oil Division

Ref: HSE: 01 -714/24 **Dated: 18.10.2024**

To,

The Regional Officer,
Integrated Regional Office, Guwahati,
Ministry of Environment, Forest and Climate Change,
4thFloor, Housefed Building, G.S. Road, Rukminigaon,
Guwahati – 781022

Sub: Submission of the Half-Yearly Compliance Report for the period (1st Apr'24 to 30th Sep'24) on Environmental Stipulations pertaining to various units of Digboi Refinery.

Dear Sir,

Please find enclosed herewith the six monthly compliance status of Digboi Refinery on the Environmental Clearance Stipulations of the Environmental Clearance letters referred to above for the period **(April 2024-September 2024)**.

Thanking you,

Yours sincerely,
For Indian Oil Corporation (AOD)

D. K. Barua
General Manager (TS & HSE)

डी.के. बरुवा / D.K. BARUA
जीएम (टीएस एवं एचएसई)
GM (TS & HSE)
आई.ओ.सी.एल. (एओडी), डिगबोई
I.O.C. LTD. (AOD), DIGBOI

Copy To:

1. The Member Secretary, Pollution Control Board, Assam, Guwahati-21.
2. The Environmental Engineer, North Eastern Zonal Office, CPCB, Shillong-14
3. The Regional Executive Engineer, PCBA Dibrugarh-786001

HALF YEARLY COMPLIANCE REPORT OF ENVIRONMENTAL CLEARANCE DIGBOI REFINERY (1St April 2024 – 30th September 2024)

INDEX

REPORTS ATTACHED

Report Name	Annexure list
Average six monthly 21 MINAS parameter of ETP Effluent(polishing pond outlet) Reports by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India	Annexure-1
Six monthly River water body sample Report by QC Department of AOD	Annexure-2
Six monthly compliance Report on Quantum Limit (Kg/1000 MT Crude processed)	Annexure-3
Six month Stack emission Report by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India	Annexure-4
Six month Ambient Air quality Monitoring Report by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India	Annexure-5
Fugitive Monitoring (LDAR) Report	Annexure-6
Latest compliance status of the CREP	Annexure-7
Compliance Report to PCCF(Wildlife) & CWW, Assam on 03.04.2024	Annexure-8
Site specific conservation plan and wildlife management plan submitted to DFO, Digboi on 14.03.2023	Annexure-9
Advertisement in two local newspapers about EC granted for DR 1.0 FOR Capacity Augmentation of Digboi Refinery to 1 MMTPA	Annexure-10
Bio-monitoring of aquatic life in lotic and lentic water bodies in and around Digboi Refinery" by M/S A.B.N Scientific Services, Guwahati on April-September '24	Annexure-11

ENVIRONMENTAL CLEARANCE (J-11011/12/87-1A, dated – 19-10-1987) FOR DIGBOI REFINERY MODERNISATION PROJECT

SL. NO	STIPULATIONS	COMPLIANCE STATUS AS ON 30.09.2024
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.	The concentration levels of all the parameters of effluent after treatment at ETP meets the MINAS specification. As per revised CPCB guideline, Digboi Refinery meets the stipulations for all 21 parameters of effluent. Six monthly compliance Report on Quantum Limit (Kg/1000 MT Crude processed) is attached in **Annexure-3.** Online effluent monitoring & connectivity to CPCB server was commissioned on 28th December 2015. WebSite: Online Emission and Effluent Monitoring System (cpcb.gov.in)
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. Six monthly 21 MINAS parameter ETP effluent Reports (Polishing Pond outlet) by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India is enclosed as **Annexure-1** Six monthly nearby river water body sample by AOD QC Laboratories is enclosed as **Annexure-2.**
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.	One HDPE lining concrete oily sludge storage tank of 400m^3 capacity was constructed in 2014 to prevent leaching and seepage of oil to ground water. Another storage pit bottom is made up of concrete to avoid leaching.
5.0	The ambient air around Refinery	Four nos. of Ambient Air quality monitoring stations have

	should be monitored at least at four monitoring stations for SPM, SOx, NOx, Hydrocarbons and H_2S.	been installed around Digboi Refinery-(I) Bazar Gate (II) Wax Sector Cooling Tower (III) New Tank Farm (IV) Effluent treatment Plant. One no. of Continuous Ambient Air Quality Monitoring Station installed and commissioned in September 2012 at Welfare center which is connected with CPCB and PCBA server. Ambient air quality monitoring is being carried out monthly by external agency. Six-month Ambient Air Quality Monitoring Report by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India is attached as **Annexure-5**
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 analyzers are also installed in AVU, DCU, CPP HRSG's, CRU, SDU, HDT, HGU and MSQU and monitoring through RTDBMS. Online connectivity established with CPCB Server and PCBA for Furnaces having heat capacity of more than 10mkcl/hr (HGU & HRSG's Stacks). Apart from own monitoring, external agencies Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India is also employed to conduct stack emission analysis on regular basis. Six month Stack emission Report by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India is enclosed as **Annexure-4**
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. Leak detection and repair (LDAR) report for the Q 1 and Q2 of FY 2024-25 is attached as **Annexure-6.**
8.0	Land filling, if any, must be done with fill material only from within battery limits of the Refinery.	It is being followed accordingly.
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 southwest side, which acts as a natural Green Belt. Green belt is developed with regular tree plantation around Refinery premises and township area. Since 2002, Digboi Refinery has planted around **316099** trees till September '24 in and around Digboi Refinery achieving a green belt coverage of 52.86% of the total IOCL area. Refinery has taken up mega tree plantation drive of 6.25 Lakh trees in FY 2024-25 through modified Akira Miyawaki Method in collaboration with PCBA. Already 1.4 Lakh trees saplings planted till Sep'24.

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

SL. NO	STIPULATIONS	COMPLIANCE STATUS AS ON 30.09.2024
1.0	Only sweet natural gas will be used as feed stock.	Digboi Refinery uses only sweet Natural Gas.
2.0	Under the envisaged modernization programme for the refinery, Sulphur recovery units to be provided to reduce emission of SO_2. Efforts should also be made to reduce the emissions of NOx. The existing sulphuric acid plant should be scrapped.	Digboi Refinery processes only indigenous sweet Assam crude with Sulphur content less than 0.25 wt%. 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 NOx is very low and always remains within the prescribed limit. Further, low NOx burners are also fitted in all the new units viz. Solvent De-waxing Unit, Hydro-treater Unit, 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.	Digboi Refinery is surrounded by the Upper Dehing Reserve Forest on the south and southwest side, which acts as a natural Green Belt. Green belt is developed with regular tree plantation around Refinery premises and township area. Since 2002, Digboi Refinery has planted around 316099 trees till September '2024 in and around Digboi Refinery achieving a green belt coverage of 52.86% of the total IOCL area. Refinery has taken up mega tree plantation drive of 6.25 Lakh trees in FY 2024-25 through modified Akira Miyawaki Method in collaboration with PCBA. Already 1.4 Lakh trees saplings planted till Sep'24.
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

<table>
<tr><th>SL. NO</th><th>STIPULATIONS</th><th>COMPLIANCE STATUS AS ON 30.09.2024</th></tr>
<tr><td>1.0</td><td>The project authority must strictly adhere to the stipulations made by State govt. and the State Pollution Control Board.</td><td>The stipulations made by the State Govt. and the State Pollution Control Board are strictly followed with regard to effluent and emission norms.
The existing CTO has been renewed till 31st March 2028.
Digboi Refinery meets all parameters of effluent as per revised CPCB guideline.</td></tr>
<tr><td>2.0</td><td>The project authority will not increase the throughput capacity of the refinery from the existing level.</td><td>Crude processing capacity of Digboi Refinery was based on neat Assam crude. The actual crude throughput is based on Govt MoU maintaining all the environmental parameters within the stipulated norm.</td></tr>
<tr><td>3.0</td><td>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.</td><td>Complied.</td></tr>
<tr><td>4.0</td><td>Gaseous emissions of SO2, 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.</td><td>Complied.

The reported gaseous emission of SOx and NOx by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India are :-

<table>
<tr><td></td><td>CRU-HDT(SOx) mg/Nm3</td><td>CRU-HDT(NOx) mg/Nm3</td><td>CRU-OBSG(SOx) mg/Nm3</td><td>CRU-OBSG(NOx) mg/Nm3</td></tr>
<tr><td>May’24</td><td>3.00</td><td>5.00</td><td>5.00</td><td>6.00</td></tr>
<tr><td>Aug’24</td><td>9.00</td><td>25.00</td><td>7.00</td><td>54.00</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

(Provide results upto two decimal)</td></tr>
<tr><td>5.0</td><td>The project authority must explore the possibility of maximum recycling of effluent either as process water or for aforestation.</td><td>Treated effluent from ETP is recycled to refinery as make up for Fire water tank, Coke Cutting water at delayed coking unit, Wax Sector Cooling Tower, cleaning and gardening purposes.
During April’24 – Sep’24, 100 % of treated effluent was reused.</td></tr>
<tr><td>6.0</td><td>The entire quantity of liquid effluent coming out of the complex should strictly confirm 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.</td><td>Effluent is meeting MINAS specification both in quality and quantity before being discharged.
Six monthly compliance Report on Quantum Limit (Kg/1000 MT Crude processed) is attached in Annexure-3.</td></tr>
</table>

7.0	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.	4 (Four) numbers of Ambient Air quality monitoring stations have been installed around Digboi Refinery-(i)Bazar Gate (ii)Wax Sector Cooling Tower (iii)New Tank Farm (iv) Effluent treatment Plant. Ambient air quality monitoring is being carried out on monthly basis. 1(One) number of Continuous Ambient Air Quality Monitoring Station installed and commissioned in September 2012 at Welfare centre. Online CAAQMS parameters are being monitored regularly through https://aicpl.glensserver.com/#/login Six month Ambient Air quality Monitoring Report by External Agency Nitya laboratories 43, sector -A1 Ext. Bhalla Enclave, channi Himmat, Jammu-180015, J&K (UT), India attached as **Annexure-5** Fixed on-line analyzers are also installed in AVU, DCU, CPP HRSG's, CRU, SDU, HDT, HGU and MSQU and being monitored regularly through RTDBMS. Online connectivity established with CPCB Server and PCBA server for Furnaces having heat capacity of more than 10mkcl/hr (HGU & HRSG's Stacks). Apart from own monitoring, external agencies are also employed to conduct stack emission analysis on regular basis. Online stack monitoring regularly done through Website http://www.envsaindia.com/cpcb/login.php
8.0	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.	Water quality monitoring stations were set up:- one near ETP, three at Digboi Nullah and one at oily sludge area. Liquid effluent quality from ETP outlet is monitored regularly on daily basis. 1. 8(eight) parameters daily basis by QC (AOD) 2. 21(twenty-one) parameters on monthly basis tested by SPCB approved outside agency. 3. In addition to above four parameters, BOD, COD, TSS & pH being monitored through online analyzers connected with CPCB Server, 4. Sample from Digboi River and Dihing River is being collected and analyzed by QC (AOD) on monthly basis.
9.0	The project authority must monitor the aquatic life (like fish, tortoise etc.) and report should be submitted to the Ministry once in six months.	Digboi Refinery has carried out study on **"Bio-monitoring of aquatic life in lotic and lentic water bodies in and around Digboi Refinery**" by M/S A.B.N Scientific Services, Guwahati on April-September '24. The report has been enclosed as **Annexure-11**.

10.	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.	**Complied.** Present PESO License **P/HQ/AS/15/880** is valid till 31.12.2026.
11.	The project authority must provide oil separator in the nullah and the effluents should be discharged through covered drains.	At present oil separator is being provided and the effluents are discharged through covered drain.
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 certified by PNGRB empanelled party. Copy of plan submitted to CIF Guwahati & DC, Tinsukia. Offsite drills are carried out regularly, once 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 **M/S Sanmarg Engineering Validation and Assessment Private Ltd.** Last Offsite Disaster drill was carried out on 26 December 2023 on scenario of "Drone attack at Tank-001 Crude tank leading to explosion and fire". Last Odd hours onsite Disaster drill was carried out on 28th March, 2024 on scenario of "Leakage from Crude / HGO Product Exchanger-01-EE-00-004 A/B shell side inlet isolation valve downstream flange due to gasket rupture lead to vapour cloud explosion and fire." Last L2 level onsite Disaster drill was carried out on 06.09.2024 "Leakage from LDO Circulating Reflux (CR) / Feed Exchanger-07-EE-00-102 shell side inlet body flange due to gasket rupture, which led to fire and oil spillage in storm water channel"
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.	Digboi Refinery has set up its own state of art Quality Control Laboratories inside the Refinery premises with NABL Accreditation **ISO/IEC 17025:2017**

16.	The project authority must provide necessary infrastructural facilities to the construction workers during construction.	**Complied.** 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.	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 is developed with regular tree plantation around Refinery premises and township area. Since 2002, Digboi Refinery has planted around **316099** trees till March'2024 in and around Digboi Refinery achieving a green belt coverage of 52.86% of the total IOCL area. Refinery has taken up mega tree plantation drive of 6.25 Lakh trees in FY 2024-25 through modified Akira Miyawaki Method in collaboration with PCBA. Already 1.4 Lakh trees saplings planted till Sep'24.
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.	It is followed as part of IOCL's green belt development.
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.	Digboi Refinery has a full-fledged Health, Safety and Environment (HSE) unit functioning under Chief General Manager with direct reporting to Head of Organization.HSE Department team consists of General Manager, Chief Manager and Assistant Managers. The HSE team regularly monitors and review the effectiveness of the EMP implementation.
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.	The HSE department is supported with budgetary Allocation. The allocation for the last three years are as follows: ➢ 2020-21: Rs 7.74 Cr. ➢ 2021-22: Rs 7.78 Cr. ➢ 2022-23: Rs 8.83 Cr. ➢ 2023-24: Rs 3.51 Cr ➢ 2024-25: Rs. 2.59 Cr.

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

SL. NO	STIPULATIONS	COMPLIANCE STATUS AS ON 30.09.2024
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. Quantitative Risk Analysis study for all the units, including MSQU, was carried out in March, 2012 & in Aug' 2013 post installation of Wax Pelletisation Unit. Further Quantitative Risk Analysis (QRA) study for all the units of DR was carried out in 2019 by M/s Techniche Engineering Private Limited, Pune and final report received in February 2020. The QRA study report was submitted to the office of IRO-Guwahati, MoEF & CC during Dec'2022 EC Compliance inspection Monitoring. Next QRA study by M/s Techniche Engineering Private Limited, Pune is currently under progress with all DR existing units including facilities for capacity augmentation of Digboi refinery to 1 MMTPA and expected to be completed by Jan'25. The report shall be submitted to MoEF immediately after receipt.

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

SL. NO	STIPULATIONS	COMPLIANCE STATUS AS ON 30.09.2024
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. Quantitative Risk Analysis study for all the units, including MSQU, was carried out in March, 2012 & in Aug' 2013 post installation of Wax Pelletisation Unit. Further Quantitative Risk Analysis (QRA) study for all the units of DR was carried out in 2019 by M/s Techniche Engineering Private Limited, Pune and final report received in February 2020. The QRA study report was submitted to the office of IRO-Guwahati, MoEF & CC during Dec'2022 EC Compliance inspection Monitoring. Next QRA study by M/s Techniche Engineering Private Limited, Pune is currently under progress with all DR existing units including facilities for capacity augmentation of Digboi refinery to 1 MMTPA and expected to be completed by Jan'25. The report shall be submitted to MoEF immediately after receipt.

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

A	Specific Conditions	
SL. NO	**STIPULATIONS**	**COMPLIANCE STATUS AS ON 30.09.2024**
1	The company shall comply with new standards/norms that are being proposed by the CPCB for petrochemical plants and refineries.	Digboi Refinery strictly complies with all the norms and parameters of effluent and gaseous emission as per revised CPCB guideline.
2	The process emissions (SO_2, NOx, 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.	The various process Emissions are within the prescribed limits and meets the norms as prescribed by MoEF & CC and Assam State Pollution Control Board as mentioned in the CTO. The various Emission reports from Refinery are submitted to Assam State Pollution Control Board and MoEF & CC on regular basis.
3	Ambient air quality monitoring stations. [SPM, SO_2, NOx 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 $S0_2$ and NOx.	5(Five) no's of Ambient Air Quality monitoring stations are already in operation in the Refinery premises as per direction of Pollution Control Board, Assam. Out of five stations one Continuous Ambient Air Quality Monitoring Station is connected with CPCB server. Furnaces having heat capacity of more than 10mkcal/hr (HGU & HRSG's Stacks) are continuously connected with CPCB Server and PCBA server. On line stack monitoring analyzers are already installed for monitoring stack emissions. Apart from own monitoring, external agencies are also employed to conduct stack emission analysis on regular basis as per CPCB guideline.

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 (VOC) is being carried out regularly by external agency. Report is submitted regularly to the office of MoEF & CC with six monthly compliance reports. For control of fugitive emissions, dual seal has been installed in all light oil pumps with provision of venting at Flare system. Leak detection and repair (LDAR) report for the Q 1 and Q2 of FY 2024-25 is attached as **Annexure-6.**
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.	Fugitive emissions of HC from product storage tank yards etc is being monitored quarterly by external agency. HC detectors are already provided at strategic locations at plants and tank farm areas. HC detectors are maintained by the vendors on a quarterly basis. HC detector also provided at MS Quality up gradation unit. Digboi Refinery is using sweet natural gas with average sulphur content of ~ 2.5 ppm.
6	The company shall strictly follow all the recommendation mentioned In the charter on corporate responsibility for environmental protection (CREP).	The latest compliance status of the CREP is enclosed as **Annexure -7** Also, Digboi Refinery has carried out various CSR activities in and around Digboi with total CSR budget of Rs 32.48 Cr during last three fiscal years. The major activities include empowering underprivileged young girls by enrolling 60 students each year in Nursing course (BSc & GNM), empowering 45 students from economically underprivileged section with Medical & Engineering coaching, skill development of local women, provision of Drinking water facility in schools, water supply to non IOCL consumers in and around Digboi etc.
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.	At Digboi Refinery, flaring is done at the height of 108 meters through flare stack. Knockout drums are provided in the flare system Further, modern fire fighting system and hydrant network system has been provided and it meets OISD – 116 standards. 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, 560 & 452.
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.	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 is developed with regular tree plantation around Refinery premises and township area. Since 2002, Digboi Refinery has planted around 316099 trees till September'2024 in and around Digboi Refinery achieving a green belt coverage of 52.86% of the total IOCL area. Refinery has taken up mega tree plantation drive of 6.25 Lakh trees in FY 2024-25 through modified Akira Miyawaki Method in collaboration with PCBA. Already 1.4 Lakh trees saplings planted till Sep'24.
B.	**General Conditions**	
1	The project authorities must strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government and any other statuary body.	The stipulations made by the State Govt. and the State Pollution Control Board are strictly followed with regard to effluent and emission norms. The existing CTO has been renewed till 31st March 2028. Digboi Refinery meets all parameters of effluent as per revised CPCB guideline.
2	No further expansion or modification in the project shall be carried without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from those submitted to the Ministry for clearance, a fresh reference shall be made to the Ministry.	**Complied.**
3	At no time, the emissions should go beyond the prescribed standards. In the event of failure of any pollution control system, the respective well site should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved. Provision of adequate height of stack attached to DG sets & flare is to be done.	Stack emission quality data of SOx and NOx are regularly monitored. Apart from own monitoring, external agencies are also employed to conduct stack emission analysis on regular basis as per CPCB guideline.
4	Wastewater shall be properly collected and treated so as to conform to the standards prescribed under EP Act & Rules and mentioned in the Consents provided by the relevant SPCB.	Digboi Refinery had installed Effluent Treatment Plant (ETP) in the year 1989, for the treatment of process wastewater generated from various units of the refinery. Digboi Refinery meets all MINAS parameters related to effluent discharge as per revised CPCB guideline and CTO.

5	The overall noise levels in and around the premises shall be limited within the prescribed standards (75 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	Acoustic hoods are available all over the refinery and silencers exist in all sensitive parts of the plant where noise is a major concern. Moreover, all vehicle/trucks speed is limited to 20 km/hr inside the refinery, which is also less than 75 DB. Quarterly Noise survey is also being carried out by Occupational Health Centre of AOD hospital.
6	The project authorities must 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 etc. Necessary approvals from Chief Controller of Explosives must be obtained before commission of the expansion project, if required, Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	Digboi Refinery strictly follows the provisions made in the Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended in 2000 and later for handling of hazardous chemicals. Present PESO License **P/HQ/AS/15/880** is valid till 31.12.2026. Disaster Management Plan duly certified by PNGRB empanelled party. Copy of plan submitted to CIF Guwahati & DC, Tinsukia. 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 **M/S Sanmarg Engineering Validation and Assessment Private Ltd**
7	Disposal of hazardous wastes shall be as per the Hazardous Wastes. (Management and Handling) Rules, 2003 Authorization from the State Pollution Control Board must be obtained for collections / treatment /storage/disposal of hazardous wastes.	Digboi Refinery has been granted Hazardous Waste Authorization **WB/T-311/21-22/115/101** and is valid till 31-Mar-2027. Digboi Refinery annually files Hazardous Wastes Return to PCBA. Last Annual Hazardous Wastes Return for FY 2023-24 has been duly submitted to Pollution Control Board, Assam on 23.09.2024 (Revised).

8	The project authorities will provide adequate funds as nonrecurring and recurring expenditure to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	The HSE department is supported with budgetary Allocation. The allocation for the last three years are as follows: ➢ 2020-21: Rs 7.74 Cr. ➢ 2021-22: Rs 7.78 Cr. ➢ 2022-23: Rs 8.83 Cr. ➢ 2023-24: Rs. 3.51 Cr. ➢ 2024-25: Rs. 2.59 Cr.
9	The company shall develop rain water harvesting structures to harvest the runoff water for recharge of ground water.	Storage Cum Percolation Pond (SCP) was commissioned in 2018 utilizing run-off water of 9 interlinked natural catchment areas around Digboi, first of its type in eastern Asia. The usage of rainwater has proven a very cost effective and environment friendly to increase the water table in Digboi area. During FY 2023-24 , 42.8 % of industrial water requirement was met through harvested rain water as Cooling Tower Make up, feed to DM plant, Service water and fire water make up. During April-Sep'2024 , usage of harvested rain water was 72.44 % of total refinery industrial water requirement.
10	The stipulated conditions will be monitored by the concerned Regional Office of this Ministry /Central Pollution Control Board/State Pollution Control Board. A six monthly compliance report and the monitored data should be submitted to them regularly. It will also be displayed on the Website of the Company	Six-monthly EC compliance reports are duly submitted to IRO Guwahati. Last Report Submitted on 22 June 2024. Previous EC compliance reports of Digboi Refinery are uploaded on Indian Oil website. Link to the website is below. https://iocl.com/statutory-notices

11	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in This should 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 should be forwarded to the concerned Regional office of this Ministry	The advertisement in local newspapers was published.
12	A separate environment management cell with full fledged laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior Executive.	Digboi Refinery has a full-fledged Health, Safety and Environment (HSE) unit functioning under Chief General Manager with direct reporting to Head of Organization.HSE Department team consists of General Manager, Chief Manager , Two Senior Managers and one Officer. The HSE team regularly monitors and review the effectiveness of the EMP implementation.
13	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.	All the formalities for closure of project have been completed and project capitalized on 28.12.2010

ENVIRONMENTAL CLEARANCE (J-11011/482/2007-IA II (I) dated 01-01-2024) FOR Capacity Augmentation of Digboi Refinery to 1 MMTPA

A	Specific Conditions	
SL. NO	STIPULATIONS	COMPLIANCE STATUS AS ON 30.09.2024
1	The environmental clearance is subject to obtaining prior clearance from the wildlife angle, including clearance from the Standing Committee of the National Board for Wildlife, as applicable, as per the Ministry's OM dated 8th August, 2019. Grant of environmental clearance does not necessarily imply that Wildlife Clearance shall be granted to the project and that their proposal for Wildlife Clearance will be considered by the respective authorities on its merit and decision taken. PP shall also strictly follow the conditions mentioned in existing NBWL clearance.	NBWL Minutes was issued on 16.02.24 recommending the project with 4 conditions. Letter from PCCF to DR issued on 27.02.24 with decision taken and conditions to be complied. Refinery submitted the compliance report to PCCF (Wildlife) & CWW, Assam on 03.04.2024 **(Enclosed as Annexure -8)**
2	The project proponent shall prepare a site-specific conservation plan and wildlife management plan in case of the presence of Schedule-1 species in the study area, as applicable to the project, and submit to Chief Wildlife Warden for approval. The recommendations shall be implemented in consultation with the State Forest/Wildlife Department in a time bound manner.	Site specific conservation plan and wildlife management plan has been prepared and submitted to DFO, Digboi on 14.03.2023 for onward forwarding to Chief Wildlife Warden. DFO forwarded the same to PCCF vide letter dated 10.05.2023. **(Enclosed as Annexure -9)**
3	The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.	Actions being initiated for strictly complying EIA/EMP and risk mitigation measures during designing & construction phase of Digboi Refinery Capacity Augmentation project to 1 MMTPA.
4	The effluent generation post expansion of the refinery shall not exceed 2352 m3/day which will be treated through Effluent Treatment Plant which shall be re-used inside refinery.	The effluent generation post expansion of the refinery has been considered within 2352 m3/day during engineering and shall be complied post commissioning of the project. Treated effluent from ETP shall be recycled to refinery

		as make up for Fire water tank, Coke Cutting water at delayed coking unit, Wax Sector Cooling Tower, cleaning and gardening purposes.
5	The National Emission Standards for Petroleum Oil Refinery issued by the Ministry vide G.S.R. 186(E) dated 18th March, 2008 and G.S.R.595(E) dated 21st August, 2009 as amended from time to time, shall be followed.	Shall be complied
6	Volatile organic compounds (VOCs)/Fugitive emissions shall be controlled at 99.997% with effective chillers/modern technology. For emission control and management, use of FG/NG in heater as fuel, adequate stack height, use of Low NOX burners in heater & boiler, continuous stack monitoring, Sulphur recovery plant, etc. shall be installed/ensured.	Project has been conceived for implementation with state-of-the-art technology with equipment to ensure negligible VOC emission to comply EC norm. Currently Digboi refinery doesn't use any liquid fuel and Natural Gas & Fuel Gas (FG) being used. No Liquid fuel burning has been considered under DR 1.0 project. Use of Low Nox burner, adequate stack height etc. has been considered in the engineering design. Currently, quarterly monitoring of fugitive emission (VOC) is being carried out regularly by CPB/MoEFCC approved external agency and shall also be continued post DR 1.0 project commissioning.
7	As proposed, the total SOx emission form post project shall not exceed 16.61 kg/hr (i.e. 0.398 TPD).	SOx emission from Stack shall be maintained within stipulated limit.
8.	All the commitments made to the public during public hearing/public consultation meeting held on 04.03.2023 shall be satisfactorily implemented and adequate budget provision shall be made accordingly.	DR has allocated Rs. 5.0 Crores towards Extended EMP (CER) which shall be spent as submitted in CER plan by involving local villages and administration. All the activities under CER shall be completed before the commissioning of the plant.

9.	Total freshwater requirement after proposed expansion shall not exceed 13032 KLPD which will be met from the existing pumping station at Nazirating. Necessary permission in this regard shall be obtained from the concerned regulatory authority.	No Objection Certificate to withdraw 14400 KLPD is obtained vide letter no. EE/WRD/DBR/2022-23/D-3/Pt IV/790 dated 15/03/2023 from Dibrugarh Water Resource Division. Total freshwater requirement shall be ensured within 13032 KLPD.
10.	The additional effluent generation shall not exceed 8 m3/hr from the proposed expansion i.e. the refinery (including DM Plant regeneration wastewater, process units, Cooling towers blowdown), which will be treated in the existing Effluent Treatment Plant (ETP). The existing ETP capacity is 375 m3/hr with present load of 90 m3/hr from refinery.	Present ETP load is around 90 m3/hr & post DR 1.0 additional load is considered within 8 m3/hr.
11	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.	Process and storm drains are separate systems and not allowed to mix. All process effluent is routed to ETP. Strom water channel is provided with hay filter and Oil boom to catch any accidental oil spillage prior to routing to Digboi Nallah.
12	Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm, and solvent transfer to be done through pumps.	All hazardous chemicals shall be stored in tanks & drums. All solvent & chemical transfer shall be done through pumps and manual transfer shall be avoided. Flare arrestor in tank farm shall be provided As per safe engineering practice.
13	Process organic residue and spent carbon, if any, shall be sent to cement industries. ETP sludge, process inorganic & evaporation salt shall be disposed off to the TSDF.	Process organic residues (ETP Bio sludge) is allowed to dry and weather in sludge drying beds at ETP. Bio-sludge is then transferred to secured land fill for bioremediation. After completion, the same is disposed inside battery limit. No evaporation salt is generated from ETP.

14	The company shall undertake waste minimization measures as below: Metering and control of quantities of active ingredients to minimize waste. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. Use of automated filling to minimize spillage. Use of Close Feed system into batch reactors. Venting equipment through vapour recovery system. Use of high pressure hoses for equipment clearing to reduce wastewater generation.	Slop oil generated if any is reprocessed as per prevailing practice. The process handles close loop system without any provision for manual filling. Venting of equipment through FG header/Flare has been considered. Use of high pressure hoses for equipment cleaning (e.g exchanger) shall be ensured.
15	The green belt of 5-10 m width shall be developed in the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. The project proponent shall ensure 33% greenbelt area vis-à-vis the project area through afforestation in the degraded area. The Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department	Green belt developed with regular tree plantation around Refinery premises and township area. Currently, Digboi refinery has 52.8 % of greenbelt covers of the total refinery area and already achieved min. 33% greenbelt areas as per guidelines prescribed by MoEFCC. Digboi Refinery planted total 1,41,111 trees during FY 24-25 (till 30th Sep) through Miyawaki Methodology besides 1,75,099 trees from 2002-2024.
16	PP proposed to allocate Rs. 5.0 Crores towards Extended EMP (CER) which shall be spent as submitted in CER plan. Further, all the proposed activities under CER shall be completed before the commissioning of the plant in consultation with District Administration.	Digboi Refinery has allocated 5.0 Crore towards extended EMP as per the proposed activities mentioned in the EIA report. Accordingly, preliminary activities have been started and all the CER recommendations shall be completed before the commissioning of the plant.
17	For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.	Shall be complied

18	The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Firefighting system shall be as per the norms.	Comprehensive Fire protection system shall be installed and activated prior to commissioning of new facilities under DR 1.0 project. The same shall also be vetted through external audit like OISD & PESO.
19	Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises. In case of the treated effluent to be utilized for irrigation/gardening, real time monitoring system shall be installed at the ETP outlet.	Online connectivity established with CPCB Server and PCBA for Furnaces having heat capacity of more than 10mkcal/hr (HGU & HRSG's Stacks) ETP is already installed with real time analyzers (pH, COD, BOD, TSS) and connected to CPCB and PCBA server. Further online Oil & Grease analyser shall be installed by Mar'2026 at ETP effluent line. Installation of web camera with night vision capability in the channel/drain carrying effluent within the premises has been installed to monitor at 6 locations.
20	PP shall allocate at least Rs. 0.5 Crore/annum for Occupational Health Safety. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	PME and WPME is being carried out as per Factories Act with. Budged provision of 0.5 Crore/Annum for Occupational Health Safety shall be ensured.
21	Process safety and risk assessment studies shall be further carried out using advanced models, and the mitigating measures shall be undertaken/implemented accordingly.	RRA study of DR 1.0 project has been carried out using PHAST by M/s EIL. All the RRA recommendations shall be considered and ensured implementation during DR 1.0 Project implementation alongwith Hazop recommendations. QRA study by M/s Techniche

		Engineering Private Limited, Pune is currently under progress with all DR existing units including facilities for capacity augmentation of Digboi refinery to 1 MMTPA and expected to be completed by Jan'25. The report shall be submitted to MoEF immediately after receipt.
22	The PP should improve the efficiency of ETP Plant and the water discharge should be as per prescribed CPCB Norms. They should also install 24x7 hours monitoring system (of the discharge) and the same should be connected to the server of SCPB/CPCB.	ETP is already installed with real time analyzers (pH, COD, BOD, TSS) and connected to CPCB and PCBA server. Further online Oil & Grease analyzer shall be installed before commissioning by March'26 at ETP effluent line. The effluent quality meets all the MINAS standard.
23	PP shall sensitize and create awareness among the people working within the project area as well as its surrounding area on the ban of Single Use Plastic in order to ensure the compliance of Notification published by MOEFCC on 12th August, 2021. A report along with photographs on the measures taken shall also be included in the six-monthly compliance report being submitted to concerned authority.	Under Mission LIFE campaign, awareness regarding ban of Single Use Plastic is already being carried out through distribution of leaflets, display of banners and posters and conducting Nukkad natak etc. World Environment Day 2024 was also observed at DR with various awareness programs and campaigns like waste segregation, carrying jute bags to market to avoid use of plastic bags etc.
B.	**General Conditions**	
1	No further expansion or modifications in the plant, other than mentioned in the EIA Notification, 2006 and its amendments, shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change/SEIAA, as applicable. 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/SEIAA, as applicable, to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	**Shall be complied**

2	The energy source for lighting purpose shall be preferably LED based, or advanced having preference in energy conservation and environment betterment.	LED based lighting is only used for lighting purpose
3	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 the Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	Acoustic hoods are available all over the refinery and silencers exist in all sensitive parts of the plant where noise is a major concern. Moreover, all vehicle/trucks speed is limited to 20 km/hr inside the refinery. The ambient noise levels conforms to the standards prescribed under the Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). Quarterly Noise survey is carried out by Occupational Health Centre of Digboi Refinery hospital.
4	The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CER activities shall be undertaken by involving local villages and administration and shall be implemented. The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.	DR has allocated Rs. 5.0 Crores towards Extended EMP (CER) which shall be spent as submitted in CER plan by involving local villages and administration. Actions have been already initiated and planned for compliance prior to commissioning of DR 1.0 project facilities.
5	The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.	Shall be complied & ensured.
6	A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.	Complied (No such suggestion / representations received from any bodies)

7	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.	Shall be complied in line with current practice.
8	The environmental statement for each financial year ending 31st March in Form-V as is mandated shall be submitted 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 company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.	Shall be complied in line with current practice.
9	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/Committee and may also be seen at Website of the Ministry and at https://parivesh.nic.in/. 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 concerned Regional Office of the Ministry.	Complied **Attached As Annexure 10**
10	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.	Shall be ensured & complied
11	This Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.	Shall be ensured & complied

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43, Sector-A1 Ext., Bhalla Enclave, Chann
Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.cor

Test Report

Issued To M/s Indian Oil Corporation Limited
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

ULR No. : TC636624000003231F
Test Report Date: 10/05/2024

Annexure -1

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	04/05/2024
Test Started On	:	04/05/2024
Test Completed On	:	09/05/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	30/04/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.34	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	14	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	3	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	12	15	IS:3025 (P-44)
5	COD	mg/L	74	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	ND	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	ND	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

TC-6366

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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43, Sector-A1 Ext., Bhalla Enclave, Chann
Himmat, Jammu-180 015, J&K (UT), Indi
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info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 202404300110
Test Report Date: 10/05/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	04/05/2024
Test Started On	:	04/05/2024
Test Completed On	:	09/05/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	30/04/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.68	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

ULR No. : TC636624000004012F
Test Report Date: 11/06/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	05/06/2024
Test Started On	:	05/06/2024
Test Completed On	:	10/06/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	30/05/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.43	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	16	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	4	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	13	15	IS:3025 (P-44)
5	COD	mg/L	80	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	ND	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	ND	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

TC-6366

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(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 2024053000120
Test Report Date: 11/06/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	05/06/2024
Test Started On	:	05/06/2024
Test Completed On	:	10/06/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	30/05/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.72	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

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(RAVINDER MITTAL)

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Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

ULR No. : TC636624000004236F
Test Report Date: 24/06/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	17/06/2024
Test Started On	:	17/06/2024
Test Completed On	:	22/06/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	12/06/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.45	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	16	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	2	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	10	15	IS:3025 (P-44)
5	COD	mg/L	60	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	ND	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	ND	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

(AUTHORISED SIGNATORY)

(RAVINDER MITTAL)

CORPORATE OFFICE & CENTRAL LABORATORIES
PLOT NO. 118, CHURCH ROAD, BEHIND KAUSIK VATIKA, BHAGAT SINGH COLONY, BALLABHGARH, FARIDABAD - 121004, HARYANA, INDIA
+91-129-2241021 +91-9013591021, +91-9013552273 labsnitya@gmail.com www.nityalab.com

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+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 202406120110
Test Report Date: 24/06/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	17/06/2024
Test Started On	:	17/06/2024
Test Completed On	:	22/06/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	12/06/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.76	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

(AUTHORISED SIGNATORY)

(RAVINDER MITTAL)

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info@nitylab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

ULR No. : TC6366240000004912F
Test Report Date: 25/07/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	18/0/7/2024
Test Started On	:	18/0/7/2024
Test Completed On	:	24/0/7/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	11/07/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.46	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	16	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	2	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	11	15	IS:3025 (P-44)
5	COD	mg/L	60	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	ND	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	ND	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

TC-6366

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 202407110110
Test Report Date: 25/07/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	18/0/7/2024
Test Started On	:	18/0/7/2024
Test Completed On	:	24/0/7/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	11/07/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.78	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

Test Report No. : 202408020110
Test Report Date: 16/08/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	09/08/2024
Test Started On	:	09/08/2024
Test Completed On	:	15/08/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	02/08/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.48	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	14	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	4	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	14	15	IS:3025 (P-44)
5	COD	mg/L	80	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	ND	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	0.56	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 202408020110
Test Report Date: 16/08/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	09/08/2024
Test Started On	:	09/08/2024
Test Completed On	:	15/08/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	02/08/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.68	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
AOD, Digboi, Dist. Tinsukia, Assam, INDIA

Test Report No. : 202409020110
Test Report Date: 09/09/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	05/09/2024
Test Started On	:	05/09/2024
Test Completed On	:	09/09/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	02/09/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	pH	...	7.56	6.0-8.5	IS:3025 (P-11)
2	Total Suspended Solids (TSS)	mg/L	16	20	IS:3025 (P-17)
3	Oil & Grease (O&G)	mg/L	2	5	IS:3025 (P-39)
4	Bio-Chemical Oxygen Demand (3 days at 27°C) (BOD)	mg/L	13	15	IS:3025 (P-44)
5	COD	mg/L	70	125	IS:3025 (P-58)
6	Ammonical Nitrogen	mg/L	0.13	15	IS:3025 (P-34)
7	Total Kjeldhal Nitrogen	mg/L	0.84	40	IS:3025 (P-34)
8	Lead as Pb	mg/L	ND	0.1	APHA 23rd Ed.
9	Chromium Hexavalent as Cr^{+6}	mg/L	ND	0.1	APHA 23rd Ed.
10	Chromium as Cr	mg/L	ND	2.0	APHA 23rd Ed.
11	Copper as Cu	mg/L	ND	1.0	APHA 23rd Ed.
12	Zinc as Zn	mg/L	ND	5.0	APHA 23rd Ed.
13	Sulphide as S^{2-}	mg/L	ND	0.5	IS:3025 (P-29)
14	Mercury as Hg	mg/L	ND	0.01	APHA 23rd Ed.
15	Phenolic Compounds(C_6H_5OH)	mg/L	ND	0.35	IS:3025 (P-43)
16	Nickel as Ni	mg/L	ND	1.0	APHA 23rd Ed.

Remark:
ND-Not Detected

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
Bongaigaon Refinery
Distt. Chirang-783 380, Assam, India

Test Report No. : 202409020110
Test Report Date: 09/09/2024

Sample Particulars

Nature of the Sample	:	**Treated Effluent**
Sample Quantity & Packaging	:	1 L HDPE Can+150 ml Sterile Container
Sample Received at Lab	:	05/09/2024
Test Started On	:	05/09/2024
Test Completed On	:	09/09/2024
Method of Sampling	:	SOP/B/D-3
Date of Sampling	:	02/09/2024
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Location	:	ETP Polishing Pond-Outlet

Test Report

Sr. No.	Parameter	Unit	Result	Permissible Limit	Protocol
1	Cyanide as CN	mg/L	ND	0.2	IS:3025 (P-27)
2	Total Phosphorous as P	mg/L	0.56	3.0	IS:3025 (P-31)
3	Vanadium as V	mg/L	ND	0.2	IS:3025 (P-56)
4	Benzene	mg/L	ND	0.1	USEPA-8270C
5	Benzo (a) pyrene	mg/L	ND	0.2	USEPA-8270C

Remark:
ND-Not Detected

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(RAVINDER MITTAL)

Annexure-1

Effluent Parameters Test Report								
From April 2024 to September,2024 (IOCL -Digboi Refinery Lab)								
Parameters	Limits	April	May	June	July	August	September	Average
pH	6.0 - 8.5	**6.10**	**6.30**	**6.30**	**6.40**	**6.30**	**6.70**	6.350
Oil & Grease	5.0	**3.97**	**4.02**	**3.79**	**3.59**	**3.90**	**4.04**	3.885
BOD	15.0	**9.91**	**9.30**	**9.69**	**9.33**	**9.97**	**10.00**	9.700
COD	125.0	**68.75**	**72.00**	**66.44**	**62.55**	**70.58**	**73.72**	69.007
TSS	20.0	**17.53**	**17.30**	**15.66**	**14.21**	**16.21**	**15.66**	16.095
Phenols	0.35	**0.27**	**0.27**	**0.25**	**0.24**	**0.25**	**0.26**	0.257
Sulphides	0.5	**0.12**	**0.14**	**0.11**	**0.10**	**0.12**	**0.12**	0.115
CN	0.20	**0.011**	**0.011**	**0.010**	**0.016**	**0.01**	**0.01**	0.012
From April 2024 to September 2024 (Source-External Agency)								
Parameters	**Limits**	April	May	June	July	August	September	**Average**
pH	6.0 - 8.5	7.34	7.43	7.45	7.46	7.48	7.56	7.476
Oil & Grease	5.0	3.00	4.00	2.00	2.00	4.00	2.00	2.800
BOD	15.0	12.00	13.00	10.00	11.00	14.00	13.00	12.200
COD	125.0	74.00	80.00	60.00	60.00	80.00	70.00	70.000
TSS	20.0	14.00	16.00	16.00	16.00	14.00	16.00	15.600
Phenols	0.35	ND	ND	ND	ND	ND	ND	#DIV/0!
Sulphides	0.5	ND	ND	ND	ND	ND	ND	#DIV/0!
CN	0.20	ND	ND	ND	ND	ND	ND	#DIV/0!
Ammonia as N	15.0	ND	ND	ND	ND	ND	0.13	0.130
TKN	40.0	ND	ND	ND	ND	0.56	0.84	0.700
P	3.0	0.68	0.72	0.76	0.78	0.68	0.56	0.700
Cr (Hexavalent)	0.1	ND	ND	ND	ND	ND	ND	0.01
Cr (Total)	2.0	ND	ND	ND	ND	ND	ND	0.05
Pb	0.1	ND	ND	ND	ND	ND	ND	#DIV/0!
Hg	0.01	ND	ND	ND	ND	ND	ND	0.007
Zn	5.0	ND	ND	ND	ND	ND	ND	#DIV/0!
Ni	1.0	ND	ND	ND	ND	ND	ND	#DIV/0!
Cu	1.0	ND	ND	ND	ND	ND	ND	0.050
V	0.2	ND	ND	ND	ND	ND	ND	0.100
Benzene	0.1	ND	ND	ND	ND	ND	ND	0.010
Benzo (a) - Pyrene	0.2	ND	ND	ND	ND	ND	ND	0.100

ND- Not Detectable

Checked by:- 17.10.24 कमलजीत मेधी /Kamaljit Medhi मुख्य प्रबंधक (एच.एस ई.) Chief Manager (HSE) आई.ओ.सी.एल (एओडी), डिगबोई I.O.C. LTD. (AOD), DIGBOI

Prepared by: 17.10.24 मुजीब अहमद/Mujeeb Ahmad वरिष्ठ प्रबंधक (एच एस ई) Senior Manager (HSE) आई.ओ.सी.एल. (एओडी), डिगबोई I.O.C. LTD. (AOD), DIGBOI

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Analysis Lab Report of Dihing and Digboi Rivers

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/April-2024 | **Dated 30.04.2024**

Dated of sample Collection :-22.04.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	6.7	2.9	0.15	0.09	66.0	8.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	7.0	2.7	0.13	BDL	52.0	6.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	6.9	2.3	0.12	BDL	46.0	6.0
4	Dihing River water before confluence with Digboi river	7.7	1.8	0.08	BDL	40.0	4.0
5	Dihing River water after confluence with Digboi river	7.5	1.2	0.09	BDL	38.0	3.0

***BDL = Below Detection Limit

Tested & Report by: -
Dipankar Rajkhowa (JQCA)
Inter Com Water Lab No:-3592

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Analysis Lab Report of Dihing and Digboi Rivers

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/May-2024 | Dated 27.05.2024

Dated of sample Collection :-11.05.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	6.9	2.0	0.18	0.08	70.0	8.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	7.2	2.2	0.15	BDL	66.0	7.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	7.1	1.9	0.12	BDL	60.0	7.0
4	Dihing River water before confluence with Digboi river	7.5	1.5	0.08	BDL	38.0	4.0
5	Dihing River water after confluence with Digboi river	6.9	1.0	0.05	BDL	30.0	3.0

***BDL = Below Detection Limit

Tested & Report by: -
Dipankar Rajkhowa (JQCA)
Inter Com Water Lab No:-3592

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Analysis Lab Report of Dihing and Digboi Rivers

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/JUNE-2024 | Dated 24.06.2024

Dated of sample Collection :-15.06.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	7.1	3.2	0.21	0.10	68.0	10.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	7.2	2.8	0.18	BDL	56.0	9.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	7.2	2.5	0.17	BDL	52.0	7.0
4	Dihing River water before confluence with Digboi river	7.4	1.6	0.05	BDL	30.0	4.0
5	Dihing River water after confluence with Digboi river	7.1	2.0	0.10	BDL	42.0	5.0

***BDL = Below Detection Limit

Tested & Report by: -
Dipankar Rajkhowa (JQCA)
Inter Com Water Lab No:-3592

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Analysis Lab Report of Dihing and Digboi Rivers

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/JULY-2024 | Dated 16.07.2024

Dated of sample Collection :-08.07.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	6.5	3.0	0.20	0.10	62.0	8.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	6.7	2.5	0.16	BDL	54.0	6.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	6.7	2.0	0.12	BDL	46.0	6.0
4	Dihing River water before confluence with Digboi river	6.8	0.8	0.03	BDL	28.0	4.0
5	Dihing River water after confluence with Digboi river	6.8	1.4	0.08	BDL	35.0	6.0

***BDL = Below Detection Limit

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Analysis Lab Report of Dihing and Digboi Rivers

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/AUG-2024 | **Dated 19.08.2024**

Dated of sample Collection :-12.08.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	6.4	3.6	0.21	0.10	65.0	9.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	6.3	2.8	0.18	BDL	58.0	8.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	6.4	2.2	0.14	BDL	52.0	6.0
4	Dihing River water before confluence with Digboi river	6.7	1.0	0.06	BDL	32.0	5.0
5	Dihing River water after confluence with Digboi river	6.5	1.2	0.10	BDL	42.0	6.0

***BDL = Below Detection Limit

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

गुणवत्ता नियंत्रण विभाग (QUALITY CONTROL DEPARTMENT)

इंडियन ऑयल कॉर्पोरेशन लिमिटेड(INDIAN OIL CORPORATION LIMITED)

(असम ऑयल डिवीजन (ASSAM OIL DIVISION)

डिगबोई रिफाइनरी, असम(DIGBOI REFINERY, ASSAM)

Test Report of Dihing and Digboi Rivers Water Sample

Source: Dihing and Digboi Rivers

रिपोर्ट संख्या/ Report No.:DR/QC/Sept-2024 | **Dated 27.09.2024**

Dated of sample Collection :-11.09.2024

PARAMETER		pH	Oil & Grease	Phenol	Sulphide	COD	BOD (3 Days) @ 27°C
Test Method		IS 3025 (Part 11)	APHA-5520-B	APHA-5530-D	IS 3025 (Part 29)	APHA-5220-B	IS-3025 PART-44
Unit			mg/l	mg/l	mg/l	mg/l	mg/l
Requirements as per MINAS noems (Minimum National Standards)		6.0-8.5	Max 5.0 mg/l	Max 0.35 mg/l	Max 0.5 mg/l	Max 125 mg/l	Max 15.0 mg/l
S.No	Sample Details	Test Results					
1	Digboi River Water in Kenduguri Area	6.6	3.5	0.20	0.10	62.0	9.0
2	Digboi River Water (15 km away from Digboi Refinery on Digboi	6.7	3.2	0.17	BDL	54.0	8.0
3	Digboi River Water (26 km away from Digboi Refinery on Digboi	6.7	2.4	0.12	BDL	48.0	6.0
4	Dihing River water before confluence with Digboi river	6.8	0.8	0.02	BDL	25.0	4.0
5	Dihing River water after confluence with Digboi river	6.6	1.5	0.08	BDL	37.0	5.0

***BDL = Below Detection Limit

Test Report Released By :-
Dr. Gopal Maurya (QCM)
Inter Com No:-3593

ANNEXURE-3

COMPLIANCE OF EFFLUENT STANDARDS (In Kg/TMT of Crude)

	(March'24 - september '24) Source-External agency							
PARAMETER	**LIMIT**	October	November	December	January	February	March	**Average**
pH	--	-	-	-	-	-	-	-
Oil & Grease	2.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000
BOD	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000
COD	50	0.00	0.00	0.00	0.00	0.00	0.00	0.000
TSS	8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Phenols	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Sulphides	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.000
CN	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Ammonia as N	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000
TKN	16	0.00	0.00	0.00	0.00	0.00	0.00	0.000
P	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Cr (Hexavalent)	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Cr (Total)	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Pb	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Hg	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Zn	2.0	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Ni	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Cu	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.000
V	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Benzene	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Benzo (a) -Pyrene	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.000

NB:- ND ; Not Done & BDL; Bellow Detection Level

Remarks **No effluent Discharged outside ETP**

Checked by:

17.10.24

कमलजीत मेधी /Kamaljit Medhi
मुख्य प्रबंधक (एच.एस.ई.)
Chief Manager (HSE)
आई.ओ.सी.एल (एओडी), डिगबोई
I.O.C. LTD. (AOD), DIGBOI

Prepared by:

17.10.24

मुजीब अहमद/Mujeeb Ahmad
वरिष्ठ प्रबंधक (एच एस ई)
Senior Manager (HSE)
आई.ओ.सी.एल. (एओडी), डिगबोई
I.O.C. LTD. (AOD), DIGBOI

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+91-191-2465597
info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003318F
Test Report Date: 18/05/2024

Annexure-IV

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024s
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	DCU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	58
Diameter of the Stack(m)	:	1.68
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	126
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	11.68
Quantity of Gas Flow, Nm^3/hr	:	69626.7
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	5.4	10	IS:11255(P-1)

TC-6366

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(RAVINDER MITTAL)

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info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070110
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024s
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	DCU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	58
Diameter of the Stack(m)	:	1.68
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	126
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	11.68
Quantity of Gas Flow, Nm^3/hr	:	69626.7
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	6.24	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	20	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	2.49	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	3.1	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	16.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Himmat, Jammu-180 015, J&K (UT), India
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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003319F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	MSQU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.10
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	254
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.12
Quantity of Gas Flow, Nm^3/hr	:	29268.8
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	6.2	10	IS:11255(P-1)

TC-6366

(AUTHORISED SIGNATORY)

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Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070111
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	MSQU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.10
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	254
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.12
Quantity of Gas Flow, Nm^3/hr	:	29268.8
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	6.21	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	22	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	5	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	13.4	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	4.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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43, Sector-A1 Ext., Bhalla Enclave, Chann
Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003353F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HGU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.00
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	165
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.23
Quantity of Gas Flow, Nm^3/hr	:	27385.7
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	5.2	10	IS:11255(P-1)

TC-6366

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43, Sector-A1 Ext., Bhalla Enclave, Chann
Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070112
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HGU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.00
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	165
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.23
Quantity of Gas Flow, Nm^3/hr	:	27385.7
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	7	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	19	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	9	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	2.5	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	17.6	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003354F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-4)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	60
Diameter of the Stack(m)	:	3.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	134
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.97
Quantity of Gas Flow, Nm^3/hr	:	279073.9
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	6.8	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070113
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-4)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	60
Diameter of the Stack(m)	:	3.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	134
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.97
Quantity of Gas Flow, Nm^3/hr	:	279073.9
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	31	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	21	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	3	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	4.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	14.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003355F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-2)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	50
Diameter of the Stack(m)	:	2.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	139
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.77
Quantity of Gas Flow, Nm^3/hr	:	129045.1
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.0	10	IS:11255(P-1)

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info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070114
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-2)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	50
Diameter of the Stack(m)	:	2.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	139
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.77
Quantity of Gas Flow, Nm^3/hr	:	129045.1
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	9	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	18	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_X), mg/Nm^3	4	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	1.7	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	20.6	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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43, Sector-A1 Ext., Bhalla Enclave, Chann
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+91-191-2465597
info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003349F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CRU (HDT)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.1
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	212
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.78
Quantity of Gas Flow, Nm^3/hr	:	33188.5
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.6	10	IS:11255(P-1)

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43, Sector-A1 Ext., Bhalla Enclave, Chann
Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070115
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CRU (HDT)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.1
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	212
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.78
Quantity of Gas Flow, Nm^3/hr	:	33188.5
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	5	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	15	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	3	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	5.2	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	15.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003350F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	OBSU (CRU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	45
Diameter of the Stack(m)	:	1.8
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	167
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	16.28
Quantity of Gas Flow, Nm^3/hr	:	95529.5
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	5.8	10	IS:11255(P-1)

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Himmat, Jammu-180 015, J&K (UT), Indi
+91-191-2465597
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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070117
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	OBSU (CRU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	45
Diameter of the Stack(m)	:	1.8
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	167
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	16.28
Quantity of Gas Flow, Nm^3/hr	:	95529.5
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	6	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	24	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	5	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	14.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	7.8	-	SOP No.: NL/ SOP / FGA /11

Remark:

ND-Not Detected, DL-Detection Limit

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+91-191-2465597
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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003351F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HDTU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	298
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	20.59
Quantity of Gas Flow, Nm^3/hr	:	30392.8
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.2	10	IS:11255(P-1)

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43, Sector-A1 Ext., Bhalla Enclave, Chan
Himmat, Jammu-180 015, J&K (UT), Indi
+91-191-2465597
info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070116
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	08/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HDTU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	298
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	20.59
Quantity of Gas Flow, Nm^3/hr	:	30392.8
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	4	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	18	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	7	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	4.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	15.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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43, Sector-A1 Ext., Bhalla Enclave, Chan
Himmat, Jammu-180 015, J&K (UT), Indi
+91-191-2465597
info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003353F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	SDU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46
Diameter of the Stack(m)	:	1.38
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	171
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.85
Quantity of Gas Flow, Nm^3/hr	:	53684.0
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.4	10	IS:11255(P-1)

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Himmat, Jammu-180 015, J&K (UT), Indi
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info@nityalab.com www.nityalab.co

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070118
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	09/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	SDU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46
Diameter of the Stack(m)	:	1.38
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	171
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	14.85
Quantity of Gas Flow, Nm^3/hr	:	53684.0
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	28	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	16	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	25	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	2.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	17.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

(AUTHORISED SIGNATORY)

(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No. : TC636624000003320F
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	AVU (CDU/VDU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46.5
Diameter of the Stack(m)	:	1.59
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	126
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.35
Quantity of Gas Flow, Nm^3/hr	:	82001.9
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.2	10	IS:11255(P-1)

TC-6366

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+91-191-2465597
info@nityalab.com www.nityalab.c

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202405070119
Test Report Date: 18/05/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	07/05/2024
Sample Received at Lab	:	14/05/2024
Test Started On	:	14/05/2024
Test Completed On	:	18/05/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	AVU (CDU/VDU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46.5
Diameter of the Stack(m)	:	1.59
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	126
Ambient Air Temperature °C	:	24
Flue Gas Velocity (m/s)	:	15.35
Quantity of Gas Flow, Nm^3/hr	:	82001.9
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	6	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	24	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	4	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	5.2	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	13.9	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260140
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	DCU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	58
Diameter of the Stack(m)	:	1.68
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	134
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	11.97
Quantity of Gas Flow, Nm^3/hr	:	69940.3
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	6.2	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260140
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	DCU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	58
Diameter of the Stack(m)	:	1.68
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	134
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	11.97
Quantity of Gas Flow, Nm^3/hr	:	69940.3
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	97	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	34	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	4.6	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	3.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	17.4	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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+91-191-2465597
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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260141
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	28/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	MSQU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.10
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	267
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.98
Quantity of Gas Flow, Nm^3/hr	:	54703.44
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.4	10	IS:11255(P-1)

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43, Sector-A1 Ext., Bhalla Enclave, Channi Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nitylab.com www.nitylab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260141
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	28/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	MSQU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.10
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	267
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.98
Quantity of Gas Flow, Nm^3/hr	:	54703.44
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	278	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	786	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	8	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	15.8	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	5.7	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

(AUTHORISED SIGNATORY)
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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260142
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HGU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.00
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	172
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	14.87
Quantity of Gas Flow, Nm^3/hr	:	28165.2
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	5.9	10	IS:11255(P-1)

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+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260142
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HGU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.00
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	172
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	14.87
Quantity of Gas Flow, Nm^3/hr	:	28165.2
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	43	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	35	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	18	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	3.6	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	20.4	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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info@nitylab.com www.nitylab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260143
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-4)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	60
Diameter of the Stack(m)	:	3.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	142
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.58
Quantity of Gas Flow, Nm^3/hr	:	284791
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.8	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260143
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-4)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	60
Diameter of the Stack(m)	:	3.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	142
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.58
Quantity of Gas Flow, Nm^3/hr	:	284791
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	103	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	28	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	8	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	7.8	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	17.8	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260144
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-3)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	50
Diameter of the Stack(m)	:	2.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	140
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.20
Quantity of Gas Flow, Nm^3/hr	:	124048.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	8.7	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260144
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CPP (HRSG-3)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	50
Diameter of the Stack(m)	:	2.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	140
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.20
Quantity of Gas Flow, Nm^3/hr	:	124048.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	45	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	28	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	9	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	3.5	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	19.2	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260145
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CRU (HDT)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.1
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	204
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	15.73
Quantity of Gas Flow, Nm^3/hr	:	33623.4
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	6.7	10	IS:11255(P-1)

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260145
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	CRU (HDT)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.1
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	204
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	15.73
Quantity of Gas Flow, Nm^3/hr	:	33623.4
Barometric Pressure, mmHg	:	752

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	25	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	32	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	9	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	6.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	18.7	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260146
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	OBSU (CRU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	45
Diameter of the Stack(m)	:	1.8
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	173
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	16.78
Quantity of Gas Flow, Nm^3/hr	:	97119.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	6.1	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260146
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	OBSU (CRU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	45
Diameter of the Stack(m)	:	1.8
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	173
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	16.78
Quantity of Gas Flow, Nm^3/hr	:	97119.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	54	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	31	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	7	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	20.4	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	10.4	-	SOP No.: NL/ SOP / FGA /11

Remark: ND-Not Detected, DL-Detection Limit

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260147
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HDTU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	278
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	20.39
Quantity of Gas Flow, Nm^3/hr	:	31189.7
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	8.5	10	IS:11255(P-1)

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Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260147
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	26/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	HDTU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	40
Diameter of the Stack(m)	:	1.0
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	278
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	20.39
Quantity of Gas Flow, Nm^3/hr	:	31189.7
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	56	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	27	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	8	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	23.4	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	20.5	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

CORPORATE OFFICE & CENTRAL LABORATORIES :-
PLOT NO. 118, CHURCH ROAD, BEHIND KAUSIK VATIKA, BHAGAT SINGH COLONY, BALLABHGARH, FARIDABAD - 121004, HARYANA, INDIA
+91-129-2241021 +91-9013591021, +91-9013552273 labsnitya@gmail.com www.nityalab.com

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Test Report

Issued To M/s Indian Oil Corporation Limited
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260148
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	SDU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46
Diameter of the Stack(m)	:	1.38
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	178
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	14.43
Quantity of Gas Flow, Nm^3/hr	:	51343.0
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	8.6	10	IS:11255(P-1)

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Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260148
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	SDU
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46
Diameter of the Stack(m)	:	1.38
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	178
Ambient Air Temperature °C	:	27
Flue Gas Velocity (m/s)	:	14.43
Quantity of Gas Flow, Nm^3/hr	:	51343.0
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1.	Oxide of Nitrogen (as NO_x), mg/Nm^3	45	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	37	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	31	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	15.8	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	19.3	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

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Test Report

Issued To M/s Indian Oil Corporation Limited
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260149
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	AVU (CDU/VDU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46.5
Diameter of the Stack(m)	:	1.59
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	139
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.01
Quantity of Gas Flow, Nm^3/hr	:	77608.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Particulate Matter, (as PM), mg/Nm^3	7.6	10	IS:11255(P-1)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
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Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No. : 202408260149
Test Report Date: 06/09/2024

Sample Particulars:

Nature of the Sample	:	**Stack Gas Emission**
Date of Sampling	:	27/08/2024
Sample Received at Lab	:	30/08/2024
Test Started On	:	30/08/2024
Test Completed On	:	05/09/2024
Purpose of Monitoring	:	To Check the Pollution Load
Sampling Location	:	AVU (CDU/VDU)
Method of Sampling	:	IS: 11255 (P-7)
Normal Operating Schedule	:	As per requirement
Type of Stack /Duct	:	Mild Steel
Stack height from Ground Level (m)	:	46.5
Diameter of the Stack(m)	:	1.59
Sampling Duration (min)	:	40

Observations:

Flue Gas Temperature °C	:	139
Ambient Air Temperature °C	:	28
Flue Gas Velocity (m/s)	:	15.01
Quantity of Gas Flow, Nm^3/hr	:	77608.4
Barometric Pressure, mmHg	:	753

Analysis Report

Sr. No.	Parameter	Test Results	Permissible Limits	Test Method
1	Oxide of Nitrogen (as NO_x), mg/Nm^3	14	350	USEPA OTM-39
2	Carbon Monoxide (as CO), mg/Nm^3	43	-	USEPA OTM-39
3	Oxides of Sulphur (as SO_x), mg/Nm^3	7	50	SOP No.: NL/ SOP / FGA /01
4	Hydrogen Sulphide (as H_2S), mg/Nm^3	ND (DL-4)	150	SOP No.: NL/ SOP / FGA /10
5	Carbon Dioxide (as CO_2), %	16.9	-	SOP No.: NL/ SOP / FGA /11
6	Oxygen (as O_2), %	17.6	-	SOP No.: NL/ SOP / FGA /11

Remark:
ND-Not Detected, DL-Detection Limit

(AUTHORISED SIGNATORY)
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Test Report

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Assam, INDIA

ULR No.: TC636624000002713F,2749F, 2780F, 2858F, 2903F, 2939F, 3030F 3151F, 3227F
Test Report Date: 08/05/2024

Annexure -V

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Wax Sector Cooling Tower
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/04/2024	29.48	58.60	14.60	19.40	21.20	ND	1.32	15.20	ND	ND	ND	ND
04/04/2024	31.62	62.80	15.90	20.20	17.20	ND	0.37	12.80	ND	ND	ND	ND
08/04/2024	42.30	64.10	12.40	18.90	21.10	ND	1.09	13.40	ND	ND	ND	ND
11/04/2024	47.80	52.80	14.10	17.40	20.40	ND	1.18	14.80	ND	ND	ND	ND
16/04/2024	30.34	54.80	12.90	18.10	16.20	ND	1.12	15.60	ND	ND	ND	ND
18/04/2024	29.91	53.30	15.20	16.20	21.80	ND	1.20	14.10	ND	ND	ND	ND
22/04/2024	36.32	52.40	13.80	18.80	17.80	ND	1.11	12.50	ND	ND	ND	ND
25/04/2024	34.61	54.60	13.10	17.90	21.90	ND	1.22	13.20	ND	ND	ND	ND
30/04/2024	34.18	50.80	13.20	16.80	19.90	ND	1.25	13.60	ND	ND	ND	ND
Minimum	**29.48**	**50.80**	**12.40**	**16.20**	**16.20**	-	**0.37**	**12.50**	-	-	-	-
Maximum	**47.80**	**64.10**	**15.90**	**20.20**	**21.90**	-	**1.32**	**15.60**	-	-	-	-
Average	**35.17**	**56.02**	**13.91**	**18.19**	**19.72**	-	**1.10**	**13.91**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
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Assam, INDIA

ULR No.: TC636624000002714F, 2750F, 2781F, 2859F, 2904F, 2940F, 3031 3152F, 3228F
Test Report Date: 08/05/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Bazaar Gate
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/04/2024	34.61	74.20	11.90	16.80	17.80	ND	1.27	12.10	ND	ND	ND	ND
04/04/2024	35.47	63.40	12.40	18.90	19.40	ND	0.22	14.60	ND	ND	ND	ND
08/04/2024	38.03	66.20	11.50	19.20	20.50	ND	1.03	13.20	ND	ND	ND	ND
11/04/2024	35.04	59.70	13.20	17.50	19.80	ND	1.12	12.90	ND	ND	ND	ND
16/04/2024	37.60	61.90	14.30	19.80	20.10	ND	1.05	14.20	ND	ND	ND	ND
18/04/2024	35.89	60.60	12.30	17.10	18.80	ND	1.09	13.40	ND	ND	ND	ND
22/04/2024	38.46	64.80	13.80	16.90	20.10	ND	1.16	16.10	ND	ND	ND	ND
25/04/2024	33.36	66.20	14.10	19.10	17.20	ND	1.22	14.20	ND	ND	ND	ND
30/04/2024	33.76	64.20	11.80	14.90	18.40	ND	1.14	12.20	ND	ND	ND	ND
Minimum	**33.36**	**59.70**	**11.50**	**14.90**	**17.20**	-	**0.22**	**12.10**	-	-	-	-
Maximum	**38.46**	**74.20**	**14.30**	**19.80**	**20.50**	-	**1.27**	**16.10**	-	-	-	-
Average	**35.80**	**64.58**	**12.81**	**17.80**	**19.12**	-	**1.03**	**13.66**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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43, Sector-A1 Ext., Bhalla Enclave, Channi Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000002715F, 2751F, 2782F, 2860F, 2905F, 2941F, 3032F 3153F, 3229F
Test Report Date: 08/05/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Effluent Treatment Plant
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/04/2024	36.32	66.60	13.40	16.60	19.10	ND	1.32	13.80	ND	ND	ND	ND
04/04/2024	37.60	47.50	12.60	19.20	20.37	ND	0.30	12.38	ND	ND	ND	ND
08/04/2024	40.59	68.20	11.40	16.40	21.20	ND	1.10	15.90	ND	ND	ND	ND
11/04/2024	36.75	69.10	13.20	17.30	19.50	ND	1.18	14.80	ND	ND	ND	ND
16/04/2024	39.74	49.80	12.60	18.20	18.77	ND	1.24	15.12	ND	ND	ND	ND
18/04/2024	36.32	63.20	11.90	19.90	19.10	ND	1.03	12.80	ND	ND	ND	ND
22/04/2024	38.46	65.80	12.10	19.40	20.08	ND	1.16	13.61	ND	ND	ND	ND
25/04/2024	41.02	51.60	14.10	20.80	17.80	ND	1.22	15.43	ND	ND	ND	ND
30/04/2024	40.17	63.80	10.60	18.80	15.80	ND	1.20	13.40	ND	ND	ND	ND
Minimum	**36.32**	**47.50**	**10.60**	**16.40**	**15.80**	-	**0.30**	**12.38**	-	-	-	-
Maximum	**41.02**	**69.10**	**14.10**	**20.80**	**21.20**	-	**1.32**	**15.90**	-	-	-	-
Average	**38.55**	**60.62**	**12.43**	**18.51**	**19.08**	-	**1.08**	**14.14**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000002716F, 2752F, 2783F, 2861F, 2906F, 2942F, 3033F 3154F, 3230F
Test Report Date: 08/05/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : New Tank Farm
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/04/2024	38.03	65.40	12.40	15.90	19.16	ND	1.23	14.40	ND	ND	ND	ND
04/04/2024	36.32	51.20	13.20	14.40	20.37	ND	0.22	12.20	ND	ND	ND	ND
08/04/2024	39.31	68.60	13.60	15.20	21.10	ND	1.03	13.60	ND	ND	ND	ND
11/04/2024	37.17	69.50	12.10	17.60	20.57	ND	0.15	15.20	ND	ND	ND	ND
16/04/2024	38.88	49.90	13.40	16.80	18.87	ND	1.13	12.80	ND	ND	ND	ND
18/04/2024	40.59	63.40	14.50	18.50	17.90	ND	1.11	13.10	ND	ND	ND	ND
22/04/2024	41.09	66.40	12.20	17.80	19.30	ND	0.72	14.40	ND	ND	ND	ND
25/04/2024	37.60	53.20	14.10	14.10	17.10	ND	1.02	14.10	ND	ND	ND	ND
30/04/2024	41.02	51.20	12.50	15.80	15.90	ND	1.09	12.60	ND	ND	ND	ND
Minimum	**36.32**	**49.90**	**12.10**	**14.10**	**15.90**	-	**0.15**	**12.20**	-	-	-	-
Maximum	**41.09**	**69.50**	**14.50**	**18.50**	**21.10**	-	**1.23**	**15.20**	-	-	-	-
Average	**38.89**	**59.87**	**13.11**	**16.23**	**18.92**	-	**0.86**	**13.60**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5] [2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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Himmat, Jammu-180 015, J&K (UT), India
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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000003238F,3310F, 3384F, 3454F, 3563F, 3660F, 3814F 3877F, 4001F

Test Report Date: 08/06/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Wax Sector Cooling Tower
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/05/2024	30.28	60.28	15.27	21.10	22.16	ND	0.98	16.59	ND	ND	ND	ND
06/05/2024	29.47	59.38	14.21	21.17	20.18	ND	0.54	11.28	ND	ND	ND	ND
09/05/2024	40.12	62.13	13.13	20.49	22.47	ND	1.10	12.49	ND	ND	ND	ND
13/05/2024	43.25	54.87	15.28	18.79	19.58	ND	1.23	13.31	ND	ND	ND	ND
16/05/2024	34.45	60.12	14.20	19.21	19.23	ND	1.04	14.67	ND	ND	ND	ND
20/05/2024	32.19	58.28	16.12	17.28	20.15	ND	1.15	13.28	ND	ND	ND	ND
24/05/2024	35.68	56.63	14.49	20.17	19.20	ND	1.18	10.28	ND	ND	ND	ND
27/05/2024	32.26	59.78	15.82	18.89	18.25	ND	1.20	14.39	ND	ND	ND	ND
30/05/2024	35.16	52.13	14.30	17.87	20.19	ND	1.21	12.39	ND	ND	ND	ND
Minimum	**29.47**	**52.13**	**13.13**	**17.28**	**18.25**	-	**0.54**	**10.28**	-	-	-	-
Maximum	**43.25**	**62.13**	**16.12**	**21.17**	**22.47**	-	**1.23**	**16.59**	-	-	-	-
Average	**34.76**	**58.18**	**14.76**	**19.44**	**20.16**	-	**1.07**	**13.19**	-	-	-	-
NAAQM Standards	60	100	80	80	100	1	2	400	20	6	1	5
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000003239F,3311F, 3385F, 3455F, 3564F, 3661F, 3815F 3878F, 4002F
Test Report Date: 08/06/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Bazaar Gate
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb^1) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni^2) ng/m^3	Arsenic (as As^3) ng/m3	Benzo (a) pyrene (as BAP^4) ng/m^3	Benzene ($C6H6^5$) ug/m3
02/05/2024	31.28	67.28	11.90	16.80	17.80	ND	1.27	12.10	ND	ND	ND	ND
06/05/2024	33.59	68.79	12.40	18.90	19.40	ND	0.22	14.60	ND	ND	ND	ND
09/05/2024	34.16	71.23	11.50	19.20	20.50	ND	1.03	13.20	ND	ND	ND	ND
13/05/2024	36.52	68.70	13.20	17.50	19.80	ND	1.12	12.90	ND	ND	ND	ND
16/05/2024	34.21	67.53	14.30	19.80	20.10	ND	1.05	14.20	ND	ND	ND	ND
20/05/2024	31.20	62.13	12.30	17.10	18.80	ND	1.09	13.40	ND	ND	ND	ND
24/05/2024	34.58	66.70	13.80	16.90	20.10	ND	1.16	16.10	ND	ND	ND	ND
27/05/2024	32.35	70.12	14.10	19.10	17.20	ND	1.22	14.20	ND	ND	ND	ND
30/05/2024	30.49	69.19	11.80	14.90	18.40	ND	1.14	12.20	ND	ND	ND	ND
Minimum	**30.49**	**62.13**	**11.50**	**14.90**	**17.20**	-	**0.22**	**12.10**	-	-	-	-
Maximum	**36.52**	**71.23**	**14.30**	**19.80**	**20.50**	-	**1.27**	**16.10**	-	-	-	-
Average	**33.15**	**67.96**	**12.81**	**17.80**	**19.12**	-	**1.03**	**13.66**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000003240F,3312F, 3386F, 3456F, 3565F, 3662F, 3816F 3879F, 4003F
Test Report Date: 08/06/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Effluent Treatment Plant
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/05/2024	36.32	66.60	13.40	16.60	19.10	ND	1.32	13.80	ND	ND	ND	ND
06/05/2024	37.60	47.50	12.60	19.20	20.37	ND	0.30	12.38	ND	ND	ND	ND
09/05/2024	40.59	68.20	11.40	16.40	21.20	ND	1.10	15.90	ND	ND	ND	ND
13/05/2024	36.75	69.10	13.20	17.30	19.50	ND	1.18	14.80	ND	ND	ND	ND
16/05/2024	39.74	49.80	12.60	18.20	18.77	ND	1.24	15.12	ND	ND	ND	ND
20/05/2024	36.32	63.20	11.90	19.90	19.10	ND	1.03	12.80	ND	ND	ND	ND
24/05/2024	38.46	65.80	12.10	19.40	20.08	ND	1.16	13.61	ND	ND	ND	ND
27/05/2024	41.02	51.60	14.10	20.80	17.80	ND	1.22	15.43	ND	ND	ND	ND
30/05/2024	40.17	63.80	10.60	18.80	15.80	ND	1.20	13.40	ND	ND	ND	ND
Minimum	**36.32**	**47.50**	**10.60**	**16.40**	**15.80**	-	**0.30**	**12.38**	-	-	-	-
Maximum	**41.02**	**69.10**	**14.10**	**20.80**	**21.20**	-	**1.32**	**15.90**	-	-	-	-
Average	**38.55**	**60.62**	**12.43**	**18.51**	**19.08**	-	**1.08**	**14.14**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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Himmat, Jammu-180 015, J&K (UT), India
+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000003241F,3313F, 3387F, 3457F, 3566F, 3663F, 3817F 3880F, 4004F
Test Report Date: 08/06/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : New Tank Farm
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/05/2024	38.03	65.40	12.40	15.90	19.16	ND	1.23	14.40	ND	ND	ND	ND
06/05/2024	36.32	51.20	13.20	14.40	20.37	ND	0.22	12.20	ND	ND	ND	ND
09/05/2024	39.31	68.60	13.60	15.20	21.10	ND	1.03	13.60	ND	ND	ND	ND
13/05/2024	37.17	69.50	12.10	17.60	20.57	ND	0.15	15.20	ND	ND	ND	ND
16/05/2024	38.88	49.90	13.40	16.80	18.87	ND	1.13	12.80	ND	ND	ND	ND
20/05/2024	40.59	63.40	14.50	18.50	17.90	ND	1.11	13.10	ND	ND	ND	ND
24/05/2024	41.09	66.40	12.20	17.80	19.30	ND	0.72	14.40	ND	ND	ND	ND
27/05/2024	37.60	53.20	14.10	14.10	17.10	ND	1.02	14.10	ND	ND	ND	ND
30/05/2024	41.02	51.20	12.50	15.80	15.90	ND	1.09	12.60	ND	ND	ND	ND
Minimum	**36.32**	**49.90**	**12.10**	**14.10**	**15.90**	-	**0.15**	**12.20**	-	-	-	-
Maximum	**41.09**	**69.50**	**14.50**	**18.50**	**21.10**	-	**1.23**	**15.20**	-	-	-	-
Average	**38.89**	**59.87**	**13.11**	**16.23**	**18.92**	-	**0.86**	**13.60**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5], [2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Dist. Tinsukia
Assam, INDIA

ULR No.: TC636624000004060F,4115F, 4191F, 4288F, 4336F, 4403F, 4558F 4686F
Test Report Date: 10/07/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Wax Sector Cooling Tower
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
03/06/2024	27.10	55.60	13.60	19.20	18.20	ND	0.86	18.40	ND	ND	ND	ND
06/06/2024	25.50	54.80	12.20	18.80	17.40	ND	0.82	13.50	ND	ND	ND	ND
10/06/2024	36.10	58.20	14.10	17.80	19.20	ND	1.01	14.20	ND	ND	ND	ND
13/06/2024	38.40	51.10	13.80	16.20	17.50	ND	1.12	15.20	ND	ND	ND	ND
18/06/2024	30.20	56.20	12.80	16.00	15.80	ND	0.96	16.40	ND	ND	ND	ND
20/06/2024	29.40	54.00	14.40	15.90	18.00	ND	1.04	15.50	ND	ND	ND	ND
24/06/2024	31.40	51.60	12.90	16.80	15.50	ND	1.08	12.80	ND	ND	ND	ND
27/06/2024	30.50	55.20	13.70	17.00	16.40	ND	1.10	16.80	ND	ND	ND	ND
Minimum	**25.50**	**51.10**	**12.20**	**15.90**	**15.50**	-	**0.82**	**12.80**	-	-	-	-
Maximum	**38.40**	**58.20**	**14.40**	**19.20**	**19.20**	-	**1.12**	**18.40**	-	-	-	-
Average	**31.08**	**54.59**	**13.44**	**17.21**	**17.25**	-	**1.00**	**15.35**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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(RAVINDER MITTAL)

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000004061F,4116F, 4192F, 4289F, 4337F, 4404F, 455
4687F

Test Report Date: 10/07/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Bazaar Gate
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
03/06/2024	28.40	61.20	13.40	18.20	19.10	ND	1.16	14.10	ND	ND	ND	ND
06/06/2024	30.10	62.30	14.60	17.90	18.30	ND	0.39	16.70	ND	ND	ND	ND
10/06/2024	32.20	64.40	13.30	20.50	21.40	ND	0.90	15.30	ND	ND	ND	ND
13/06/2024	31.50	63.90	15.40	19.20	21.30	ND	1.02	14.30	ND	ND	ND	ND
18/06/2024	29.10	62.60	16.10	21.20	22.50	ND	0.96	16.90	ND	ND	ND	ND
20/06/2024	32.20	57.80	14.80	18.00	19.00	ND	1.05	15.50	ND	ND	ND	ND
24/06/2024	31.50	60.20	15.00	19.40	21.90	ND	1.06	18.40	ND	ND	ND	ND
27/06/2024	28.80	65.20	16.90	18.40	16.50	ND	1.12	16.00	ND	ND	ND	ND
Minimum	**28.40**	**57.80**	**13.30**	**17.90**	**16.50**	-	**0.39**	**14.10**	-	-	-	-
Maximum	**32.20**	**65.20**	**16.90**	**21.20**	**22.50**	-	**1.16**	**18.40**	-	-	-	-
Average	**30.48**	**62.20**	**14.94**	**19.10**	**20.00**	-	**0.96**	**15.90**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000004062F,4117F, 4193F, 4290F, 4338F, 4405F, 4560F 4688F
Test Report Date: 10/07/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Effluent Treatment Plant
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
03/06/2024	32.40	61.50	15.40	18.20	20.40	ND	1.22	15.50	ND	ND	ND	ND
06/06/2024	34.50	41.30	14.80	19.90	19.60	ND	0.40	14.60	ND	ND	ND	ND
10/06/2024	36.70	62.20	13.80	17.20	20.60	ND	1.01	17.40	ND	ND	ND	ND
13/06/2024	32.00	63.20	15.20	19.00	18.90	ND	1.08	16.20	ND	ND	ND	ND
18/06/2024	35.40	47.82	14.10	20.10	21.40	ND	1.14	17.20	ND	ND	ND	ND
20/06/2024	31.70	59.30	13.60	17.50	18.00	ND	0.96	14.90	ND	ND	ND	ND
24/06/2024	34.90	60.20	14.00	18.10	19.10	ND	1.06	16.00	ND	ND	ND	ND
27/06/2024	37.30	49.30	16.60	21.90	18.50	ND	1.12	14.10	ND	ND	ND	ND
Minimum	**31.70**	**41.30**	**13.60**	**17.20**	**18.00**	-	**0.40**	**14.10**	-	-	-	-
Maximum	**37.30**	**63.20**	**16.60**	**21.90**	**21.40**	-	**1.22**	**17.40**	-	-	-	-
Average	**34.36**	**55.60**	**14.69**	**18.99**	**19.56**	-	**1.00**	**15.74**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000004063F,4118F, 4194F, 4291F, 4339F, 4406F, 4561F 4689F

Test Report Date: 10/07/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : New Tank Farm
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
03/06/2024	33.30	61.50	14.10	17.20	18.80	ND	1.13	16.90	ND	ND	ND	ND
06/06/2024	34.20	53.40	15.20	18.20	19.40	ND	0.38	14.50	ND	ND	ND	ND
10/06/2024	35.50	62.20	15.90	17.90	20.50	ND	1.01	15.40	ND	ND	ND	ND
13/06/2024	32.90	63.70	14.80	17.40	21.10	ND	0.26	17.10	ND	ND	ND	ND
18/06/2024	36.60	51.60	16.00	18.90	20.80	ND	1.03	14.50	ND	ND	ND	ND
20/06/2024	37.70	60.20	17.20	20.50	17.10	ND	0.69	15.20	ND	ND	ND	ND
24/06/2024	38.40	62.90	14.00	19.10	19.40	ND	0.96	16.40	ND	ND	ND	ND
27/06/2024	33.00	51.90	16.40	18.90	21.00	ND	1.05	17.00	ND	ND	ND	ND
Minimum	**32.90**	**51.60**	**14.00**	**17.20**	**17.10**	-	**0.26**	**14.50**	-	-	-	-
Maximum	**38.40**	**63.70**	**17.20**	**20.50**	**21.10**	-	**1.13**	**17.10**	-	-	-	-
Average	**35.20**	**58.43**	**15.45**	**18.51**	**19.76**	-	**0.81**	**15.88**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Dist. Tinsukia
Assam, INDIA

ULR No.: TC636624000000494 3F,5001F, 5103F, 5210F, 5322F, 5366F
Test Report Date: 10/08/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Wax Sector Cooling Tower
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m³	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m³	Benzene (C6H6[5]) ug/m3
11/07/2024	28.63	57.42	13.46	19.53	20.62	ND	0.82	14.22	ND	ND	ND	ND
15/07/2024	26.92	56.83	12.72	19.84	17.32	ND	0.44	9.47	ND	ND	ND	ND
18/07/2024	37.60	60.34	11.19	18.35	20.43	ND	0.99	10.34	ND	ND	ND	ND
22/07/2024	41.45	51.23	13.42	16.58	16.33	ND	1.11	11.67	ND	ND	ND	ND
26/07/2024	31.62	57.10	12.32	17.64	16,43	ND	0.93	12.78	ND	ND	ND	ND
29/07/2024	30.76	56.18	14.78	15.49	17.29	ND	0.94	11,49	ND	ND	ND	ND
Minimum	**26.92**	**51.23**	**11.19**	**15.49**	**16.33**	-	**0.44**	**9.47**	-	-	-	-
Maximum	**41.45**	**60.34**	**14.78**	**19.84**	**20.62**	-	**1.11**	**14.22**	-	-	-	-
Average	**32.83**	**56.33**	**12.98**	**17.85**	**18.42**	-	**0.85**	**11.74**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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+91-191-2465597
info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC6366240000004944F,5002F, 5104F, 5211F, 5323F, 5367F
Test Report Date: 10/08/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Bazaar Gate
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
11/07/2024	29.05	63.41	10.11	14.24	16.62	ND	1.21	10.04	ND	ND	ND	ND
15/07/2024	31.62	64.45	11.48	16.48	17.44	ND	0.18	11.86	ND	ND	ND	ND
18/07/2024	32.47	66.84	9.86	17.55	18.06	ND	0.99	12.18	ND	ND	ND	ND
22/07/2024	34.61	64.23	11.87	15.33	17.94	ND	1.08	10.82	ND	ND	ND	ND
26/07/2024	31.19	63.28	12.33	17.88	17.88	ND	1.01	12.48	ND	ND	ND	ND
29/07/2024	28.63	60.04	10.72	15.15	16.56	ND	1.04	11.74	ND	ND	ND	ND
Minimum	**28.63**	**60.04**	**9.86**	**14.24**	**16.56**	-	**0.18**	**10.04**	-	-	-	-
Maximum	**34.61**	**66.84**	**12.33**	**17.88**	**18.06**	-	**1.21**	**12.48**	-	-	-	-
Average	**31.26**	**63.64**	**11.07**	**16.09**	**17.39**	-	**0.86**	**11.46**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

TC-6366

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC636624000000494 5F,5003F, 5105F, 5212F, 5324F, 5368F
Test Report Date: 10/08/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Effluent Treatment Plant
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
11/07/2024	34.61	64.14	11.76	14.86	17.08	ND	1.29	11.28	ND	ND	ND	ND
15/07/2024	35.89	45.25	10.42	17.89	18,36	ND	0.26	10.06	ND	ND	ND	ND
18/07/2024	38.46	66.56	9.88	14.96	19.46	ND	1.07	13.80	ND	ND	ND	ND
22/07/2024	34.18	68.05	11.58	14.34	16.09	ND	1.15	13.44	ND	ND	ND	ND
26/07/2024	37.60	41.34	10.46	16.78	16.72	ND	1.21	13.89	ND	ND	ND	ND
29/07/2024	33.76	61.72	10.36	17.68	17.72	ND	1.01	10.99	ND	ND	ND	ND
Minimum	**33.76**	**41.34**	**9.88**	**14.34**	**16.09**	-	**0.26**	**10.06**	-	-	-	-
Maximum	**38.46**	**68.05**	**11.76**	**17.89**	**19.46**	-	**1.29**	**13.89**	-	-	-	-
Average	**35.75**	**57.06**	**10.76**	**16.09**	**17.52**	-	**0.94**	**12.18**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

ULR No.: TC6366240000004946F,5004F, 5106F, 5213F, 5325F, 5369F
Test Report Date: 10/08/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	New Tank Farm
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
11/07/2024	36.75	63.28	11.08	13.68	17.18	ND	1.19	12.56	ND	ND	ND	ND
15/07/2024	34.61	49.92	11.48	13.04	18.36	ND	0.18	10.24	ND	ND	ND	ND
18/07/2024	37.17	66.48	11.31	13.98	19.86	ND	0.99	11.38	ND	ND	ND	ND
22/07/2024	35.89	67.56	10.96	15.47	17.54	ND	0.11	13.44	ND	ND	ND	ND
26/07/2024	36.32	47.68	11.86	15.28	16.58	ND	1.08	10.66	ND	ND	ND	ND
29/07/2024	38.46	61.89	12.38	16.49	16.36	ND	1.07	11.78	ND	ND	ND	ND
Minimum	**34.61**	**47.68**	**10.96**	**13.04**	**16.36**	-	**0.11**	**10.24**	-	-	-	-
Maximum	**38.46**	**67.56**	**12.38**	**16.49**	**19.86**	-	**1.19**	**13.44**	-	-	-	-
Average	**36.53**	**59.01**	**11.55**	**14.68**	**17.76**	-	**0.74**	**11.72**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

TC-6366

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43, Sector-A1 Ext., Bhalla Enclave, Channi Himmat, Jammu-180 015, J&K (UT), India
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info@nitylab.com www.nitylab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202408010113,202408050113, 202408080113, 202408120113 20240815011 3, 202408190113, 202408220113, 202408260113 202408290113

Test Report Date: 07/09/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	New Tank Farm
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
01/08/2024	36.20	61.50	15.20	18.40	22.40	ND	1.12	16.60	ND	ND	ND	ND
05/08/2024	34.40	48.20	16.40	19.20	23.60	ND	0.32	14.40	ND	ND	ND	ND
08/08/2024	37.10	62.70	16.50	18.90	21.80	ND	0.94	15.20	ND	ND	ND	ND
12/08/2024	35.20	64.40	14.40	19.40	22.5-0	ND	0.26	13.80	ND	ND	ND	ND
15/08/2024	36.60	44.80	15.80	18.20	20.60	ND	1.03	14.40	ND	ND	ND	ND
19/08/2024	38.20	58.90	16.60	20.60	19.80	ND	1.01	16.10	ND	ND	ND	ND
22/08/2024	39.30	62.20	14.90	19.20	21.10	ND	0.82	17.20	ND	ND	ND	ND
26/08/2024	35.50	50.40	17.10	18.90	21.60	ND	0.98	16.00	ND	ND	ND	ND
29/08/2024	38.90	48.20	15.00	18.50	19.20	ND	1.02	14.80	ND	ND	ND	ND
Minimum	**34.40**	**44.80**	**14.40**	**18.20**	**19.20**	-	**0.26**	**13.80**	-	-	-	-
Maximum	**39.30**	**64.40**	**17.10**	**20.60**	**23.60**	-	**1.12**	**17.20**	-	-	-	-
Average	**36.82**	**55.70**	**15.77**	**19.03**	**21.26**	-	**0.83**	**15.39**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

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(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202408010111,202408050111, 202408080111, 202408120111 202408150111, 202408190111, 202408220111, 202408260111 202408290111

Test Report Date: 07/09/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Bazaar Gate
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m3	Benzene (C6H6[5]) ug/m3
01/08/2024	29.40	63.30	13.20	18.20	19.20	ND	1.17	15.20	ND	ND	ND	ND
05/08/2024	30.80	64.40	14.60	19.40	20.10	ND	0.34	16.40	ND	ND	ND	ND
08/08/2024	31.20	67.20	13.20	20.10	20.60	ND	0.95	14.60	ND	ND	ND	ND
12/08/2024	34.50	64.60	15.40	19.10	21.20	ND	1.02	15.80	ND	ND	ND	ND
15/08/2024	32.10	62.80	12.30	17.40	18.40	ND	1.00	12.30	ND	ND	ND	ND
19/08/2024	29.50	60.10	14.40	18.80	18.00	ND	0.98	16.00	ND	ND	ND	ND
22/08/2024	32.70	63.60	15.50	17.90	20.40	ND	1.06	14.40	ND	ND	ND	ND
26/08/2024	38.20	65.20	16.10	21.00	19.40	ND	1.12	12.20	ND	ND	ND	ND
29/08/2024	28.60	64.00	13.30	16.90	20.00	ND	1.04	15.00	ND	ND	ND	ND
Minimum	**28.60**	**60.10**	**12.30**	**16.90**	**18.00**	-	**0.34**	**12.20**	-	-	-	-
Maximum	**38.20**	**67.20**	**16.10**	**21.00**	**21.20**	-	**1.17**	**16.40**	-	-	-	-
Average	**31.89**	**63.91**	**14.22**	**18.76**	**19.70**	-	**0.96**	**14.66**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	40CFR Appendix L Part 53 CPCB Guidelines	IS:5182 (P-23)	IS:5182 (P-2)	IS:5182 (P-6)	IS:5182 (P-9)	NL/SOP /AAQ-11	IS:5182 (P-10)	Method of Air Sampling & Analysis	NL/SOP/AAQ-13	NL/SOP/ AAQ-12	IS:5182 (P-12)	IS:5182 (P-11)

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202408010112,202408050112, 202408080112, 202408120112 202408150112, 202408190112, 202408220112, 202408260112 202408290112

Test Report Date: 07/09/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Effluent Treatment Plant
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
01/08/2024	33.30	60.50	15.20	18.40	20.40	ND	1.21	15.20	ND	ND	ND	ND
05/08/2024	34.40	44.40	14.60	20.20	21.40	ND	0.25	14.60	ND	ND	ND	ND
08/08/2024	36.20	61.40	13.30	21.40	23.30	ND	1.01	13.70	ND	ND	ND	ND
12/08/2024	33.80	63.30	15.50	1.40	20.90	ND	1.07	16.40	ND	ND	ND	ND
15/08/2024	35.50	46.60	14.40	19.20	20.70	ND	1.14	17.20	ND	ND	ND	ND
19/08/2024	32.80	59.90	13.80	20.00	21.50	ND	0.98	14.90	ND	ND	ND	ND
22/08/2024	5.50	60.10	14.90	21.10	22.40	ND	1.06	15.60	ND	ND	ND	ND
26/08/2024	37.70	48.20	16.40	22.40	18.80	ND	1,.12	13.90	ND	ND	ND	ND
29/08/2024	38.00	57.70	13.80	19.90	17.10	ND	1.10	16.00	ND	ND	ND	ND
Minimum	**5.50**	**44.40**	**13.30**	**1.40**	**17.10**	-	**0.25**	**13.70**	-	-	-	-
Maximum	**38.00**	**63.30**	**16.40**	**22.40**	**23.30**	-	**1.21**	**17.20**	-	-	-	-
Average	**31.91**	**55.79**	**14.66**	**18.22**	**20.72**	-	**0.98**	**15.28**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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43, Sector-A1 Ext., Bhalla Enclave, Channi Himmat, Jammu-180 015, J&K (UT), India
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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202408010113,202408050113, 202408080113, 202408120113 202408150113, 202408190113, 202408220113, 202408260113 202408290113

Test Report Date: 07/09/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : New Tank Farm
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m[3]	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m[3]	Benzene (C6H6[5]) ug/m3
01/08/2024	36.20	61.50	15.20	18.40	22.40	ND	1.12	16.60	ND	ND	ND	ND
05/08/2024	34.40	48.20	16.40	19.20	23.60	ND	0.32	14.40	ND	ND	ND	ND
08/08/2024	37.10	62.70	16.50	18.90	21.80	ND	0.94	15.20	ND	ND	ND	ND
12/08/2024	35.20	64.40	14.40	19.40	22.5-0	ND	0.26	13.80	ND	ND	ND	ND
15/08/2024	36.60	44.80	15.80	18.20	20.60	ND	1.03	14.40	ND	ND	ND	ND
19/08/2024	38.20	58.90	16.60	20.60	19.80	ND	1.01	16.10	ND	ND	ND	ND
22/08/2024	39.30	62.20	14.90	19.20	21.10	ND	0.82	17.20	ND	ND	ND	ND
26/08/2024	35.50	50.40	17.10	18.90	21.60	ND	0.98	16.00	ND	ND	ND	ND
29/08/2024	38.90	48.20	15.00	18.50	19.20	ND	1.02	14.80	ND	ND	ND	ND
Minimum	**34.40**	**44.80**	**14.40**	**18.20**	**19.20**	-	**0.26**	**13.80**	-	-	-	-
Maximum	**39.30**	**64.40**	**17.10**	**20.60**	**23.60**	-	**1.12**	**17.20**	-	-	-	-
Average	**36.82**	**55.70**	**15.77**	**19.03**	**21.26**	-	**0.83**	**15.39**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:
*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

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info@nityalab.com www.nityalab.com

Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202409020110,202409050110, 202409090110, 202409120110 202409160110, 202409190110, 202409230110, 202409260110 202409300110
Test Report Date: 08/10/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : Wax Sector Cooling Tower
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/09/2024	35.20	51.30	15.40	20.80	21.20	ND	0.93	16.50	ND	ND	ND	ND
05/09/2024	32.30	52.80	14.20	19.80	18.40	ND	0.54	15.20	ND	ND	ND	ND
09/09/2024	33.80	54.30	16.90	21.10	22.50	ND	1.10	16.80	ND	ND	ND	ND
12/09/2024	36.20	53.10	15.30	19.20	21.10	ND	1.20	14.50	ND	ND	ND	ND
16/09/2024	33.00	52.90	14.50	22.40	23.10	ND	1.04	15.90	ND	ND	ND	ND
19/09/2024	31.60	50.40	16.70	19.30	22.00	ND	0.98	13.70	ND	ND	ND	ND
23/09/2024	31.00	54.60	14.00	18.80	17.40	ND	1.02	14.00	ND	ND	ND	ND
26/09/2024	29.50	51.20	13.80	18:00	20.80	ND	1.16	17.20	ND	ND	ND	ND
30/09/2024	34.80	49.90	15.90	20.50	22.30	ND	1.20	16.40	ND	ND	ND	ND
Minimum	**29.50**	**49.90**	**13.80**	**18.00**	**17.40**	-	**0.54**	**13.70**	-	-	-	-
Maximum	**36.20**	**54.60**	**16.90**	**22.40**	**23.10**	-	**1.20**	**17.20**	-	-	-	-
Average	**33.04**	**52.28**	**15.19**	**19.99**	**20.98**	-	**1.02**	**15.58**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202409020111,202409050111, 202409090111, 202409120111 202409160111, 202409190111, 202409230111, 202409260111 202409300111

Test Report Date: 08/10/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Bazaar Gate
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m³	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m³	Benzene (C6H6[5]) ug/m3
02/09/2024	31.20	58.20	15.50	20.10	21.40	ND	1.06	17.50	ND	ND	ND	ND
05/09/2024	28.80	59.40	16.70	21.80	22.70	ND	0.44	18.80	ND	ND	ND	ND
09/09/2024	33.20	61.20	15.80	22.40	23.40	ND	1.09	16.40	ND	ND	ND	ND
12/09/2024	32.10	59.10	17.40	21.10	22.50	ND	1.12	17.30	ND	ND	ND	ND
16/09/2024	30.60	57.40	14.80	19.20	20.80	ND	0.98	14.50	ND	ND	ND	ND
19/09/2024	31.50	55.90	16.70	20.90	20.10	ND	1.02	18.20	ND	ND	ND	ND
23/09/2024	30.90	58.10	17.80	21.60	22.00	ND	1.16	16.30	ND	ND	ND	ND
26/09/2024	34.40	60.20	18.20	23.40	21.50	ND	1.04	14.80	ND	ND	ND	ND
30/09/2024	29.90	59.80	15.30	18.90	19.80	ND	0.92	17.60	ND	ND	ND	ND
Minimum	**28.80**	**55.90**	**14.80**	**18.90**	**19.80**	-	**0.44**	**14.50**	-	-	-	-
Maximum	**34.40**	**61.20**	**18.20**	**23.40**	**23.40**	-	**1.16**	**18.80**	-	-	-	-
Average	**31.40**	**58.81**	**16.47**	**21.04**	**21.58**	-	**0.98**	**16.82**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analyzed within Seven days from the date of sampling.

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202409020112,202409050112, 202409090112, 202409120112 202409160112, 202409190112, 202409230112, 202409260112 202409300112
Test Report Date: 08/10/2024

Sample Particulars

Nature of the Sample	:	**Ambient Air Quality Monitoring**
Sampling Location	:	Effluent Treatment Plant
Purpose of Monitoring	:	To Check the Pollution Load
Method of Sampling	:	IS 5182 (Part 14)
Monitoring Conducted By	:	M/s Nitya Laboratories
Sampling Duration (Hrs.)	:	24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/09/2024	30.80	54.80	17.40	19.30	21.60	ND	1.11	17.80	ND	ND	ND	ND
05/09/2024	31.50	46.70	16.5	22.50	23.40	ND	0.37	16.40	ND	ND	ND	ND
09/09/2024	33.60	56.90	15.50	23.60	24.90	ND	0.94	15.30	ND	ND	ND	ND
12/09/2024	30.90	58.20	17.80	19.80	18.80	ND	1.04	18.20	ND	ND	ND	ND
16/09/2024	32.40	44.80	16.10	18.80	20.90	ND	1.05	19.80	ND	ND	ND	ND
19/09/2024	29.80	55.60	15.30	19.20	22.70	ND	0.92	16.40	ND	ND	ND	ND
23/09/2024	30.00	56.10	16.40	23.20	21.50	ND	1.09	17.10	ND	ND	ND	ND
26/09/2024	33.50	50.20	18.20	22.90	19.30	ND	1.18	15.20	ND	ND	ND	ND
30/09/2024	34.40	51.80	15.50	20.60	18.80	ND	1.09	19.40	ND	ND	ND	ND
Minimum	**29.80**	**44.80**	**15.30**	**18.80**	**18.80**	-	**0.37**	**15.20**	-	-	-	-
Maximum	**34.40**	**58.20**	**18.20**	**23.60**	**24.90**	-	**1.18**	**19.80**	-	-	-	-
Average	**31.88**	**52.79**	**16.52**	**21.10**	**21.32**	-	**0.98**	**17.29**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

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Test Report

Issued To **M/s Indian Oil Corporation Limited**
(Refinery Division)
Assam Oil Division, Digboi, Distt.Tinsukia
Assam, INDIA

Test Report No.: 202409020113,202409050113, 202409090113, 202409120113 202409160113, 202409190113, 202409230113, 202409260113 202409300113

Test Report Date: 08/10/2024

Sample Particulars

Nature of the Sample : **Ambient Air Quality Monitoring**
Sampling Location : New Tank Farm
Purpose of Monitoring : To Check the Pollution Load
Method of Sampling : IS 5182 (Part 14)
Monitoring Conducted By : M/s Nitya Laboratories
Sampling Duration (Hrs.) : 24 Hrs.

Date of Sampling	Parameter											
	Particulate Matter (PM2.5) µg/m3	Particulate Matter (PM10) µg/m3	Sulphur Dioxide (as SO2) µg/m3	Nitrogen Dioxide (as NO2) ug/m3	Ozone (as O3) ug/m3	Lead (as Pb[1]) µg/ m3	Carbon Monoxide (as CO) mg/m3	Ammonia (as NH3) ug/m3	Nickel (as Ni[2]) ng/m^3	Arsenic (as As[3]) ng/m3	Benzo (a) pyrene (as BAP[4]) ng/m^3	Benzene (C6H6[5]) ug/m3
02/09/2024	32.80	56.50	17.70	20.40	21.80	ND	1.02	18.60	ND	ND	ND	ND
05/09/2024	30.50	43.40	18.50	21.20	22.40	ND	0.46	16.50	ND	ND	ND	ND
09/09/2024	32.50	57.70	18.40	20.90	20.90	ND	0.98	17.80	ND	ND	ND	ND
12/09/2024	30.90	59.20	16.70	21.80	23.40	ND	0.39	15.40	ND	ND	ND	ND
16/09/2024	31.40	41.20	17.90	20.60	21.00	ND	1.09	16.80	ND	ND	ND	ND
19/09/2024	33.90	53.40	18.80	21.80	18.80	ND	1.00	18.40	ND	ND	ND	ND
23/09/2024	34.40	57.20	16.40	19.90	20.60	ND	0.92	19.30	ND	ND	ND	ND
26/09/2024	31.80	46.90	15.30	18.80	22.00	ND	1.13	18.10	ND	ND	ND	ND
30/09/2024	33.90	45.90	17.00	20.00	21.30	ND	1.09	16.60	ND	ND	ND	ND
Minimum	**30.50**	**41.20**	**15.30**	**18.80**	**18.80**	-	**0.39**	**15.40**	-	-	-	-
Maximum	**34.40**	**59.20**	**18.80**	**21.80**	**23.40**	-	**1.13**	**19.30**	-	-	-	-
Average	**32.46**	**51.27**	**17.41**	**20.60**	**21.36**	-	**0.90**	**17.50**	-	-	-	-
NAAQM Standards	**60**	**100**	**80**	**80**	**100**	**1**	**2**	**400**	**20**	**6**	**1**	**5**
Test Method	**40CFR Appendix L Part 53 CPCB Guidelines**	**IS:5182 (P-23)**	**IS:5182 (P-2)**	**IS:5182 (P-6)**	**IS:5182 (P-9)**	**NL/SOP /AAQ-11**	**IS:5182 (P-10)**	**Method of Air Sampling & Analysis**	**NL/SOP/AAQ-13**	**NL/SOP/ AAQ-12**	**IS:5182 (P-12)**	**IS:5182 (P-11)**

Remark:

*NAAQS: National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009
ND-Not Detected, [3]Arsenic-ND [DL- 0.5],[4]BAP-ND [DL- 0.5], [5]Benzene-ND [DL- 0.5], [1]Lead-ND [DL- 0.5],[2]Nickel-ND [DL- 1.0]
Sample Analysed within Seven days from the date of sampling.

NITYA LABORATORIES AUTHORISED

(AUTHORISED SIGNATORY)
(RAVINDER MITTAL)

Annexure-VI

LDAR Monitoring Report

for

Month of April to June 2024

at

IOCL, Digboi Refinery

Prepared by

NETEL (INDIA) LIMITED

Email: ems@netel-india.com,
emsne@netel-india.com

LDAR Monitoring Report for IOCL, Digboi

Name of client	M/s Indian Oli Corporation Assam Oil Division Digboi-786171 Assam
Name of Contractor	NETEL (INDIA) LIMITED Environment Management W-408, Rabale MIDC, TTC Industrial Area, Navi
Nature of job	LDAR Monitoring Report
Report Period	3 Months April to June,2024

For NETEL (INDIA) LIMITED

Shraddha Kere
Quality Manager

Fugitive Emission Survey for 1st Quarter of 2024-2025

Environment Department is conducting quaterly " Fugitive Emission Survey" of potential soures of various process units under Leak Detection & Repair Program (LDAR)and as per revised Effluent & Emission Standerd.The locations for the survey were selected in consultation with the various departments The survey covered the following units and areas:

Leak definition: A leak is defined as the detection of VOC concentration more than the values (in PPM) specified below at the emission source using a hydrocarbon analyzer to measurement Protocol (US EPA – 453/R-95-017, 1995 Protocol for equipment leak emission estimates may be referred):

Sr. No.	Component	General Hydrocarbon (PPM)
		w. e. f. January 01, 2009
1	Pump/Compressor	5000
2	Valves/Flanges	3000
3	Other component	3000

In addition, any component observed to be leaking by sight, sound or smell regardless of concentration (liquid dripping, visible vapor leak) or presence of bubbles using soap solution should be considered as leak.

In this quarter, 5810 probable leak points are surveyed and 28 leaky points detected, which is having HC potential loss 39.20 Kg/Day

LEAK DETECTION AND REPAIR (LDAR) PROGRAM
VOC LEAK SUMMARY : April to June, 2024.

Sr. No.	Date	Unit	Equipment	Tag. No	Components	Line Size	Location	Statutory Limit PPM	Leak Type	Reading (ppm)	KG/per day	Readings After attending leak (ppm)	KG/per day	Total Saving
1	23-04-2024	AVU	Pump Valve	P-001 A Suction I/V	Valve	3"	Isolation Valve	3000	Gland	9000	0 758	150	0.007	0 751
2	24-04-2024	CRU	Valve	03-PA-002 A Discharge I/V	Valve	2"	-	3000	Gland	7400	0 606	80	0 003	1 645
3	24-04-2024		Flange	FCV-1601 U/S I/V	Valve	2"	-	3000	Gland	12000	1 052	200	0.010	
4	23-04-2024	DCU	Pump Valve	EQP NO-07-PA-003 A OUT	Valve	3"	-	3000	Gland	10000	0 855	90	0 004	0 851
5	24-04-2024	MSQU	Pump Valve	037-PA-CF-001A OUT LET LINE	Valve	4"	-	3000	Gland	10000	0 855	70	0.005	3 851
6	24-04-2024		Valve	037 FV-0401 U/S Valve	Valve	3"	-	3000	Gland	9000	0 758	160	0 008	
7	24-04-2024		Valve	CONTROL VALVE 037-FV-401	Valve	2"	-	3000	Gland	10000	0 855	98	0 004	
8	24-04-2024		Valve	037-FV-401 D/S Valve	Valve	4"	-	3000	Gland	7000	0 569	360	0 019	
9	24-04-2024		Valve	036-PA-CF-001 B OUT LET LINE	Valve	2"	Isolation Valve	3000	Gland	10000	0 855	140	0 007	
10	25-04-2024	HGU	Valve	CONTROL VALVE10-PV-2404 BY PASS LINE	Valve	3"	-	3000	Gland	7000	0 569	60	0.003	1 717
11	25-04-2024		Valve	PRODUCT HYDROGEN LINE TO MSQU 1st GATE VALVE	Valve	3"	-	3000	Gland	8100	0 672	120	0.006	
12	25-04-2024		Valve	37-FV-3302 D/S I/V Flange	Valve	3"	-	3000	Flange	6400	0 514	180	0 029	
13	27-04-2024	OMS (PPH)	Valve	TK-599 Receiving line Valve-I	Valve	3"	Isolation Valve	3000	Gland	9000	0 758	240	0.012	2 201
14	27-04-2024		Valve	TK-599 Suction line Valve-I	Valve	3"	Isolation Valve	3000	Gland	- 7500	0 616	230	0.012	
15	27-04-2024		Valve	TK-600 Receiving lineValve	Valve	3"	-	3000	Gland	10000	0 855	100	0.004	
16	26-04-2024	SDU	Valve	Outlet Line 1st I/V	Valve	6"	-	3000	Gland	5000	0 388	70	0.003	1 601
17	26-04-2024		Valve	Inlet Line I/V	Valve	6"	-	3000	Gland	8000	0 663	65	0 003	
18	26-04-2024		Valve	Outlet Line 1st I/V	Valve	6"	-	3000	Gland	7000	0 569	260	0 013	

LEAK DETECTION AND REPAIR (LDAR) PROGRAM
VOC QUARTERLY REPORT : APRIL TO JUNE,2024
PLANTWISE SUMMARY

Sr. No.	Name of the Unit	Date of Monitoring	Total No of Points Monitored	Page No.	No. of Points Where leaks found beyond standard limits	Before Repair Leak (kg/day)	After Repair Leak (kg/day)
1	AVU	23/04/2024	551	10 to 26	1	0.758	0.007
2	DCU	23/04/2024	1043	27 to 58	1	0.855	0.004
3	CRU	24/04/2024	272	58 to 66	2	1.658	0.013
4	MSQU	24/04/2024	1012	67 to 97	5	3.892	0.041
5	HDTU	25/04/2024	164	97 to 102	0	0.000	0.000
6	HGU	25/04/2024	165	103 to 108	3	1.755	0.038
7	OM & S (CTF)	27/04/2024	174	108 to 113	0	0.000	0.000
8	OM&S (PPH)	27/04/2024	1119	113 to 147	3	2.229	0.028
9	SDU	26/04/2024	336	147 to 158	3	1.620	0.019
10	CRU off side Pump house	26/04/2024	267	158 to 166	0	0.000	0.000
11	NEW TANK FARM	29/04/2024	587	166 to 184	0	0.000	0.000
12	SDU (Off side Pump House)	26/04/2024	120	184 to 188	0	0.000	0.000
Total in Kg/day						**12.77**	**0.15**
Toatl in MT/Annum						**4.673**	**0.055**
Total Saving in kg/day							**12.62**
Total in MT/Annum							**4.62**

Verified by
Neelima Dalvi
Technical Manager

Checked by
Shraddha Kere
Quality Manager

LDAR Monitoring Report

for

Month of July to September 2024

at

IOCL, Digboi Refinery

Prepared by

NETEL (INDIA) LIMITED

Email: ems@netel-india.com,
emsne@netel-india.com

LDAR Monitoring Report for IOCL, Digboi

Name of client	M/s Indian Oli Corporation Assam Oil Division Digboi-786171 Assam
Name of Contractor	NETEL (INDIA) LIMITED Environment Management W-408, Rabale MIDC, TTC Industrial Area, Navi
Nature of job	LDAR Monitoring Report
Report Period	3 Months July to Sept,2024

For NETEL (INDIA) LIMITED

Shraddha Kere
Quality Manager

Fugitive Emission Survey for 2nd Quarter of 2024-2025

Environment Department is conducting quaterly " Fugitive Emission Survey" of potential soures of various process units under Leak Detection & Repair Program (LDAR)and as per revised Effluent & Emission Standerd.The locations for the survey were selected in consultation with the various departments The survey covered the following units and areas:

1. Process unit - AVU, CRU, DCU, MSQU, HGU, HDTU, SDU
2. Off site Area -Tank Area, SDU offsite, CRU offsite, OM&S, NTF

Leak definition: A leak is defined as the detection of VOC concentration more than the values (in PPM) specified below at the emission source using a hydrocarbon analyzer to measurement Protocol (US EPA – 453/R-95-017, 1995 Protocol for equipment leak

Sr. No.	Component	General Hydrocarbon (PPM)
		w. e. f. January 01, 2009
1	Pump/Compressor	5000
2	Valves/Flanges	3000
3	Other component	3000

In addition, any component observed to be leaking by sight, sound or smell regardless of concentration (liquid dripping, visible vapor leak) or presence of bubbles using soap solution should be considered as leak.

In this quarter, 5810 probable leak points are surveyed and 28 leaky points detected, which is having HC potential loss 39.20 Kg/Day

LEAK DETECTION AND REPAIR (LDAR) PROGRAM
VOC LEAK SUMMARY : July to September, 2024.

Sr. No.	Date	Unit	Equipment	Tag. No	Components	Line Size	Location	Statutory Limit PPM	Leak Type	Reading (ppm)	KG/per day	Readings After attending leak (ppm)	KG/per day	Total Saving
1	02-09-2024	AVU	Pump Valve	P-008 A Suction I/V	Valve	3"	Isolation Valve	3000	Gland	4000	0.301	120	0.006	0.295
2	04-09-2024	CRU	Valve	P-002 B Discharge I/V	Valve	2"	-	3000	Gland	5400	0.423	160	0.008	0.415
3	04-09-2024		Flange	LIC-1401 Drain Flange	Flange	1"	-	3000	Gland	5200	0.406	80	0.003	0.403
4	02-09-2024	DCU	Pump Valve	EQPNO407-PA-002B OUTLET	Valve	4"	Isolation Valve	3000	Gland	5000	0.388	140	0.007	0.381
5	04-09-2024	MSQU	Valve	FV-803 U/S I/V	Valve	4"	-	3000	Flange	5000	0.388	200	0.031	0.357
6	03-09-2024	HDTU	Pump Valve	P-004 A Suction I/V	Valve	1"		3000	Gland	5500	0.432	50	0.002	0.430
7	03-09-2024		Pump Valve	P-003 A Suction I/V	Valve	-	-	3000	Gland	6500	0.523	130	0.006	0.517
8	03-09-2024	HGU	Valve	CONTRO LVALVE 10-PV-1506 B	Bonnet	6"	-	3000	Gland	5000	0.388	60	0.003	0.385
9	03-09-2024		Flange	PRODUCT HYDROGEN LINE 2nd GATE VALVE	Flange	3"	-	3000	Gland	3500	0.258	150	0.007	0.251
10	07-09-2024	OMS (CTF)	Valve	P-001 A Suction I/V	Valve	6"	-	3000	Gland	6500	0.523	110	0.005	0.518
11	07-09-2024	OMS (PPH)	Valve	P-010 C Suction I/V	Valve	3"	Isolation Valve	3000	Gland	5400	0.423	60	0.003	0.420
12	05-09-2024	SDU	Valve	Outlet Line Flange	Flange	6"	-	3000	Gland	5800	0.459	40	0.002	0.457
13	05-09-2024	CRU offside Area	Pump Valve	P-001 A Discharge I/V	Valve	3"	-	3000	Gland	5200	0.406	60	0.003	0.403
											5.318		0.086	5.232

LEAK DETECTION AND REPAIR (LDAR) PROGRAM
VOC QUARTERLY REPORT : JULY TO SEPTEMBER, 2024
PLANTWISE SUMMARY

Sr. No.	Name of the Unit	Date of Monitoring	Total No of Points Monitored	Page No.	No. of Points Where leaks found beyond standard limits	Before Repair Leak (kg/day)	After Repair Leak (kg/day)
1	AVU	02-09-2024	551	10 to 26	1	0.301	0.006
2	DCU	02-09-2024	1043	27 to 58	1	0.388	0.007
3	CRU	04-09-2024	272	58 to 66	2	0.829	0.011
4	MSQU	04-09-2024	1012	67 to 97	1	0.388	0.031
5	HDTU	03-09-2024	164	97 to 102	2	0.955	0.008
6	HGU	03-09-2024	165	103 to 108	2	0.646	0.010
7	OM & S (CTF)	07-09-2024	174	108 to 113	1	0.523	0.005
8	OM&S (PPH)	07-09-2024	1119	113 to 147	1	0.423	0.003
9	SDU	05-09-2024	336	147 to 158	1	0.459	0.002
10	CRU off side Pump house	05-09-2024	267	158 to 166	1	0.406	0.003
11	NEW TANK FARM	06-09-2024	587	166 to 184	0	0.000	0.000
12	SDU (Off side Pump House)	06-09-2024	120	184 to 188	0	0.000	0.000
Total in Kg/day						**5.32**	**0.09**
Toatl in MT/Annum						**1.941**	**0.031**
Total Saving in kg/day							**5.23**
Total in MT/Annum							**1.91**

Verified by
Neelima Dalvi
Technical Manager

Checked by
Shraddha Kere
Quality Manager

Annexure – 7

CREP – Present Status of Digboi Refinery

Sl No	Action Point	Present Status of Digboi Refinery
1.	Member Secretary, CPCB expressed serious concern on most of the Refineries not Monitoring all the New parameters (as per March, 2008 notification) in effluent and desired Refineries should develop capabilities to start monitoring each parameter and report the detail data to CPCB regularly. Further effluents discharged from the ETP outlet were found having high values of BOD and oil and grease indicating that effluent treatment facilities are not meeting standards and may require up-gradation. The effluent data to be sent CPCB on daily basis through the CPCB online air quality monitoring server	For Effluent out of 21 parameters 9 Parameters i.e pH, oil and grease, BOD, COD, TSS, MLSS, Phenol, Sulphide & Cyanide are tested in Digboi Refinery on daily basis. Report of these test are submitted to PCB, Assam regularly. Remaining tests are done by the Third-Party Nitya laboraties Nitya laboratories, 43, sector -A1 Ext. Bhalla Enclave, Channi Himmat, Jammu-180015, J&K (UT), India. Detailed up gradation study of ETP through M/s NEERI, Nagpur, was done in October 2014. Treated effluent from ETP is recycled to refinery as Fire water tank make up, cleaning and gardening purposes at ETP. Treated effluent is reused as make up for Coke Cutting water at delayed coking unit, Wax Sector Cooling Tower & Fire Water Network. During Apr'24 – Sep'24, 100% of treated effluent was reused.
2.	2.1 The PM Emission from furnace, boilers and captive power plant is not compiled in some of the units and the reason stated are (10 & 100 mg/Nm3 for FG and NG Respectively) too stringent and retrofitting like ESP or installation of filters for fuel is not feasible.	Emission of PM from furnace, boilers & Captive Power Plant is well within the prescribed limit due to the use of natural gas with very low sulphur content and sweetened refinery fuel gas as fuel.
	2.2 Installation of low Nox burner is yet to be completed. Refineries shall give the status and time target for the same and if installation is not possible, reason to be given, so that decision could be arrived.	As natural gas is the primary fuel used at Digboi Refinery, emissions of NOx from process units and Captive Power Plant is below the limit. Since the refinery is using natural gas, formation of NOx is very low and always remains within the prescribed limit. Further, low NOx burners are also fitted in all the new units viz. Solvent De-waxing Unit, Hydro-treater Unit, Delayed Coking Unit and MSQ Unit

	2.3 IOC Refineries expressed inability to meet PM stipulations on neat fuel gas firing in furnaces. Member Secretary advised to generated data for both cases i.e. neat fuel gas firing and mixed (oil and gas)firing to look into the issue of PM standards compliance. All the Refineries are advised to submit in detail fuel gas & Oil analysis and emission data every month to HSE , RHQ for taking up with MoEF & CC.	• For firing, only fuel gas is used and no liquid fuels are in use. • Emission of PM from stacks at Digboi refinery is within specified norms.
	2.4 PM in FCC regenerators is not achieved is some of the units. In some of the units it is proposed to be taken during revamp. Gujarat and Mathura Refineries to give detail action plan.	Not applicable for Digboi Refinery.
3	Member Secretary, CPCB expressed, although the units have started bioremediation of oily sludge, the disposal of bio-remediated material and storage will be a problem leading to space constraint and leachate problem on the nearby areas, He advised to find better avenues like Co-processing of oily sludge in cement plants or providing common remediation sites. Within 6 months.	The following actions taken by Digboi Refinery to liquidate legacy oily sludge stock: 1. Bioremediation of 4500MT Oily sludge is in progress through M/s Innotech Interventions Private Limited, Guwahati. 2. 1st batch of 3000 MT of oily sludge sold to M/S Star Petrochem Industries via MSTC e-auction on March'22. Party lifted only 1333 MT till 03.10.2024. 3. Another batch of 3000 MT of oily sludge sold to M/S Falak Industries Fuel Pvt. Ltd via MSTC e-auction on May'23. Party lifted only 128 MT till 03.10.2024. 4. In view of poor upliftment by M/s Star Petrochem Industries & M/s Falak Industries Fuel Pvt. Ltd, fresh e-auction was done in Oct'24 & M/s KM Oils Pvt. Ltd., Gulbarga, Karnataka was allocated for 6000 MT to be uplifted within 18 months. 5. Confined Bio-remediation batches are in progress since April,2024
4	Linking of CAAQMS & Stacks data to server. Target date June, 2013(to submit road map) and 7-8 months for Implementation. The pending Refineries shall submit activity-wise schedule within a month.	Online connectivity of Furnaces with heat capacity of 10mkcal/hr (HGU) established to CPCB Server. One no. of Continuous Ambient Air Quality Monitoring Station installed and commissioned in September 2012.

5	Member Secretary desired that all the parameters of treated effluent shall be Linked to CPCB server using online analyzer by taking advantage of the technological development. All the Refineries shall initiate necessary action for implementation of the same. Till such time, Refineries shall post the requisite data on CPCB server day-to-day basis (Target –July, 2013)	Online effluent monitoring & connectivity to CPCB server was commissioned on 28th December 2015. WebSite: Online Emission and Effluent Monitoring System (cpcb.gov.in)
6	Minimization of fugitive VOC emission from ETP 's- To meet the environmental standard, old Refineries shall take necessary action to cover effluent sump, API , TPI and other equipments exposed to atmosphere to reduce fugitive emission and also recovery facility.	1. For reduction of fugitive VOC emission from ETP,VOC reduction facility has been commissioned inside ETP on 04.12.2022 2. The CSS (Central Static Sump) inside refinery has already been covered.
7	Member Secretary advised Refineries to follow LDAR programme in true spirit as per gazette notification of "Effluent & Emission Standards, 2008. Data shall be submitted in periodic intervals to CPCB	Quarterly LDAR surveys are being followed. LDAR reports are being sent to MoEF & CC Bi-annually along with EC compliance report.
8	Member Secretary expressed concern on non-reporting of incidents of fire, oil spills and pollution to CPCB. He advised all the Refineries to reporting of such incidents to CPCB of concerned area during such occurrence.	No major oil spill has occurred till 30.09.2024. Shall be ensured.

01.10.24

(Kamaljit Medhi)

Place: Digboi

Date: 01.10.2024

Signature of the Authorized Person

कमलजीत मेधी (Kamaljit Medhi
मुख्य प्रबंधक (एच.एस.ई.)
Designation: Chief Manager (HSE)
आई.ओ.सी.एल (एओडी), डिगबोई
I.O.C. LTD. (AOD), DIGBOI

Annexure 8

इंडियन ऑयल कॉर्पोरेशन लिमिटेड
एओडि - डिगबोई रिफाइनरी
पो.ओ. डिगबोई, पिन-786171, असम

Indian Oil Corporation Limited
AOD - Digboi Refinery
P. O. Digboi, PIN: 786171, Assam
Tel. : 03751-262000
Fax : 03751-269015
E-mail : aoddigboi@indianoil.in
Website : www.iocl.com

असम ऑयल डिवीजन
Assam Oil Division

Ref: HSE/760/01/2024

Date: 03.04.2024

To
The Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Wardens, Assam
Aranya Bhavan, Panjabari,
Guwahati -781037.

Sub: Compliance Certificate against recommendation of SC, NBWL on the "Proposal for use of 63.95 ha of non-forest land from default Eco-Sensitive Zone about 3.6 Km from Dihing Patkai National Park for expansion of capacity Augmentation of Digboi Refinery to 1 MMTPA in favour of Indian Oil Corporation Ltd. Assam- **WL/AS/IND/429055/2023"** and regarding.

Ref: Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden letter **No. WL/FG.35/Diversion of Capacity Augmentation of Digboi to 1 MMTPA/Oil** dated 27.02.2024 (copy enclosed as Annexure-I)

Respected Sir,

With reference to the subject and letter cited above Digboi Refinery is pleased to submit the ATR on the recommendation by the Standing Committee, NBWL for the proposal.

NBWL Recommendation	Compliance Status
EIA with a scientifically robust Mitigation Plan shall have to be in place for taking appropriate steps to mitigate the adverse impacts on environment and wildlife in the event of breaking out of fire in the plant.	Rapid Risk Assessment Study (RRA) has been carried out by engaging NABET accredited consultant M/s Engineers India Limited to identify the hazards associated with the "NEW FACILITIES" under this project to analyse the consequences, draw suitable conclusions and provide necessary recommendations to mitigate the hazard/risk associated with the implementation of the new project facilities. Under the new facility for mitigation of fire inside new Golai Tank farm near Digboi marketing terminal, 2(two) numbers of Fire water tanks with associated Fire Water pumps (2 no's of jockey, 1 motor driven and 2 diesel driven) has been considered to restrict hazard within Tank farm. Also, for mitigation of fire inside existing Refinery for the revamped facilities, 2(two) new fire water pumps have been considered along with the existing firefighting system, fire prevention and protection facility (like HVLRM, water spray system, Hydrant, monitor, rim seal, HC detectors etc.) to

	restrict the fire within boundary. In addition to the RRA, Quantitative risk assessment (QRA) has also been recommended before commissioning of the project. Accordingly, action has been initiated to carry out the QRA study before commissioning of the project facilities.
At least 2% amount of the estimated cost of the project should be deposited as CORPUS fund to the Chief Wildlife Warden for Conservation of Wildlife & Human Animal Conflict mitigation measures.	An amount of Rs. 14.80 crore has been deposited as corpus fund to the Chief Wildlife Warden for Conservation of Wildlife & Human Animal Conflict mitigation measures. The deposited corpus amount is 2% of the approved Digboi Refinery expansion project Cost (Rs. 740 Crore). NEFT UTR NO: SBIN524093816642--CHIEF WILDLIFE WARDEN TRANSACTION DATE: 02-04-2024 (Payment receipt of Rs 14.80 Cr is enclosed as Annexure-II)
The User Agency shall also implement the conservation plan submitted along with the project proposal.	A total amount of Rs. 20.0 lakhs (for first 3 years of implementation of project) towards wildlife conservation in the surrounding areas of project site. The Wildlife Conservation Plan (WCP) has been submitted to Divisional Forest Officer (DFO), Digboi for further actions. DFO, Digboi Division has forwarded the letter to PCCF, Guwahati vide letter no. A/G-8 (a)/Diversion Proposal/2023/1239 dated 10/05/2023. (The DFO letter is enclosed as Annexure-III.) Digboi Refinery shall ensure the implementation of the submitted conservation plan in consultation with the DFO, Digboi Division.
An annual compliance certificate on the stipulated conditions shall be submitted by the User Agency to the State Chief Wildlife Warden and an annual compliance certificate shall be submitted by the State Chief Wildlife Warden to Government of India.	Shall be duly complied.

We humbly request your good office to kindly acknowledge the above submitted compliance status against the recommendations of the standing Committee, NBWL and grant the final approval for the Digboi Refinery 1MMTPA capacity Expansion Project.

Thanking You,

Yours faithfully,

Dhanjit Baishya 03/04/2024

Dhanjit Baishya
Chief General Manager (TS & HSE)
Digboi Refinery (Assam Oil Division)
Indian Oil Corporation Limited

धनजित बैश्य/Dhanjit Baishya
मुख्य महाप्रबंधक (टीएस व एच, एस व ई)/CGM (TS&H, S&E)
आई.ओ.सी.एल. (एओडी)/I.O.C.L. (AOD)
डिगबोई /DIGBOI-786171

Enclosures: As above

Copy for information:

1. The Special Chief Secretary to the Govt, of Assam, Environment & Forest Department, Dispur, Guwahati-781006.
2. The Principal Chief Conservator of Forests & Head of Forest Force, Assam, Panjabari, Guwahati -781037.
3. The Deputy Director General of Forests, Regional Office, Ministry of Environment, Forest & Climate Change, 4th Floor, HOUSEFED, GS, Road Rukminigaon, Guwahati – 781022.
4. The Regional Officer-Scientist F, Integrated Regional Office, Ministry of Environment Forest and Climate Change, Guwahati-781022.
5. The Divisional Forest Officer(DFO), Digboi Division, Digboi

Annexure-I

GOVERNMENT OF ASSAM
OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS (WILDLIFE) AND CHIEF WILDLIFE WARDEN, ASSAM::PANJABARI::GUWAHATI-37

Email Id : pccf.wl.assam@gmail.com

No. WL/FG.35/Diversion of Capacity Augmentation of Digboi to 1 MMTPA/Oil Date:27.02.2024

To,

Chief Manager (HSE),
IOCL Refinery, Digboi,
Tinsukia, Assam-786171

Sub: Recommendation of SC, NBWL on the "Proposal for use of 63.95 ha of non-forest land from default Eco-Sensitive Zone about 3.6 Km from Dihing Patkai National Park for expansion of capacity Augmentation of Digboi Refinery to 1 MMTPA in favour of Indian Oil Corporation Ltd. Assam- **WL/AS/IND/429055/2023**" and regarding.

Ref: Govt. of India, MoEF & CC (Wildlife Division)'s letter F.No. WL-6/41/2024 WL, dated.09.02.2024. **(Copy enclosed)**

Sir,

With reference to the subject and letter cited above, I would like to inform you that the above quoted project proposal was discussed in the 77th meeting of SC, NBWL held on 30.01.2024 and the SC has recommended the proposal subject to the following conditions:

1. EIA with a scientifically robust Mitigation Plan shall have to be in place for taking appropriate steps to mitigate the adverse impacts on environment and wildlife in the event of breaking out of fire in the plant.
2. At least 2% amount of the estimated cost of the project should be deposited as CORPUS fund to the Chief Wildlife Warden for Conservation of Wildlife & Human Animal Conflict mitigation measures.
3. The User Agency shall also implement the conservation plan submitted along with the project proposal.
4. An annual compliance certificate on the stipulated conditions shall be submitted by the User Agency to the State Chief Wildlife Warden and an annual compliance certificate shall be submitted by the State Chief Wildlife Warden to Government of India.

Therefore, it is requested kindly to deposit 2% amount of the estimated cost of the project (at current price level) as CORPUS Fund to the Chief Wildlife Warden as per the condition laid by the SC, NBWL (condition Sl.No.2) at an early date. The details of the bank account are given below. Further, it is requested to please comply with the rest of the conditions as recommended by the SC, NBWL during its 77th meeting.

Bank Name & Branch: Union Bank of India, Panbazar, Guwahati-781001
Account No.: 520141001521639
IFSC Code: UBIN0908746

This is for favour of your kind information and early necessary action.

Enclo: As stated above.

Yours faithfully,

Sandeep Kumar
Digitally signed by Sandeep Kumar
Date: 2024.02.27 14:31:03 +05'30'

(Sandeep Kumar, IFS),
Principal Chief Conservator of Forests,
Wildlife & Chief Wildlife Warden, Assam

Copy to Divisional Forest Officer, Digboi Division, Digboi for his information and necessary action.

Sandeep Kumar
Digitally signed by Sandeep Kumar
Date: 2024.02.27 14:31:31 +05'30'

Principal Chief Conservator of Forests,
Wildlife & Chief Wildlife Warden, Assam

Copy for information:

1. Spl. Chief Secretary to the Govt. of Assam, Environment & Forest Department, Dispur, Guwahati-06.
2. Principal Chief Conservator of Forests & Head of Forest Force, Assam, Panjabari, Guwahati-37.

Sandeep Kumar
Digitally signed by Sandeep Kumar
Date: 2024.02.27 14:31:44 +05'30'

Principal Chief Conservator of Forests,
Wildlife & Chief Wildlife Warden, Assam

ANNEXURE-II

Payment receipt of Rs 14.80 Cr to Chief Wildlife Warden for 1.0 MMTPA DR Expansion Project

Account Number :	_00000010776289584						
Description :	OD Clean (C and I)						
Name :	INDIAN OIL CORPORATION LIMTED						
Currency :	INR						
Corporate Address :	INDIAN OIL BHAVAN G-9 ALI YAVAR JUNG MARG BANDRA (EAST) MUMBAI MUMBAI MAHARASHTRA-400051						
Branch :	DIGBOI(06000)						
IFS Code :	SBIN0006000						
Start Date :	02-04-2024						
End Date :	02-04-2024						
Txn Date	Value Date	Description	Ref No./Cheque No.	Branch Code	Debit	Credit	Balance
02-04-2024	02-04-2024	TO TRANSFER-NEFT UTR NO: SBIN524093816642-- CHIEF WILDLIFE WARDEN	TRANSFER TO 4697160044302 / CHIEF WILDLIFE WARDEN	6000	14,80,00,000.00		

Annexure -III

Government of Assam
Office of the Divisional Forest Officer
Digboi Division: Digboi

Ph.No.03751-264433 *E-mail: dfodigboi@gmail.com*

Letter No. A/G-8 (a)/Diversion Proposal/2023/1239 Dated:10/05/2023

To,

The Principal Chief Conservator of Forests, Wildlife
& Chief Wildlife Warden, Assam, Aranya Bhawan,
Panjabari, Guwahati-37

Sub:- Conservation Plan with Budgetary allocation for Digboi Refinery Expansion Project under IOCL - regarding.

Sir,

In inviting a reference to the subject cited above, I have the honour to forward herewith the Conservation Plan with Budgetary allocation for Digboi Refinery Expansion Project under IOCL as received from the Chief General Manager (TS & HSE), Digboi Refinery, Indian Oil Corporation Limited for favour of your kind approval. A detailed wildlife management plan will be prepared in due course of time for management of other wildlife and habitats.

This is for favour of your kind information and necessary action.

Enclo :- Conservation Plan.

Yours faithfully

(T.C. Ranjith Ram, IFS)
Divisional Forest Officer
Digboi Division, Digboi

Memo No. B/G-8 (a)/Diversion/2023/1328 Dated:10/05/2023

Copy to the Chief General Manager (TS & HSE)) Indian Oil Corporation Limited (AOD), Digboi for his kind information and necessary action.

10/05/2023

(T.C. Ranjith Ram, IFS)
Divisional Forest Officer
Digboi Division, Digboi

CONSERVATION PLAN FOR SCHEDULE - I SPECIES

The Conservation Plan would focuses on conservation of habitats of Schedule-I species identified during the EIA process. Support in the form of donation of funds and active participation in awareness campaigns will be provided to the existing management plans undertaken by the Forest Department in the area. Awareness drives will be undertaken targeting different group of society at different times. During these, dialogue with locals will be established and importance of co-existence of these species will be explained.

Conservation of Schedule - I species

The schedule-I species are found in the surrounding areas of the project site. Wildlife Conservation Plan for threatened species is prepared and IOCL Digboi refinery will abide by the same. The following species are comes under Schedule-I category of Indian Wildlife Protection Act 1972.

Table 10.6 Listing of Schedule I species in the study area

Sl. No.	Species Name	Scientific Name
Bird		
1	Black kite	*Milvus migrans*
2	Crested Serpent Eagle	*Spilornis cheela*
3	Great Indian hornbill	*Buceros bicornis*
4	Hill Myna	*Gracula religiosa*
5	Mountain Bamboo Partridge	*Bambusicola fytchii*
6	Oriental pied hornbill	*Anthracoceros albirostris*
7	Shikra	*Accipiter badius*
8	Slender billed vulture	*Gyps tenuirostris*
9	White-rumped Shama	*Copsychus malabaricus*
10	Wreathed Hornbill	*Aceros undulatus*
Reptile		
11	Indian Rock Python	*Python molurus*
12	Bengal Monitor Lizard	*Varanus bengalensis*
13	Indian Flapshell Turtle	*Lissemys punctata*
Mammal		
14	Asian Elephant	*Elephas maximus*
15	Common leopard	*Panthera pardus*
16	Bengal Slow Loris	Nycticebus bengalensis
17	Western Hoolock Gibbon	Hoolock hoolock

Avifauna Conservation

Habitat: The above 10 species of birds are found in terrestrial ecosystem and forested areas of Dihing Patkai reserve forest.

Threat: Degradation of forested areas, chemicals in the carcasses, night operation, Tea factory works etc.

Conservation Action:

- The villagers, school children, industry workers working in the vicinity are to be made aware about the importance of wildlife, its habitat, importance of conservation etc.
- IOCL would support the Forest Department for habitat improvement program.
- IOCL will also conduct awareness campaigns at the village level to make the locals aware about the protected species in the area; their behaviour, habitat, ecology, breeding/nesting seasons, threats to habitats and species, laws regarding protection of species. Awareness generation campaigns will include preparation of brochures in local language, film shows and display of posters, etc.
- IOCL will ensure that minimum illumination comes out from the project area.
- Special care to be taken for identification of vulture nests, if any, and maintain distance from the nests.

Responsibilities: Primary responsibility lies with Assam Forest Department, and Digboi Wildlife Division of Assam. Secondary responsibility lies with IOCL who will support with monetary fund for conservation.

Reptile Conservation

Habitat: The above 03 species of reptiles are found in river banks, homestead gardens and forested areas of Dihing Patkai reserve forest depending the availability of food.

Threat: Degradation of forested areas, hunting by people, road kills etc.

Conservation Action:

- Identify basking sites of this species and enhance protection of these sites through village communities.
- Awareness campaigns to be carried out among village communities, focusing on local schools for protection of the species.
- While laying approach road, measures will be taken to keep natural drainage unhindered, by construction of culverts, which will provide crossing points for reptiles and minimize risk of road kill.
- Project proponent shall comply with all the pollution control and other conditions imposed in the environmental clearance by statutory authorities.
- It is also important to inform the workers about the presence of the species.

Responsibilities: Primary responsibility lies with Assam Forest Department, and Digboi Wildlife Division of Assam. Secondary responsibility lies with IOCL who will support with monetary fund for conservation.

Mammal Conservation

Habitat: The above 04 species of reptiles are found in forested areas of Jokai Dihing Patkai reserve forest and tea gardens.

Threat: Habitat fragmentation, human-animal conflict, blockage of wildlife corridor etc.
Conservation Action:

- Awareness campaign will be carried out in local villages, on conservation of leopards & elephants and their ecosystem services & values.
- Contributing to habitat improvement activity as planned by Forest Dept.
- IOCL would support the Forest Department for habitat improvement program and also in other programs for conservation of elephants.

- Project proponent shall comply with all the pollution control and other conditions imposed in the environmental clearance by statutory authorities.
- Conservation of the elephant's habitat and maintaining habitat connectivity by securing corridors;
- The management of human–elephant conflicts as part of an integrated land-use policy that recognizes elephants as economic assets from which local people need to benefit or at least no suffer;
- Better protection to the species through improved legislation and law enforcement, improved and enhanced field patrolling, and regulating/curbing trade in ivory and other elephant products

Responsibilities: Primary responsibility lies with Assam Forest Department, and Digboi Wildlife Division of Assam. Secondary responsibility lies with IOCL who will support with monetary fund for conservation.

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IOCL will formulate the competent team of experts headed by Head Environment to discuss with the forest department officials to know various existing habitat improvement and wildlife management activities conducted in study area. In consultation with the forest department, IOCL will provide support to the existing forest and wildlife conservation plans by earmarking separate, sufficient fund as mentioned in table below for such activities and through inclusion of 'wildlife awareness campaign's in various other IOCL programs from time to time. These campaigns will be conducted by team of experts in the field to make the locals aware about the protected species in the area; their behavior, habitat, ecology, breeding/nesting seasons, threats to habitats and species, laws regarding protection of species; through audio-visual aids, quiz competitions, arranging study tours to various locations in different seasons etc. on village level.

Financial Outlay

IOCL is committed to earmarked funds and utilized it only for purpose specified through forest department. Details of utilization of funds (amount is in lakhs) are given in following table.

Table 10.7: Details of utilization of funds (amount is in lakhs)

Sr. No.	Activity	Years from commencement of project			
		I	II	III	Total
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1.	To associate with forest department, and other agencies for effective implementation of conservation progamme	2.0	1.5	1.5	7.0
2	Identification of nesting sites for birds and habitat for reptiles, and mammals	1.5	1.0	1.5	5.0
3.	Cost of capacity building of forest department staffs	2.0	2.5	2.5	9.0
4.	Awareness Generation Meetings at villages (Development of Brochure; Arrangement of Meeting; Development of Posters)	1.0	1.5	1.5	4.0
	Total	**6.5**	**6.5**	**7.0**	**20.0**

IOCL will spend total **Rs. 20.0 lakhs** (for first 3 years of implementation of project) towards wildlife conservation in the surrounding areas of project site. IOCL has already submitted a letter to DFO, Digboi division earmarking Rs. 20 lakhs for conservation of Schedule I species in the surrounding areas.

~~Annexure -II~~

Annexure 9

Government of Assam
Office of the Divisional Forest Officer
Digboi Division: Digboi

Ph.No.03751-264433 *E-mail: dfodigboi@gmail.com*

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Divisional Forest Officer
Digboi Division, Digboi

Memo No. B/G-8 (a)/Diversion/2023/1328 Dated:10/05/2023

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Annexure 10

আমাৰ অসম

৬ জানুৱাৰী, ২০২৪ শনিবাৰ, যোৰহাট

ইণ্ডিয়ান অইল কৰ্পোৰেচন লিমিটেড
(অসম অইল সংগঠন)

ডিগবৈ শোধনাগাৰ, পো.অঃ ডিগবৈ, জিলাঃ তিনিচুকীয়া, পিনঃ ৭৮৬১৭১

ইণ্ডিয়ান অইল কৰ্পোৰেচন লিমিটেড, ডিগবৈ শোধনাগাৰত ১.০ এমএমটিপিএ লৈ ক্ষমতা বৃদ্ধিৰ বাবে পৰিবেশ অনুমোদন সম্পৰ্কীয় জাননী

ইয়াৰ দ্বাৰা জাননী দিয়া হৈছে যে পৰিবেশ, বন আৰু জলবায়ু পৰিবৰ্তন মন্ত্ৰালয়ে (MOEF&CC) ফাইল নং J-11011/482/2007-IA II (I), তাৰিখ ০১-০১-২০২৪ৰ ভিত্তিত ডিগবৈ শোধনাগাৰৰ ০.৬৫ এমএমটিপিএৰ পৰা ১.০ এমএমটিপিএলৈ ক্ষমতা বৃদ্ধিৰ বাবে পৰিবেশ অনুমোদন প্ৰদান কৰিছে। ক্লিয়াৰেন্স লেটাৰৰ প্ৰতিলিপি এছপিচিবি/ কমিটীৰ ওচৰত উপলব্ধ আৰু মন্ত্ৰালয়ৰ ৱেবছাইট আৰু **https://parivesh.nic.in/**তও চাব পাৰিব।

THE ASSAM TRIBUNE, DIBRUGARH

SATURDAY, JANUARY 6, 2024

Indian Oil Corporation Ltd.
(Assam Oil Division)

Digboi Refinery, P.O.: Digboi, Dist.: Tinsukia, PIN: 786171

NOTICE REGARDING ENVIRONMENTAL CLEARANCE ACCORDED TO IOCL, DIGBOI REFINERY FOR CAPACITY AUGMENTATION to 1.0 MMTPA

Notice is hereby given that the Ministry of Environment, Forest and Climate Change (MOEF&CC) vide File No. J-11011/482/2007-IA II (I), dated 01/01/2024 has accorded Environmental Clearance for capacity augmentation of Digboi Refinery from 0.65 MMTPA to 1.0 MMTPA. Copies of the clearance letter are available with the SPCB/ Committee and may also be seen at the Website of the Ministry and at **https://parivesh.nic.in/**.

DIGBOI REFINERY

INDIAN OIL CORPORATION LIMITED

BIO-MONITORING SURVEY OF AQUATIC LIFE IN LOTIC AND LENTIC WATER BODIES IN AND AROUND DIGBOI REFINERY: September 2024

Conducted By:

ABNS SCIENTIFIC SERVICES

Guwahati-781011, Assam; www.abnsscientific.com

PREFACE

Bio-Monitoring Survey of Aquatic Life in Lotic and Lentic Water Bodies in and around Digboi Refinery during August and September,2024 covering eleven locations.

List of Contents:

List of Table:

List of Figure:

BIO-MONITORING SURVEY OF AQUATIC LIFE IN LOTIC AND LENTIC WATER BODIES IN AND AROUND DIGBOI REFINERY

Introduction

Aquatic ecosystems, the most diverse on the planet, harbored the first life forms and sustain an incredible array of plants and animals. Water, the vital factor for all living organisms, covers 71% of the Earth. Aquatic ecosystems support incredible biodiversity, providing essential resources for survival. Understanding these ecosystems' complexities is crucial for sustainable management and conservation. The increasing demands of industrialization and growing populations have escalated the need for higher water quality. Unintended consequences of human activities, such as Unplanned urbanization and deforestation, chemical releases and untreated waste discharge, excessive fertilizer and pesticide use threaten aquatic environments. To protect water resources and ensure human consumption safety, water quality assessment is crucial.

Biological Monitoring of Water Quality: A Crucial Tool

Biological monitoring assesses aquatic ecosystem health by examining changes in stream conditions, water quality, and habitat. Historically, invertebrates, especially macroinvertebrates, have been used to study running water ecosystems. Relationships between macroinvertebrate community structures and environmental variables have been extensively investigated.

Advantages of Biological Monitoring:

1. Integrated approach to assess aquatic ecosystem quality
2. Complementary to physico-chemical evaluations
3. Reliable assessment of anthropogenic impacts
4. Wide acceptance and application globally

Bio-monitoring Methods and Indices:

Numerous indices have been developed for water quality assessment. Modern techniques involve using pollution-sensitive insects, particularly benthic macroinvertebrates, as biological indicators.

Limitations of Physico-chemical Analysis:

1. Complex wastewater composition
2. Low concentration detection limits
3. Variable chemical impacts on biological systems

Bio-monitoring as a Summary Parameter:

Bio-monitoring overcomes physico-chemical analysis limitations by summing effects of pollutants in easily measurable parameters.

Case Study: Digboi, Assam, India:

Digboi, India's oldest oil town, has undergone significant environmental changes. Bio-monitoring can assess the impact of oil exploration and refining on aquatic ecosystems.

History of Digboi's Oil Industry:

- 1867: Oil discovery
- 1889: First oil well drilled
- 1901: First refinery established
- World War II: Peak production (7,000 barrels/day)
- Current production: 240 barrels/day

Biological monitoring is essential for assessing aquatic ecosystem health and understanding anthropogenic impacts. Its integration with physico-chemical analysis provides a comprehensive picture of water quality.

Types of Biological Assessment:

Biological assessments are crucial for understanding the health and integrity of ecosystems. They involve studying various aspects of biological communities to evaluate environmental conditions. Here are some common types of biological assessments:

Aquatic Ecosystems:

- **Benthic Macroinvertebrate Assessment:** This involves studying organisms that live on the bottom of water bodies, such as insects, worms, and snails. Their presence or absence can indicate water quality and pollution levels.
- **Fish Assessment:** Examining fish populations, their abundance, diversity, and health can provide insights into overall ecosystem health.
- **Aquatic Vegetation Assessment:** Analysing the types and abundance of aquatic plants can reveal information about nutrient levels, water depth, and overall ecosystem productivity.

Terrestrial Ecosystems:

- **Wildlife Surveys:** Counting and monitoring wildlife populations can help assess habitat quality and identify potential threats.
- **Vegetation Surveys:** Examining plant diversity, species composition, and health can indicate ecosystem condition and disturbance.
- **Soil Biota Assessment:** Studying organisms living in the soil, such as bacteria, fungi, and invertebrates, can reveal soil health and nutrient cycling.

Other Methods:

- **Bioindicators:** Using specific organisms as indicators of environmental conditions. For example, certain species of lichens can be sensitive to air pollution.

- **Genetic Analysis:** Examining the genetic diversity of populations can provide insights into ecosystem health and resilience.
- **Remote Sensing:** Using satellite imagery or aerial photography to monitor large-scale changes in vegetation, land cover, and water bodies.

Key Considerations(A):

- **Scale:** Biological assessments can be conducted at various scales, from small-scale site-specific studies to large-scale regional assessments.
- **Objectives:** The specific objectives of the assessment will determine the appropriate methods and data collection techniques.
- **Data Analysis:** Statistical methods are often used to analyze biological data and draw conclusions about ecosystem health.

- **Toxicity/Bioassay test** - To know acute or chronic effect of pollutants on biological system, this test is used both in laboratory by exposing specified number of test organisms directly in the water body or in test sample specified time period.

Bio-accumulation and bio-magnification studies – **Bioaccumulation** and **biomagnification** are two important ecological processes that describe the movement of pollutants through food chains. Bioaccumulation is the gradual build-up of a substance in the tissues of an organism over time. This occurs when an organism takes in more of a substance than it can eliminate. Several factors can influence bioaccumulation, including:

- **Persistence:** The ability of a pollutant to remain in the environment for a long time.
- **Bioavailability:** The ability of an organism to absorb a pollutant from its environment.
- **Lipid solubility:** Pollutants that are soluble in lipids (fats) tend to accumulate in fatty tissues.

Biomagnification: Biomagnification is the increasing concentration of a pollutant as it moves up the food chain. This occurs because predators consume prey that have already accumulated the pollutant. Examples such as DDT, a pesticide that was widely used in the mid-20th century, is a classic example of biomagnification. It accumulated in the tissues of small organisms, such as insects, and was then passed on to larger predators, such as birds and fish. This led to the decline of many bird populations.

- Bioaccumulation and biomagnification studies are used to monitor the levels of pollutants in ecosystems and assess the potential risks to wildlife and human health.
- These studies help to identify and assess the potential risks of exposure to pollutants through the food chain.

- The results of bioaccumulation and biomagnification studies can inform the development of environmental regulations and policies.

Key Considerations(B):

- **Species Sensitivity:** Different species have varying sensitivities to pollutants, and some may be more susceptible to bioaccumulation and biomagnification than others.
- **Food Chain Dynamics:** The structure and dynamics of food chains can influence the rate and extent of biomagnification.
- **Environmental Factors:** Environmental factors, such as temperature, pH, and nutrient availability, can affect the bioaccumulation and biomagnification of pollutants.

Bio assessment methods such as studying biotic communities and populations are crucial for understanding ecosystem health. Among these above methods, the study of biotic community and population of different organisms are more widely used for bio-assessment because in an ecosystem all groups of organisms are interdependent on each other, any impact on one group of organisms affects the entire ecosystem. These methods provide details into how different organism interact and depend on each other and how changes in one group can impact the entire ecosystem. Additionally, the ecosystem studies can detect gradual changes in both the structure and function of ecosystems, making them essential for long term environmental monitoring and management

Site Selection:

The following sites are selected for bio monitoring study in consultation with the Digboi Refinery authorities on the basis of upstream and downstream condition. Samples are collected from the following sites (Table-1)for Physico-chemical and Bio monitoring analysis covered in the present study:

Table-1: Sampling Location

1.	Dihing - Margherita: 27.284275° 95.663482°
2.	Dihing - Makum: 27.292424° 95.616147°
3.	Dihing - Mirika: 27.273380° 95.564508°
4.	Dihing - Gammon bridge: 27.311866° 94.882183°
5.	Dihing mukh: 27.262802° 94.703727°
6.	Digboi river - Kenduguri: 27.402045° 95.580806°
7.	Digboi river - 15 KM pt: 27.345290° 95.479622°
8.	Digboi river - 26 KM pt: 27.323431° 95.364031°
9.	Dihing - before confluence with Digboi river: 27.302082° 95.347753°
10.	Dihing - after confluence with Digboi river: 27.302421° 95.344287°
11.	Digboi Sanitary Park River (Durgapukhuri): 27.387166^0 95.615823^0

The GPS map present below shows the sample collection sites:

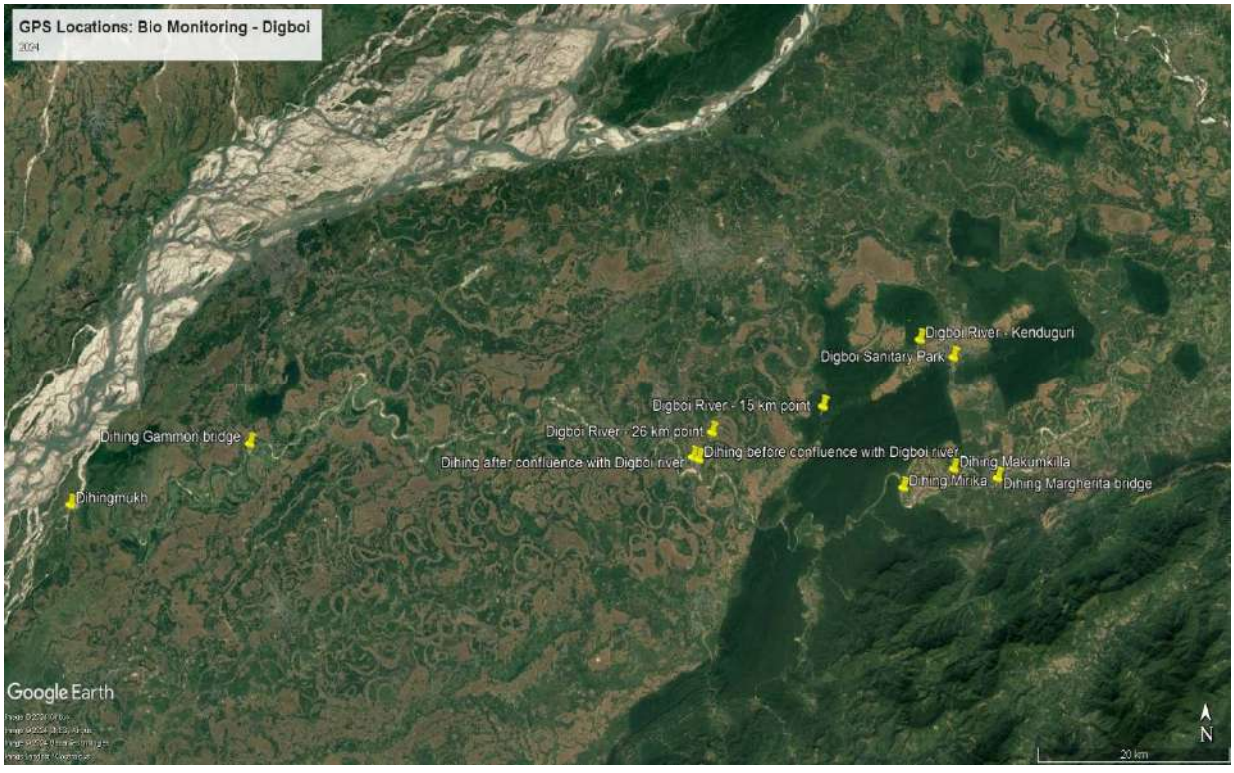

Fig 1: GPS map showing the sampling sites.

Aquatic organisms used in Bio-monitoring

Aquatic organisms are often used as bio-indicators to assess the health of aquatic ecosystems. Their sensitivity to pollution, habitat degradation, and other environmental stressors makes them valuable tools for monitoring water quality and overall ecosystem health. Here are some common aquatic organisms used in biomonitoring:

Macroinvertebrates

- **Benthic macroinvertebrates:** These are organisms that live on or near the bottom of aquatic environments, such as insects, worms, and snails. They are sensitive to changes in water quality, pollution, and habitat disturbance.
- **Examples:** Mayflies, stoneflies, caddisflies, midges, crayfish, and aquatic worms.

Fish

- **Fish species:** Different fish species have varying tolerances to pollution and habitat conditions. By monitoring the presence or absence of certain fish species, scientists can assess water quality and ecosystem health.
- **Examples:** Trout, bass, minnows, and catfish.

Algae and Plants

- **Aquatic plants:** These can be used to indicate nutrient levels, water quality, and habitat conditions.
- **Algae:** Different types of algae can be sensitive to pollution and can be used as bioindicators of water quality.

Microorganisms

- **Bacteria:** Certain bacteria can be used as indicators of pollution and water quality.
- **Diatoms:** These microscopic algae can be used to assess nutrient levels and water quality.

Factors to Consider When Selecting Bioindicators

- **Sensitivity:** The organism should be sensitive to the specific environmental stressors being monitored.
- **Availability:** The organism should be readily available in the study area.

- **Ease of identification:** The organism should be easy to identify and count.
- **Tolerance:** The organism should have a known tolerance to the environmental stressors of interest.

By studying the abundance, diversity, and health of aquatic organisms, scientists can gain valuable insights into the condition of aquatic ecosystems and develop effective conservation and management strategies.

Among these groups of organisms, **macro-invertebrates** are found best suited for bio-monitoring and are used worldwide because of more advantages. Further, more ecological information available for their taxonomic groups and in bio-monitoring, taxonomic richness and composition characterization of macro-invertebrates are being used. Taxonomic identification of macro-invertebrates is done up to family level.

The Samples are collected for general physico-chemical and Boi-monitoring Characterization from the above-mentioned locations.

The study employed a semi-quantitative sampling technique using a D-frame net to collect benthic macro-invertebrates from various habitats within the Digboi River catchment. This method is commonly used in aquatic ecology to assess water quality and ecosystem health.

Methodology:

- **Habitat diversity:** Sampling from pools, riffles, and cascades ensures a representative assessment of the aquatic fauna.
- **Preservation:** The use of 70% ethyl alcohol preserves the collected organisms for later identification.
- **Identification:** The focus on family-level identification is aligned with common practices in aquatic ecology studies.

Given the nature of the data collected, several analytical approaches could be employed:

1. **Biodiversity Indices:**
    - **Species richness:** Counting the total number of unique species or families.
    - **Species diversity:** Using indices like Shannon-Wiener or Simpson's to account for both species' richness and abundance.

    - **Evenness:** Assessing the distribution of individuals among different species or families.
2. **Tolerance Values:**
    - **Biological Assessment Index (BAI):** Assigning tolerance values to each macro-invertebrate family based on their sensitivity to pollution.
    - **Calculating water quality index:** Using the BAI values to determine the overall water quality of different sampling sites.
3. **Community Composition Analysis:**
    - **Ordination techniques:** Using methods like Principal Component Analysis (PCA) or Non-metric Multidimensional Scaling (NMDS) to visualize the relationships between sampling sites based on their macro-invertebrate assemblages.
    - **Cluster analysis:** Grouping similar sites based on their macro-invertebrate communities.
4. **Statistical Tests:**
    - **ANOVA or t-tests:** Comparing the abundance or diversity of macro-invertebrates between different habitats or sampling sites.
    - **Correlation analysis:** Examining relationships between macro-invertebrate metrics and environmental variables (e.g., water temperature, dissolved oxygen, pH).

By analyzing the collected data, the study could potentially provide insights into:

- **Water quality:** The presence or absence of certain macro-invertebrate families can indicate the overall health of the water body.
- **Habitat preferences:** The distribution of macro-invertebrates across different habitats (pools, riffles, cascades) can reveal their specific ecological requirements.
- **Impact of human activities:** Comparing macro-invertebrate assemblages upstream and downstream of potential pollution sources can help assess the effects of human activities on the aquatic ecosystem.
- **Biodiversity patterns:** The study can contribute to understanding the biodiversity of benthic macro-invertebrates in the Digboi River catchment.

Macro-invertebrates sample collection

Macro invertebrate samples were collected as per procedure and stored in thoroughly sterilized bottles from the 10 sampling stations of as mentioned above in September 2024.

Sample collection procedures are shown in figure 2 below.

Fig2: Collection of Macro-invertibrates in the present study.

Collection of water samples was undertaken according to the standard methods for examination of water (APHA, 23rd edition). Water samples used for the analysis of chemical variables, were collected in plastic container of 1000 ml. Water samples were collected facing upstream of the river as recommended in APHA et al., (1971) and the bottles were filled to the neck allowing no head space and transported to the laboratory in an ice-filled cooler box. Samples were preserved at 4^0C in the laboratory for chemical analysis. All chemical analyses were performed within 24 hours of sample collection. Analyses were conducted for three replicates for each sample and averaged. This method was adopted due to the fact that average readings were more representatives besides reducing variability in the measured results.

The ability of macro-invertebrates to colonize various habitats and substrata underscores their importance as indicators of water quality. By sampling from diverse habitats, researchers can obtain a more comprehensive picture of the aquatic ecosystem's health.

Key points regarding sampling:

- **Representative sampling:** Ensuring that the collected sample represents all habitats in the location is crucial for accurate assessment.
- **Individual organism count:** The number of individuals in the sample provides insights into the population size of different macro-invertebrate groups.
- **Sampling methods:** The choice of sampling methods depends on the substratum where macro-invertebrates are found.

The Role of BWQC in Water Quality Evaluation

The CPCB's Biological Water Quality Criteria (BWQC) provides a framework for assessing water quality based on the presence and abundance of macro-invertebrate families. The saprobic score method assigns values to families based on their tolerance to pollution.

Key aspects of BWQC:

- **Saprobic values:** Higher saprobic values indicate greater tolerance to pollution, while lower values suggest sensitivity.
- **Family-level identification:** The BWQC is based on the identification of macro-invertebrates up to the family level.
- **Scoring system:** Families are assigned scores from 1 to 10, with 10 representing the most sensitive and 1-2 representing the most tolerant.

Potential Data Analysis Approaches

To analyze macro-invertebrate data and assess water quality using BWQC, the following approaches could be employed:

1. **Calculating Saprobic Index:**
    - Sum the saprobic values of all identified macro-invertebrate families in the sample.
    - Divide the sum by the total number of individuals or families.
    - The resulting value represents the overall saprobic index of the sample.
2. **Comparing with BWQC:**
    - Compare the calculated saprobic index to the BWQC thresholds to determine the water quality category (e.g., clean, moderately polluted, heavily polluted).
    - Analyze the presence or absence of specific macro-invertebrate families that are indicative of different pollution levels.
3. **Relating to Environmental Factors:**

- Examine the relationship between saprobic index or individual macro-invertebrate abundance and environmental factors (e.g., dissolved oxygen, pH, temperature).
- Identify potential drivers of water quality changes.

4. **Temporal and Spatial Trends:**
   - Analyze changes in macro-invertebrate assemblages and saprobic indices over time to assess trends in water quality.
   - Compare data from different sampling sites to identify spatial variations in water quality.

By analyzing macro-invertebrate data and applying BWQC, the study could provide insights into:

- **Water quality status:** The overall health of the water body based on the presence of pollution-tolerant or sensitive macro-invertebrates.
- **Impact of pollution:** The identification of specific pollutants or sources of pollution affecting the aquatic ecosystem.
- **Habitat suitability:** The relationship between macro-invertebrate assemblages and different habitats or substrata.
- **Restoration efforts:** The effectiveness of pollution control measures or habitat restoration initiatives.

Table 2: Range of Saprobic Score

Range of Saprobic Score	Range of Diversity Score	Water Quality	Water Quality Class	Indicator Colour
6-7	0.5-1.0	Slight pollution	B	Light Blue
3-6	0.3-0.9	Moderate pollution	C	Green
2-5	0.4-less	Heavy pollution	D	Orange
0-2	0-0.2	Severe pollution	E	Red

The samples are collected depending on the characteristic of River bed.

a) **Boulders and Cobbles**: The stones are lifted randomly and the organisms are picked up using soft forceps or brushed off into the white tray.

b) **Pebbles and Gravels**: The hand net is placed firmly on the stream bed against the flow. The stream bed is kicked up by foot and the organisms are collected into the net. After this, the collected material is washed using sieve (recommended mesh size 0.6 mm as per ISO) and macro-invertebrates are collected intro plastic bottles containing formalin (4%).

If the river bed is covered with macrophytes then, BMIs are collected by uprooting the plants first and washing the roots with water into sieve and collected into white tray. From the tray organisms are picked up using forceps and preserved in 4% formalin for further study.

Identification of macroinvertebrates:

The macroinvertebrates were sorted and identified as suggested by online published journals, with consultation of experts. Digital Camera was used to document larger specimens, while Stereomicroscope for smaller samples.

Some of the macro invertibrates collected is shown in the figures below.

Fig 3: Some of Macro-invertibrates found in present study.

Biological Monitoring Working Party (BMWP) Score

The BMWP score was devised in the United Kingdom but was not specific to any single river catchment or geographical area. This scoring system which is based on study of macro-invertebrates' community is being used worldwide with modifications considering local conditions and type of invertebrates present/ absent in the aquatic system. The system uses sensitivity of invertebrates towards organic pollution (indicators of organic pollution) i.e. saprobic condition. All observed families have assigned a specific saprobic indicator value and are classified on the scale of 1 to 10. The families which are most sensitive to organic pollution are on the top of the list with weightage score of 10 while the tolerant families are at the bottom of the list with score value of 1. The other intermediately sensitive families are placed in between the scoring scale of 2 to 9.

BMWP Score is calculated by assigning all the observed families as per BMWP Score chart (Table 3). Total no. of families observed in one particular group is multiplied with its respective weightage value and then all multiplied values are added to generate BMWP Score. The original BMWP Score chart with some minor modifications, by including/ excluding families present/ absent in Indian conditions was adopted in India after thorough testing and discussion with experts. Table 3 summarises BMWP Scoring system adopted by CPCB.

BMWP Score = Σ No. of families in one group × Weightage score

Table.3: BMWP score system adopted by CPCB

Sl No	Taxonomical Families	Weightage Score
1	Siphlonuridae, Heptageniidae, Leptophlebiidae, Ephemerelidae, Potaminthidae, Ephemeridae, Prosopistomatidae, Neoephemeridae, Ameletidae, Taeniopterygidae, Leuctridae, Capniidae, Perlodidae, Perlidae, Aphelocheridae, Leptoceridae, Georidae, Lepidostomatidae, Brachycentridae, Sericostomatidae, , Glossosomatidae, Helicopsychidae , Leptohyphidae	10
2	Chloroperlidae	9
3	Euphaidae, Protoneuridae, Plathycnemididae, Lestidae, Gomphidae, Cordulegastridae, Aeshnidae, Corduliidae, Libellulidae, Macromiidae, Psychomyiidae, Philopotamidae, Cheumatopsychidae, Chrysomelidae, Hydrenidae,Sciomyzidae, Limoniidae	8
4	Caenidae, Nemouridae, Rhycophilidae, Polycaltropodidae, Limnephilidae, Stenopsychidae	7
5	Ancylidae, Hydrobiidae, Neritidae, Viviparidae, Thiaridae, Bithynidae, Unionidae, Pleuroceridae, Amblemidae, Septariidae, Assiminidae,	6

	Ampullaridae, Solecurtidae, Stenothyridae, Arcidae, Succinidae, Hydroptilidae, Palaemonidae, Atyidae, Genocentridae, Gammaridae, Potamidae, Parathelphusidae, Anthuridae, Niphargidae, Talitridae, Mysidae, Hymenosomatidae, Varunidae, Sesarmidae, Gecarcinucidae, Nereidae, Nephthyidae, Nereididae, Sabellidae, Pisionidae, Histriobdellidae, Megascolecidae, Coenagrionidae, Agriidae	
6	Mesovelidae, Hydrometridae, Gerridae, Nepidae, Naucaridae, Notonectidae, Pleidae, Corixidae, Vellidae, Hebridae, Belastomatidae, Haliplidae, Hygrobidae, Dytiscidae, Gyrinidae, Hydrophilidae, Noteridae, Dryopidae, Elminthidae, Psephenidae, Heteroceridae, Elmididae, Scritidae, Eulichadidae, Histeridae, Curculionidae, Hydropsychidae, Ecnomidae, Tipulidae, Culicidae, Blepharoceridae, Simulidae, Nymphomyidae, Sarcophagidae, Stratiomyiidae, Ceratopogonidae, Pyralidae,Planariidae, Dendrocoeclidae , Carabidae, Hydrochidae, Staphylinidae	5
7	Baetidae, Sialidae, Corydalidae, Piscicolidae, Hirudinidae	4
8	Lymnaeidae, Planorbidae, Sphaeridae, Physidae, orbiculidae, Onchididae, Glossophonidae, Hirudidae, Erpobdellidae, Haemadipsidae, Salifidae, Dugesidae, Aselidae, Cirolanidae, Aegidae, Stenasellidae, Cymothoidae,	3
9	Chironomidae, Syrphidae, Ephydridae, Muscidae, Psychodidae	2
10	Tubifiscidae, Naididae, Octochaetidae, Lumbricidae, Lumbricullidae	1

The Saprobic Score is calculated by

Saprobic Score = BMWP Score/ ∑Number of families encountered

Results and Discussion:

Understanding the Community Composition

The study reveals a diverse macro-invertebrate community in Digboi River, with representatives from three phyla: Arthropoda, Annelida, and Mollusca.

Key findings:

- **Dominant phyla:** Arthropoda is the most dominant phylum, followed by Mollusca.
- **Dominant classes:** Insecta and Gastropoda are the most represented classes.

- **Dominant orders:** Hemiptera, Decapoda, and Coleoptera are the most abundant orders within Insecta.
- **Dominant families:** Ancylidae, Ampullaridae, Haliplidae, Hydrometridae and Nemouridae are the most abundant families within Gastropoda.

Assessing Water Quality Using Macro-Invertebrates

While the study doesn't explicitly use a water quality index like BWQC, the presence and abundance of certain macro-invertebrate groups can provide valuable insights into water quality:

- **Pollution-tolerant species:** The dominance of pollution-tolerant species like Laccotrephes sp., Notonecta sp., and Hydaticus sp. may indicate potential pollution issues.
- **Sensitive species:** The presence of sensitive species like Hirudinaria manillensis suggests relatively good water quality conditions.
- **Habitat preferences:** The distribution of macro-invertebrates across different habitats (e.g., pools, riffles) can reveal their tolerance to varying environmental conditions.

To gain a more comprehensive understanding of water quality and ecosystem health in Digboi River, the following analyses could be conducted:

1. **Water quality index:** Apply a suitable water quality index (e.g., BWQC) to assess the overall health of the river based on macro-invertebrate data.
2. **Environmental factors:** Analyze the relationship between macro-invertebrate abundance and environmental variables (e.g., dissolved oxygen, pH, temperature) to identify potential drivers of water quality changes.
3. **Spatial and temporal trends:** Examine changes in macro-invertebrate communities over time and across different sampling sites to assess the impact of human activities or natural factors on the ecosystem.
4. **Conservation implications:** Identify species of conservation concern and develop strategies for their protection and habitat restoration.

Analysis of Results:

Analyzing Data from **Site 1: Digboi Nala**

The observations at Site 1, Digboi Nala, suggest a polluted aquatic environment. The presence of an oily film, greasy coating on substrata, and algal growth are indicative of pollution.

Key observations:

- **Oily film:** This suggests potential hydrocarbon contamination.
- **Greasy coating:** This could be due to organic pollution or other contaminants.
- **Algal growth:** Excessive algal growth can be a sign of nutrient enrichment or other water quality issues.
- **Hydrilla presence:** While Hydrilla is a common aquatic plant, its abundance can indicate nutrient-rich conditions.

Interpreting Macro-Invertebrate Data

The presence of low-weight taxa like Tubifiscidae, Naididae, Octochaetidae, Lumbricullidae, Cirolanidae and Psychodidae, Muscidae suggests a degraded water quality. These families are often associated with polluted environments.

Potential implications:

- **Pollution tolerance:** These families are known to tolerate pollution, indicating that the site is likely impacted by contaminants.
- **Habitat degradation:** The presence of these taxa may suggest a loss of habitat quality for more sensitive species.

Analyzing Data from **Site 2: Digboi Nala**

Similar to Site 1, the presence of an oil slick at Site 2 indicates potential pollution. The macro-invertebrate data further suggests a degraded aquatic environment.

Key observations:

- **Oil slick:** This continues to be a significant concern at Site 2.
- **Pollution-resistant families:** The presence of Odonata, Histeridae, Corydalidae, and Lumbricidae suggests a certain level of tolerance to pollution.
- **Absence of** Ephemeroptera, Ancylidae, Heptageniidae and Trichoptera etc**:** These orders are generally sensitive to pollution, their absence indicating a degraded water quality.
- **Marginal vegetation:** While present, it may not be sufficient to offset the negative impacts of pollution.

Interpreting Macro-Invertebrate Data

The absence of sensitive orders like Ephemeroptera and Trichoptera is a strong indicator of pollution. The presence of pollution-resistant families such as Mesovelidae, Hygrobidae, Planariidae, Hirudidae,

Erpobdellidae suggests that the site has experienced some level of degradation but may still support a limited macro-invertebrate community.

Potential implications:

- **Habitat degradation:** The oil slick and other pollutants may have negatively impacted the habitat, limiting the survival of sensitive species.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 3: Digboi Nala

Understanding the Environmental Conditions

The observations at Site 3, Digboi Nala, indicate a polluted aquatic environment. The turbid water and presence of an oil slick suggest contamination.

Key observations:

- **Turbid water:** This could be due to suspended sediments, organic matter, or other pollutants.
- **Oil slick:** This continues to be a significant concern at this site.
- **Macro-invertebrate dominance:** The presence of Hygrobidae, Dytiscidae, Odonata, Nereidae, Histriobdellidae, Nereididae, and Heteroceridae etc suggests a relatively tolerant macro-invertebrate community.
- **Absence of Mayfly and Caddis fly:** These orders are generally sensitive to pollution, their absence indicating a degraded water quality.

The dominance of pollution-tolerant families like Corixidae, Odonata, Coleoptera, and Diptera suggests that the site has experienced significant degradation. The absence of sensitive orders like Ephemeroptera and Trichoptera further confirms this.

Potential implications:

- **Habitat degradation:** The oil slick and other pollutants may have severely impacted the habitat, limiting the survival of sensitive species.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 4: Dihing River- before confluence with Digboi river

Understanding the Environmental Conditions

The data from Site 4, Dihing River, suggest a relatively healthier aquatic environment compared to the previous sites. The presence of sensitive taxa like Varunidae, Sesarmidae, Gecarcinucidae, Nereidae, Nephthyidae, Nereididae, and Viviparodae etc indicates a less polluted condition.

Key observations:

- **Dominance of odonates and trichopterans:** These groups are often associated with cleaner water conditions.
- **Sensitive taxa:** The presence of Varunidae, Sesarmidae, Nereidae, Nephthyidae, Nereididae suggests a less polluted environment.
- **Moderate incidence of Agriidae:** This family is generally tolerant of pollution, but its presence in moderate numbers is not a major concern.
- **Absence of Ephemeroptera:** While the absence of Ephemeroptera is still a potential indicator of some level of pollution, it's not as severe as in the previous sites.

The overall macro-invertebrate assemblage at Site 4 suggests a relatively good water quality. The presence of sensitive taxa and the absence of highly pollution-tolerant species are positive indicators.

Potential implications:

- **Better habitat quality:** The presence of sensitive taxa suggests a less degraded habitat.
- **Reduced pollution impact:** The lower levels of pollution have allowed for a more diverse macro-invertebrate community to establish.

Analyzing Data from Site 5: Dihing River After Confluence with Digboi River.

Understanding the Environmental Conditions

The observations at Site 5, Dihing River after the confluence with Digboi Nala, indicate a polluted aquatic environment. The turbid water and presence of an oil slick are indicative of contamination.

Key observations:

- **Turbid water:** This could be due to suspended sediments, organic matter, or other pollutants.
- **Oil slick:** This suggests potential hydrocarbon contamination.

- **Moderate Pollution-resistant taxa:** The presence of Arcidae, Succinidae, Hydroptilidae, Palaemonidae, Atyidae, Genocentridae, Gammaridae, Potamidae, Parathelphusidae, Anthuridae, Niphargidae, Talitridae etc suggests a moderate level of pollution tolerance.

The presence of pollution-resistant taxa indicates a certain level of degradation in the water quality. However, the absence of highly sensitive species suggests that the pollution may not be as severe as in some of the previous sites.

Potential implications:

- **Habitat degradation:** The oil slick and other pollutants may have negatively impacted the habitat.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 6: Dihing - Margherita

Understanding the Environmental Conditions

The observations at Site 6, Dihing River, Margherita, suggest a relatively good aquatic environment with some signs of pollution. The presence of sensitive taxa indicates a less polluted condition compared to some of the previous sites.

Key observations:

- **Dominance of odonates:** This suggests a relatively healthy aquatic environment.
- **Reduced presence of coleopterans:** While not a major concern, it could indicate some level of habitat degradation.
- **Absence of Ephemeroptera and Trichoptera:** This suggests a moderate level of pollution.
- **Sensitive taxa:** The presence of Baetidae, Sialidae, Corydalidae, Piscicolidae, Hirudinidae, and Physidae, etc indicates a less polluted condition.
- **Significant presence of Chironomus larvae:** This could be a sign of nutrient enrichment or organic pollution.

The overall macro-invertebrate assemblage at Site 6 suggests a moderately good water quality. The presence of sensitive taxa and the absence of highly pollution-tolerant species are positive indicators. However, the significant presence of Chironomus larvae suggests some level of pollution.

Potential implications:

- **Habitat degradation:** The presence of Chironomus larvae could indicate nutrient enrichment or organic pollution, which may have impacted the habitat.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 7: Dihing River, Makum

Understanding the Environmental Conditions

The observations at **Site 7**, Dihing River, Makum, suggest a moderately polluted aquatic environment. The presence of pollution-resistant and moderately resistant macro-invertebrates indicates a degraded water quality.

Key observations:

- **Moderate Pollution-resistant taxa:** The presence of Physidae, Lymnaeidae, Planorbidae, Sphaeridae, Tipulidae, Syrphidae, Ephydridae, Muscidae and Gammaridae suggests a moderate level of pollution tolerance.

The dominance of pollution-resistant taxa indicates a certain level of degradation in the water quality. However, the absence of highly sensitive species suggests that the pollution may not be as severe as in some of the previous sites.

Potential implications:

- **Habitat degradation:** The pollution may have negatively impacted the habitat.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 8: Dihing River, Mikira

Understanding the Environmental Conditions

The observations at Site 8, Dihing River, Mikira, suggest a relatively healthy aquatic environment with some signs of pollution. The dominance of Odonata and the presence of sensitive taxa indicate a less polluted condition.

Key observations:

- **Dominance of Odonata:** This suggests a relatively healthy aquatic environment.

- **Sparse representation of Trichoptera:** While not a major concern, it could indicate some level of habitat degradation.
- **Presence of Coleoptera:** This suggests a moderately tolerant macro-invertebrate community.
- **Sensitive taxa:** The presence of Potamidae, Parathelphusidae, Anthuridae, Niphargidae, Talitridae, Mysidae, Hymenosomatidae, Varunidae, and Arcidae etc indicates a less polluted

The overall macro-invertebrate assemblage at Site 8 suggests a moderately good water quality. The presence of sensitive taxa and the absence of highly pollution-tolerant species are positive indicators.

Potential implications:

- **Habitat degradation:** The presence of Chironomus larvae could indicate nutrient enrichment or organic pollution, which may have impacted the habitat.
- **Long-term effects:** Continued pollution could lead to further degradation of the aquatic ecosystem and loss of biodiversity.

Analyzing Data from Site 9: Dihing River, Gammon Bridge

Understanding the Environmental Conditions

The observations at Site 9, Dihing River, Gammon Bridge, suggest a relatively healthy aquatic environment. The dominance of cyprinids and the presence of moderately pollution-sensitive taxa indicate a less polluted condition.

Key observations:

- **Dominance of cyprinids:** This suggests a healthy fish population, which can be an indicator of good water quality.
- **Moderately pollution-sensitive taxa:** The presence of Ancylidae, Cordulegastridae, Aeshnidae, Corduliidae, Libellulidae, Macromiidae, Psychomyiidae, Philopotamidae, Agriidae, Carabidae, and Gammaridae indicates a less polluted condition.

The overall macro-invertebrate assemblage at Site 9 suggests a moderately good water quality. The presence of sensitive taxa and the absence of highly pollution-tolerant species are positive indicators.

Potential implications:

- **Healthy aquatic ecosystem:** The presence of cyprinids and moderately pollution-sensitive taxa suggests a relatively healthy aquatic ecosystem.

- **Reduced pollution impact:** The lower levels of pollution have allowed for a diverse macro-invertebrate community to establish.

Analyzing Data from Site 10: Dihing Mukh

Understanding the Environmental Conditions

The observations at Site 10, Dihing Mukh, indicate a severely degraded aquatic environment. The presence of animal carcasses and the dominance of pollution-tolerant macro-invertebrates suggest a highly polluted condition.

Key observations:

- **Animal carcasses:** This indicates a significant source of organic pollution.
- **Pollution-tolerant taxa:** The presence of Hirudinea, Gastropoda, Bivalvia, Crustacea, Insecta, Hirudinidae, Physidae, Gammaridae, Panaediae, Isotomidae, Caenidae, Gomphidae, Belostomatidae, Dryopidae, Elminthidae, Psephenidae, Heteroceridae, Elmididae, Scritidae, Eulichadidae, Histeridae, Curculionidae, Hydropsychidae, Ecnomidae, Tipulidae, Culicidae, Blepharoceridae, Simulidae, Nymphomyidae, and Chironomidae suggests a highly tolerant macro-invertebrate community.

The dominance of pollution-tolerant taxa indicates a severely degraded water quality. The absence of sensitive species further confirms this.

Potential implications:

- **Habitat degradation:** The pollution and presence of animal carcasses have likely severely impacted the habitat.
- **Long-term effects:** Continued pollution could lead to complete loss of biodiversity in the aquatic ecosystem.

Further Analysis and Considerations

To gain a more comprehensive understanding of the site's conditions, additional analyses could be conducted:

1. **Water quality parameters:** Measure parameters like dissolved oxygen, pH, temperature, conductivity, and nutrient levels to identify specific pollutants.
2. **Sediment analysis:** Analyze the sediment for contaminants like heavy metals, hydrocarbons, or organic matter.

3. **Biological assessment:** Use other biological indicators (e.g., fish, zooplankton) to assess the overall health of the aquatic ecosystem.
4. **Source identification:** Investigate potential sources of pollution, such as nearby industries, agricultural runoff, or sewage discharge.

Based on the observations, the following recommendations could be made:

- **Emergency action:** Address the immediate issue of animal carcasses to prevent further pollution.
- **Pollution control:** Implement strict measures to reduce or eliminate pollution sources.
- **Habitat restoration:** Restore degraded habitats to support a more diverse macro-invertebrate community.
- **Monitoring:** Continue monitoring water quality and macro-invertebrate populations to track changes over time.
- **Public awareness:** Educate the local community about the importance of water quality and the impacts of pollution.

The Ecological Roles of Macro-Invertebrates

Macro-invertebrates play crucial roles in aquatic ecosystems, including:

- **Decomposition:** They contribute to the breakdown of organic matter, nutrient cycling, and sediment bioturbation.
- **Predator-prey interactions:** They serve as both predators and prey, influencing the structure and dynamics of aquatic communities.
- **Bioindicators:** Their presence or absence can be used as indicators of water quality and ecosystem health.

Analyzing Data from Site 11: Digboi Sanitary Park River (Durgapukhuri)

Based on the data collected from Site 11, Durgapukhuri, it appears that the aquatic environment is **relatively healthy** compared to the previous sites analyzed. The presence of sensitive taxa, such as Varunidae, Sesarmidae, Gecarcinucidae, Nereidae, and Nephthyidae, suggests that the water quality is less polluted.

- **Dominance of Odonates and Trichopterans:** These groups are often associated with cleaner water conditions. Their prevalence in Durgapukhuri is a positive sign.

- **Sensitive Taxa:** The presence of the aforementioned sensitive taxa indicates that the environment can support organisms that are intolerant of pollution.
- **Moderate Incidence of Agriidae:** While Agriidae are generally tolerant of pollution, their moderate presence is not a significant concern in this context.
- **Absence of Ephemeroptera:** Although the absence of Ephemeroptera is a potential indicator of some level of pollution, it's not as severe as in the previous sites.

The overall macro-invertebrate assemblage at Site 11 suggests a relatively good water quality. The presence of sensitive taxa and the absence of highly pollution-tolerant species are positive indicators.

- **Better habitat quality:** The presence of sensitive taxa suggests a less degraded habitat.
- **Reduced pollution impact:** The lower levels of pollution have allowed for a more diverse macro-invertebrate community to establish.

Key Findings from the Study are that several dominant macro-invertebrate taxa, including Coleoptera, Hemiptera, Diptera, and Mollusca are identified in these sampling sites. Different taxa exhibit varying preferences for different aquatic habitats. The Family Biotic Index (FBI) revealed poor water quality in the Dihing River section.

Assessing Water Quality Using the FBI

The FBI is a valuable tool for assessing water quality based on the presence and abundance of macro-invertebrate families. A lower FBI score indicates a more degraded aquatic environment.

The FBI results suggest that the Dihing River section is heavily polluted. The presence of pollution-tolerant taxa indicates a degraded habitat. The study highlights the difficulty in identifying a suitable reference site in Digboi Nala due to its degraded condition. This emphasizes the need for careful selection of reference sites in pollution-impacted areas. To gain a more comprehensive understanding of the macro-invertebrate community and water quality in the Dihing River catchment, future studies could Increase the number of sampling sites to cover a wider range of habitats and environmental conditions, Conduct long-term monitoring to track changes in macro-invertebrate assemblages and water quality over time, Analyze the relationship between macro-invertebrate distribution and environmental factors (e.g., temperature, dissolved oxygen, pH, nutrients). Evaluate the effectiveness of habitat restoration measures on macro-invertebrate communities and water quality.

The assessment of the Digboi Nala and Digboi Nadi highlights significant degradation, primarily driven by both point and non-point sources of pollution. While the permitted discharge from the Effluent Treatment Plant (ETP) contributes to water quality issues, factors like municipal waste dumping, agricultural runoff, and seasonal flow variations also play critical roles.

To better understand and address these challenges, it's essential to combine biological surveys with chemical monitoring. This dual approach will help distinguish between the impacts of point source discharges and the broader influences of non-point pollution. Additionally, conducting laboratory evaluations on how specific pollutants affect the biota can provide insights that are applicable in field conditions.

Overall, immediate action is required to restore the health of the Digboi Nala and Digboi Nadi system. Implementing corrective measures based on comprehensive data analysis will be crucial for improving water quality and ecosystem health in the area.

The Dihing River is largely free from pollution effects and some awareness among the people residing in the areas near the confluence of the Digboi Nadi and Dihing River can take care of the impact noticed in the confluence.

To restore the Digboi Nala-Digboi Nadi system effectively, the following suggestions could be implemented:

1. **Define Attainable Conditions**: Utilize historical data alongside current biological surveys to establish baseline conditions for the ecosystem. This should consider both spatial variations (different areas of the stream) and temporal changes (seasonal fluctuations). Identifying these benchmarks will help in setting realistic restoration goals.
2. **Develop an Index of Biological Integrity**: Select an appropriate biological assemblage (e.g., fish, macroinvertebrates) and create a quantitative Index of Biological Integrity (IBI). This index will serve as a measurable tool for assessing habitat quality and tracking improvements over time.
3. **Setup Laboratory Monitoring**: Establish facilities to monitor the effects of point source discharges on selected species in a controlled laboratory environment. This will help differentiate the impacts of these discharges from other pollution sources, allowing for targeted management strategies.
4. **Implement Continuous Bio-Monitoring**: Develop a systematic, ongoing bio-monitoring program with trained field personnel. Regular assessments will ensure timely identification of changes in water quality and ecosystem health, enabling swift intervention when necessary.

These steps, when integrated, will provide a robust framework for understanding and mitigating the degradation of the Digboi Nala-Digboi Nadi system, fostering long-term ecological resilience.

Physico-chemical study

Along with Bio-monitoring, the determination of the following water quality parameters was carried out simultaneously at all the stations:

1. Temperature
2. Free CO_2
3. pH Value,
4. Turbidity
5. Dissolved Oxygen
6. Oil & Grease
7. TDS,
8. TSS,
9. Sulphate
10. BOD
11. COD
12. Nitrate
13. Total Hardness
14. Total Alkalinity
15. Heavy Metals as Arsenic, Lead, Iron, Zinc

Results and discussion Physico-chemical parameters:

Table: 4 Physico-chemical parameters for the Surface water samples

Parameter	Unit	Site1	Site2	Site3	Site4	Site5	Site6	Site7	Site8	Site9	Site10	Site 11
Temperature	^{0}C	23.5	24.2	22.7	23.6	24.2	24.6	23.3	22.8	22.6	23.4	23.1
Free CO_2	mg/L	12.4	6.5	19.3	23.2	3.5	5.8	2.8	16.6	10.2	6.6	5.4
pH	-	7.2	7.7	6.9	6.6	7.1	7.4	7.2	6.9	7.6	7.3	7.4
Turbidity	NTU	8.8	21.4	23	6.7	7.7	5.8	2.6	3.6	2.2	10.4	3.7
DO	mg/L	1.5	2.2	2.3	5.4	4.2	3.4	6.6	7.2	2.2	4.6	2.8
BOD	mg/L	2.2	2.6	2.2	3.6	3.3	2.8	4.5	2.7	3	2.4	3.2
COD	mg/L	8.6	12	7.5	14.2	16.6	8.8	12.4	9.8	10.6	12.4	9.2
Oil & Grease	mg/L	21.2	16.5	8.7	4.2	4.7	3.2	2.8	7.3	1.4	2.8	3.0
TSS	mg/L	2.3	0.7	0.6	3.4	2.9	1.2	1.8	0.6	0.5	0.8	1.1
TDS	mg/L	442	306	217	418	532	620	321	266	205	191	208
Sulphate	mg/L	4.32	5.21	0.56	0.27	4.55	3.29	2.17	0.88	13.24	6.52	4.14
Nitrate	mg/L	0.87	0.56	0.59	1.22	4.56	7.82	8.53	5.33	0.93	3.22	3.28

Total Hardness	mg/L	54.2	43.6	32.5	77.3	110.2	44.3	50.5	66.3	43.8	30.9	45.2
Total Alkalinity	mg/L	67.2	80.5	52.2	76.5	47.2	60.8	103.2	66.5	71.3	64.4	49.6
Arsenic	ug/L	2.76	4.11	0.76	BDL	13.4	3.15	BDL	0.75	4.42	5.19	BDL
Lead	mg/L	BDL	BDL	0.11	0.04	BDL	BDL	0.07	BDL	BDL	BDL	BDL
Iron	mg/L	0.56	1.14	1.31	0.66	0.25	0.54	1.06	0.45	1.07	0.54	0.33
Zinc	mg/L	0.44	1.15	2.06	BDL	BDL	0.62	0.18	0.65	0.43	1.17	1.04

Discussion of the Results:

From the above table, it is noticed that the analysis of different physico-chemical parameters is important to know the quality and productivity of an aquatic system. temperature plays a pivotal role in aquatic ecosystems. Here's a deeper dive into how it influences various aspect. Higher temperatures often increase metabolic rates in ectothermic (cold-blooded) organisms, which can lead to more active feeding and reproductive behaviors. Conversely, extreme temperatures can stress organisms, affecting their growth and survival. Many fish and aquatic species adjust their behaviors or migrate based on temperature changes, seeking optimal conditions for feeding and spawning. Warmer water typically holds less oxygen. This is critical for fish and other aerobic organisms, which may experience stress or suffocation if oxygen levels drop too low. Higher temperatures can also impact the solubility of gases like CO2, influencing photosynthesis and respiration processes in aquatic plants. Temperature can affect the evaporation rates of water, thereby influencing salinity levels in freshwater and estuarine systems. Higher temperatures may lead to increased evaporation, concentrating salts and impacting species that are sensitive to salinity changes. Temperature affects the rates of chemical reactions, including those involved in nutrient cycling. Warmer temperatures can speed up the decomposition of organic matter, releasing nutrients but also potentially leading to nutrient imbalances or eutrophication.

Monitoring and understanding temperature fluctuations in aquatic systems is vital for assessing ecosystem health and resilience. By analysing how temperature interacts with other physico-chemical parameters, we can better predict the impacts of environmental changes and implement effective conservation strategies.

In the present investigation, the water temperature was found to vary from 22.6 in site 9 to 24.6 in site 6. Change in alkalinity is a result of change in pH value. The pH value increases due to the activity of

photosynthetic algae which consumes CO_2 dissolved in water. The variations of Temperature, free CO_2 and pH is shown in the graph below (Fig 4)

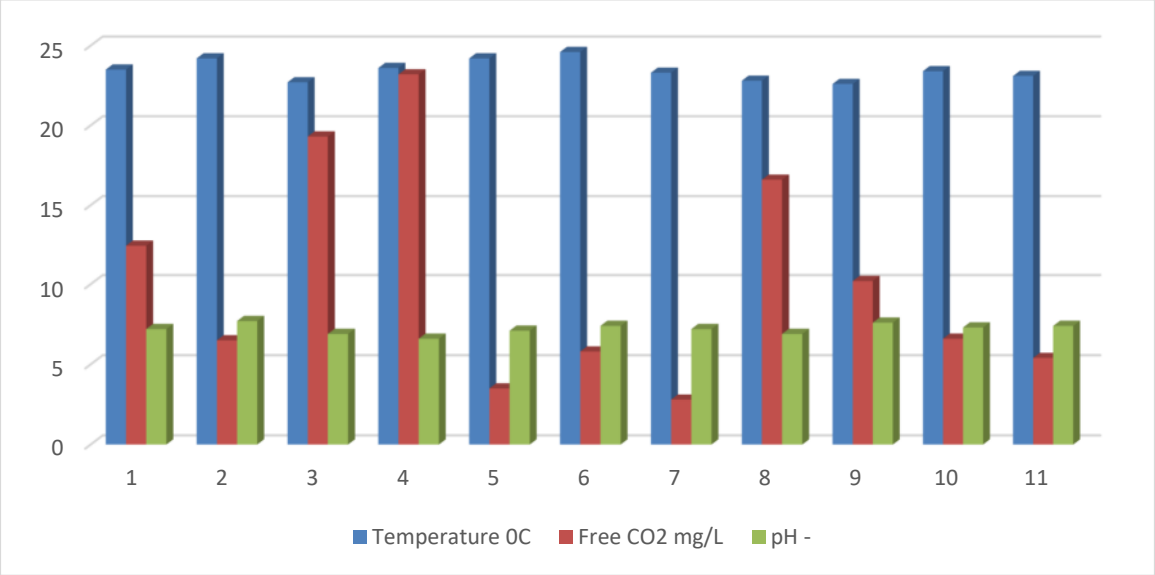

Fig 4: Variations of Temperature, free CO_2 and pH for each site of Sample collection.

Dissolved oxygen (DO) is a crucial parameter for the health of aquatic ecosystems. It supports the respiration of aquatic organisms, including fish, invertebrates, and microorganisms. When DO levels fall below a certain threshold, it can lead to stress, disease, and even mortality among these organisms.

Sites 1, 2, 3, and 6 have significantly depleted DO levels. The recorded DO values (1.5, 2.2, 2.3, and 3.4 mg/L) are below the minimum levels required for many aquatic species to thrive. Several factors can contribute to low DO levels in aquatic environments: Excessive amounts of organic matter, such as sewage or agricultural runoff, can decompose in the water, consuming oxygen during the decomposition process. Nutrient-rich pollution, often from agricultural runoff or wastewater, can lead to algal blooms. When these blooms die and decompose, they consume oxygen. Warmer water holds less dissolved oxygen than colder water. Increased temperatures can exacerbate DO depletion, especially in areas with high organic loads. Lack of water movement can limit the diffusion of oxygen from the atmosphere into the water. Certain industrial processes can release pollutants that reduce DO levels.

Free carbon dioxide (FCO2) is a crucial parameter in aquatic ecosystems. It plays a significant role in pH regulation, carbonate chemistry, and the overall balance of dissolved gases. High FCO2 levels can lead to increased acidity, which can have adverse effects on aquatic organisms. The FCO2 values vary considerably across the sites, ranging from 2.8 mg/L (site 7)

to 23.2 mg/L (site 4). This suggests significant differences in the sources and levels of carbon dioxide in the different aquatic environments. Several factors can contribute to elevated FCO2 levels in aquatic environments. Decomposition of organic matter, such as decaying plants or algae, releases carbon dioxide. Aquatic organisms, including fish, invertebrates, and microorganisms, release carbon dioxide as a byproduct of respiration. Certain industrial processes can discharge carbon dioxide-containing effluents into waterways. Groundwater with high FCO2 levels can contribute to elevated concentrations in surface waters.

pH is a crucial measure of water acidity or alkalinity. It directly influences the availability of nutrients, the toxicity of pollutants, and the metabolic processes of aquatic organisms. Maintaining a pH within a suitable range is essential for the overall health and balance of aquatic ecosystems. The pH values recorded (6.6-7.7) fall within the World Health Organization (WHO) permissible limit for drinking water, indicating a generally acceptable pH level. The lack of significant pH fluctuations suggests a relatively stable water body in terms of acidity or alkalinity. While the pH levels in this water body appear to be within a desirable range, several factors can influence pH fluctuations: Decomposition of organic matter, respiration by aquatic organisms, and the dissolution of minerals can all contribute to changes in pH. Atmospheric pollution can lead to acid rain, which can lower the pH of water bodies. Runoff from agricultural areas or industrial sites can introduce substances that alter pH. The concentration of dissolved carbon dioxide in the water can affect pH.

Turbidity is a measure of water clarity that indicates the amount of suspended particles, such as silt, clay, or organic matter, in the water. Higher turbidity levels can reduce light penetration, affecting aquatic plants and the overall health of the ecosystem. Turbidity levels vary significantly between Site 9 (2.2 NTU) and Site 2 (21.4 NTU). Site 2 exhibits the highest turbidity among the sampling sites. Several factors can contribute to elevated turbidity levels: Erosion of soil and sediments from surrounding land can increase turbidity, especially during heavy rainfall or periods of intense human activity. Construction projects near water bodies can release sediments into the water, leading to increased turbidity. Runoff from agricultural fields can carry soil particles and other suspended matter into waterways. Dense algal blooms can increase turbidity due to the presence of suspended algal cells. Certain industrial processes can discharge wastewater containing suspended solids. High turbidity levels can have several negative consequences: Turbid water blocks sunlight, affecting aquatic plants that rely on photosynthesis. Turbidity can reduce visibility for aquatic organisms, making it difficult for them to find food or avoid predators. Suspended particles can settle to the bottom of the water

body, smothering aquatic habitats and reducing oxygen levels. High turbidity can make water treatment more difficult and expensive.

Biochemical oxygen demand (BOD) is a measure of the amount of oxygen required by microorganisms to decompose organic matter in a water sample. Higher BOD levels indicate a greater amount of organic pollution, which can deplete dissolved oxygen levels and harm aquatic life. Most of the recorded BOD values exceed the standard criteria, suggesting significant organic pollution in the water body. The BOD values vary from 2.2 mg/L (site 1 and 3) to 4.5 mg/L (site 7), indicating varying levels of organic pollution across the sampling sites. The analysis points to domestic household waste discharged through drains as the primary source of organic pollution. The discharge of untreated sewage from Digboi Township into the river is a major contributor to the elevated BOD levels. This sewage contains a high concentration of organic matter, which, when released into the water body, increases the demand for oxygen as microorganisms decompose it. To address the issue of high BOD levels and improve water quality, the following measures are recommended: Construct and implement a wastewater treatment facility in Digboi Township to treat sewage before discharging it into the river. Promote public awareness about proper waste management practices to reduce the amount of organic waste entering drains and channels. Upgrade drainage systems to prevent leaks and overflows that can contribute to pollution. Regularly monitor BOD levels and other water quality parameters to track progress and identify any new pollution sources. Enforce regulations related to wastewater discharge and pollution control to ensure compliance.

The slightly acidic behaviour of this sampling site of river might be due to contamination of Digboi river with discharge from Digboi Refinery.

Total dissolved solids (TDS) measure the combined concentration of organic and inorganic substances dissolved in water. High TDS levels can affect the taste, corrosivity, and suitability of water for various uses. TDS values in Digboi River vary from 191 mg/L (site 10) to 620 mg/L (site 6). Sites 5 and 6 have TDS values exceeding the permissible limit of 500 mg/L for Class A water according to Indian standards. Several factors can influence TDS levels in a river: The type of rocks and soil in the catchment area can contribute to the dissolution of minerals and salts. Agricultural activities, industrial processes, and urbanization can introduce various substances into the water. Rainfall can influence the amount of dissolved substances washed into the river. Evaporation can concentrate dissolved solids in the water. Elevated TDS

levels can have several negative consequences: High TDS can impart a salty or mineral taste to drinking water. In extreme cases, high TDS can have adverse health effects. High TDS can accelerate the corrosion of pipes and equipment. Minerals in the water can form deposits and scale on surfaces. To address high TDS levels in Digboi River, consider the following:

1. Determine the specific sources of dissolved solids contributing to the elevated TDS levels.
2. Implement practices to reduce pollution and erosion from agricultural and industrial activities.
3. Explore water treatment options, such as reverse osmosis or ion exchange, to remove dissolved solids.
4. If feasible, investigate alternative water sources with lower TDS levels.
5. Continuously monitor TDS levels and enforce regulations to ensure compliance with water quality standards.

The variation related to Turbidity, DO, BOD and COD are shown in figure 5.

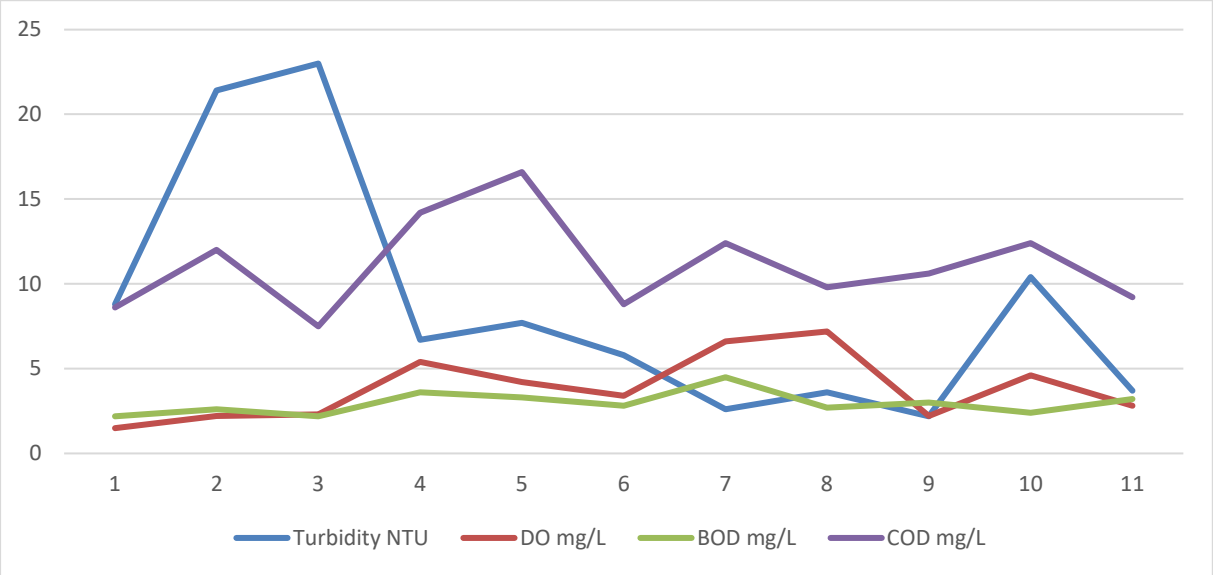

Fig 5: Variations of Turbidity, DO, BOD and COD for each site.

Hardness is a measure of the concentration of multivalent metal ions, primarily calcium and magnesium, in water. It is often expressed in terms of calcium carbonate equivalents. Hardness can affect water quality, treatment processes, and the suitability of water for various uses. Total hardness values in Digboi River vary from 30.9 mg/L (site 10) to 110.2 mg/L (site 5). Site 5 has the highest hardness, while Site 10 has the lowest. Several factors can contribute to hardness in water: The type of rocks and minerals in the catchment area can influence the

dissolution of calcium, magnesium, and other hardness-causing ions. Agricultural practices and industrial activities can introduce substances that contribute to hardness. Rainfall can influence the leaching of minerals from the soil and their transport into the river. High hardness can have several negative consequences: Hardness ions can react with soap and detergents to form scale deposits in pipes and appliances. Hardness can complicate water treatment processes, such as softening and filtration. In some cases, high hardness can affect the taste and odor of water. While generally not a major health concern, excessive hardness can contribute to gastrointestinal issues in sensitive individuals. To address high hardness levels in Digboi River, consider the following: Implement water softening techniques, such as ion exchange or lime-soda softening, to remove hardness ions. Adjust water treatment processes to accommodate high hardness levels. Educate the public about the effects of hardness and the importance of water treatment. If feasible, explore alternative water sources with lower hardness levels.

Total alkalinity is a measure of the water's capacity to neutralize acids. It is primarily due to the presence of bicarbonate, carbonate, and hydroxide ions. High alkalinity levels can affect water quality, treatment processes, and the suitability of water for various uses. Total alkalinity values in Digboi River vary from 47.2 mg/L (site 5) to 103.2 mg/L (site 7). Site 7 has the highest alkalinity, while Site 5 has the lowest. Several factors can influence total alkalinity levels: The type of rocks and minerals in the catchment area can contribute to the presence of alkaline substances in the water. Agricultural activities, industrial processes, and urbanization can introduce substances that affect alkalinity. Rainfall can influence the leaching of alkaline substances from the soil and their transport into the river. High alkalinity levels can have several implications: Alkalinity can affect water treatment processes, such as softening and pH adjustment. High alkalinity can contribute to corrosion of pipes and equipment. Alkalinity can lead to the formation of scale in boilers and other equipment. While high alkalinity is generally not a major concern for aquatic life, excessive levels can affect certain species.

The concentration of Total Alkalinity, Total Hardness, Nitrate, Sulphate, TDS, TSS and Oil & Grease are shown in figure 6

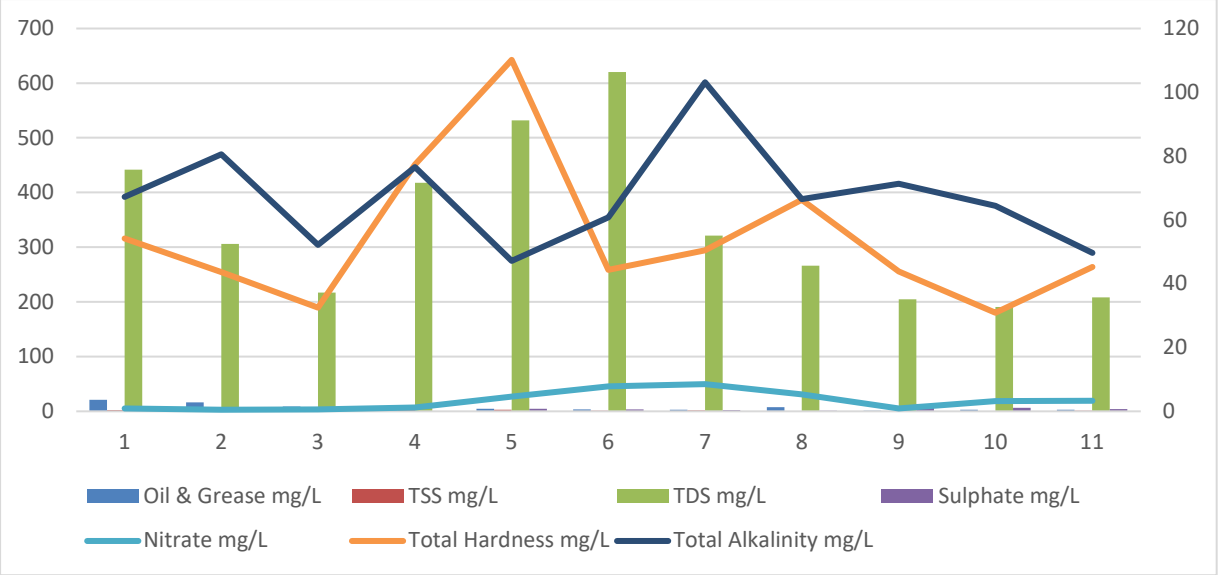

Fig 6: The concentration of Total Alkalinity, Total Hardness, Nitrate, Sulphate, TDS, TSS and Oil & Grease.

The analysis of metals in the water samples collected from 10 different sites indicates the following:

- **Lead:** Lead is detected only in Site 3, 4 and 7, indicating a localized source of contamination.
- **Arsenic:** Arsenic concentrations vary significantly, with Site 5 having the highest levels (13.4 ug/L).
- **Iron:** Iron concentrations are relatively high across all sites. Ranges from 0.25 mg/L (site 5) to 1.31 mg/L (site 2)
- **Zinc:** Zinc concentrations range from below detection limits (BDL) to moderate levels.

Potential Sources of Metal Contamination: Industrial effluents can introduce various metals into water bodies, including lead, arsenic, iron, and zinc. Mining activities can release metals into the environment through runoff and leaching. Some metals, such as iron and zinc, can occur naturally in rocks and soil and leach into water. Pesticides and fertilizers can contain trace amounts of metals that can enter waterways.

Elevated levels of heavy metals, such as lead, arsenic, and zinc, can pose significant health risks to both humans and aquatic organisms. These metals can accumulate in the food chain and cause various health problems, including:

- **Neurological disorders**
- **Reproductive issues**
- **Kidney damage**
- **Cancer**

To address metal contamination in Digboi River, consider the following: Determine the specific sources of metal contamination through investigations and monitoring. Implement measures to reduce or eliminate metal emissions from industrial facilities and mining operations. Promote sustainable land use practices to minimize agricultural runoff and erosion. Explore water treatment technologies to remove metals from drinking water sources. Continuously monitor metal concentrations and enforce regulations to ensure compliance with water quality standards.

. Figure 7 shows the concentrations of Arsenic, Lead, Iron and Zn.

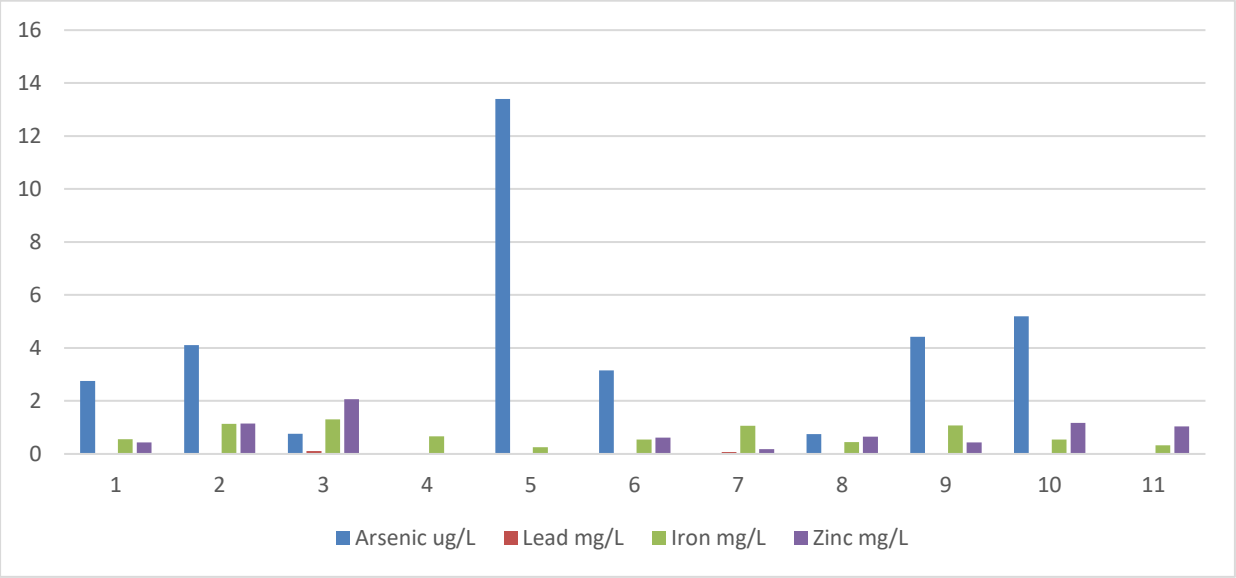

Figure 7: The concentrations of Arsenic, Lead, Iron and Zinc

CONCLUSION: The study analysed various water quality parameters in the Digboi and Dihing rivers and Durgapukhuri, including:

- **Physical-chemical parameters:** pH, electrical conductivity (EC), total dissolved solids (TDS), turbidity, total hardness, total alkalinity, oil and grease, BOD, COD, and DO etc.
- **Biological parameters:** Macroinvertebrate diversity, including molluscan species from five different families.

The pH levels showed variations across the rivers. Certain physical-chemical parameters suggested slight to moderate pollution in the rivers. Macroinvertebrate diversity provided an indication of the aquatic environment's health. Regularly monitor water quality to track changes and identify pollution sources. Analyze local activities that might contribute to pollution. Educate communities about the importance of clean water and responsible practices. Implement measures to prevent continued pollution. Use biological indicators, like macroinvertebrate diversity, to assess water quality. Encourage collaboration between local communities, government agencies, organizations, and educational institutions. Utilization of diversity indices to quantify environmental stress on the water bodies.

The study highlights the importance of vigilant monitoring and effective management of our precious water resources. Through collaborative efforts, we can safeguard aquatic ecosystems, guarantee clean water for future generations, and preserve the delicate balance of our planet's hydrological systems. The study emphasizes the need for long-term monitoring to track changes and identify pollution trends. The use of biological indicators like macroinvertebrate diversity provides valuable insights into the health of the aquatic environment. The study underscores the importance of public awareness and cooperation among different stakeholders to ensure sustainable water resource management.

To ensure the long-term health of our water resources, we must foster interagency collaboration and data sharing, support research and development of innovative monitoring technologies, encourage community involvement and environmental stewardship, develop and implement effective policies and regulations and promote water conservation practices and sustainable land use, so that we can leave a lasting legacy for future generations.

Date: 18 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing mukh Latitude: 27.262802° Longitude: 94.703727°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant		Group 2 - Moderately Intolerant		Group 3 - Fairly Tolerant		Groups 4 - Very Tolerant	
2	Stonefly nymph		Damselfly nymph		Leech	7	Aquatic worm
	Mayfly nymph	3	Dragonfly nymph	5	Midge larva		Blood midge larva (red)
	Caddisfly larva		Scud		Planaria/ Flatworm		Rat-tailed Maggot
	Riffle Beetle		Sowbug		Black fly larva		Left-Handed or Pouch snail
	Dobsonfly Larva		Cranefly larva				
4	Right-Handed or Gilled snail		Clam/Mussel				
	Water Penny		Crayfish				
	# of TAXA represented		# of TAXA represented		# of TAXA represented		# of TAXA represented
2	Weighting Factor (x4)	1	Weighting Factor (x3)	1	Weighting Factor (x2)	1	Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group) 14

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

18/9/24

Date: 18 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Digboi river - kenduguri Latitude: 27.402045° Longitude: 95.580806°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant	Group 2 - Moderately Intolerant	Group 3 - Fairly Tolerant	Groups 4 - Very Tolerant
☐ Stonefly nymph	☐ Damselfly nymph	4 Leech	☐ Aquatic worm
☐ Mayfly nymph	☐ Dragonfly nymph	☐ Midge larva	☐ Blood midge larva (red)
☐ Caddisfly larva	3 Scud	1 Planaria/ Flatworm	☐ Rat-tailed Maggot
☐ Riffle Beetle	☐ Sowbug	1 Black fly larva	☐ Left-Handed or Pouch snail
☐ Dobsonfly Larva	☐ Cranefly larva		
☐ Right-Handed or Gilled snail	☐ Clam/Mussel		
☐ Water Penny	4 Crayfish		
☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented
☐ Weighting Factor (x4)	2 Weighting Factor (x3)	3 Weighting Factor (x2)	☐ Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group)

12

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

18/9/24

Biological Monitoring Data Sheet

Date: 18 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Digboi River - 15km pt. Latitude: 27.345290° Longitude: 95.479622°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant		Group 2 - Moderately Intolerant		Group 3 - Fairly Tolerant		Groups 4 - Very Tolerant	
4	Stonefly nymph		Damselfly nymph	1	Leech		Aquatic worm
	Mayfly nymph	2	Dragonfly nymph		Midge larva		Blood midge larva (red)
3	Caddisfly larva		Scud		Planaria/ Flatworm		Rat-tailed Maggot
	Riffle Beetle	3	Sowbug		Black fly larva		Left-Handed or Pouch snail
5	Dobsonfly Larva		Cranefly larva				
	Right-Handed or Gilled snail		Clam/Mussel				
	Water Penny		Crayfish				
	# of TAXA represented		# of TAXA represented		# of TAXA represented		# of TAXA represented
3	Weighting Factor (x4)	2	Weighting Factor (x3)	1	Weighting Factor (x2)		Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group) 19

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

18/9/24

Date: 19 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Digboi River 26KM pt Latitude: 27.323431° Longitude: 95.364031°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant	Group 2 - Moderately Intolerant	Group 3 - Fairly Tolerant	Groups 4 - Very Tolerant
☐ Stonefly nymph	☐ Damselfly nymph	1 Leech	☐ Aquatic worm
☐ Mayfly nymph	4 Dragonfly nymph	☐ Midge larva	☐ Blood midge larva (red)
☐ Caddisfly larva	☐ Scud	☐ Planaria/ Flatworm	☐ Rat-tailed Maggot
☐ Riffle Beetle	☐ Sowbug	3 Black fly larva	☐ Left-Handed or Pouch snail
☐ Dobsonfly Larva	2 Cranefly larva		
☐ Right-Handed or Gilled snail	5 Clam/Mussel		
☐ Water Penny	☐ Crayfish		
☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented
☐ Weighting Factor (x4)	3 Weighting Factor (x3)	2 Weighting Factor (x2)	☐ Weighting Factor (x1)

Pollution Tolerance Index Rating
(Add the final index values for each group) 10

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

19/09/24

Date: 19 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing - before confluence with Digboi River Latitude: 27.302082° Longitude: 95°347753°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant		Group 2 - Moderately Intolerant		Group 3 - Fairly Tolerant		Groups 4 - Very Tolerant	
4	Stonefly nymph	1	Damselfly nymph		Leech		Aquatic worm
	Mayfly nymph		Dragonfly nymph		Midge larva		Blood midge larva (red)
4	Caddisfly larva		Scud		Planaria/ Flatworm		Rat-tailed Maggot
	Riffle Beetle	3	Sowbug		Black fly larva		Left-Handed or Pouch snail
	Dobsonfly Larva		Cranefly larva				
5	Right-Handed or Gilled snail	2	Clam/Mussel				
	Water Penny	1	Crayfish				
	# of TAXA represented		# of TAXA represented		# of TAXA represented		# of TAXA represented
8	Weighting Factor (x4)	4	Weighting Factor (x3)		Weighting Factor (x2)		Weighting Factor (x1)

Pollution Tolerance Index Rating 24

(Add the final index values for each group)

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

19/9/24

Date: 20 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing - after confluence with Digboi River Latitude: 27.3022121° Longitude: 95° 3442870

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant

	Stonefly nymph
4	Mayfly nymph
	Caddisfly larva
	Riffle Beetle
	Dobsonfly Larva
	Right-Handed or Gilled snail
	Water Penny
	# of TAXA represented
1	Weighting Factor (x4)

Group 2 - Moderately Intolerant

	Damselfly nymph
2	Dragonfly nymph
	Scud
2	Sowbug
	Cranefly larva
	Clam/Mussel
	Crayfish
	# of TAXA represented
2	Weighting Factor (x3)

Group 3 - Fairly Tolerant

4	Leech
	Midge larva
	Planaria/ Flatworm
	Black fly larva
	# of TAXA represented
1	Weighting Factor (x2)

Groups 4 - Very Tolerant

	Aquatic worm
	Blood midge larva (red)
	Rat-tailed Maggot
1	Left-Handed or Pouch snail
	# of TAXA represented
1	Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group) 13

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

20/09/24

Date: 20/09/24 Volunteer ID: _____ Site ID: _____

Stream Name: Digboi Sanitary park River (Durgapukhuri) Latitude: 27.387166° Longitude: 95.615823°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant		Group 2 - Moderately Intolerant		Group 3 - Fairly Tolerant		Groups 4 - Very Tolerant	
4	Stonefly nymph	2	Damselfly nymph		Leech		Aquatic worm
	Mayfly nymph		Dragonfly nymph		Midge larva		Blood midge larva (red)
5	Caddisfly larva		Scud		Planaria/ Flatworm		Rat-tailed Maggot
	Riffle Beetle	1	Sowbug	3	Black fly larva		Left-Handed or Pouch snail
2	Dobsonfly Larva		Cranefly larva				
	Right-Handed or Gilled snail	1	Clam/Mussel				
	Water Penny		Crayfish				
	# of TAXA represented		# of TAXA represented		# of TAXA represented		# of TAXA represented
3	Weighting Factor (x4)	3	Weighting Factor (x3)	1	Weighting Factor (x2)		Weighting Factor (x1)

Pollution Tolerance Index Rating (Add the final index values for each group) 23

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

20/9/24

Date: 16 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing - Margherita Latitude: 27.284275° Longitude: 95.663482°

Time ____:____ AM / PM Time Sampling: 1 hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant

	Stonefly nymph
	Mayfly nymph
	Caddisfly larva
	Riffle Beetle
	Dobsonfly Larva
	Right-Handed or Gilled snail
	Water Penny
	# of TAXA represented
	Weighting Factor (x4)

Group 2 - Moderately Intolerant

	Damselfly nymph
	Dragonfly nymph
	Scud
	Sowbug
	Cranefly larva
	Clam/Mussel
	Crayfish
	# of TAXA represented
	Weighting Factor (x3)

Group 3 - Fairly Tolerant

3	Leech
2	Midge larva
	Planaria/ Flatworm
	Black fly larva
2	# of TAXA represented
2	Weighting Factor (x2)

Groups 4 - Very Tolerant

	Aquatic worm
	Blood midge larva (red)
	Rat-tailed Maggot
3	Left-Handed or Pouch snail
1	# of TAXA represented
1	Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group) 5

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

16/09/24

Date: 16 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Diking - Makum Latitude: 27.292424° Longitude: 95.616147°

Time ____:____ AM / PM Time Sampling: 1 hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☐ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant

	Stonefly nymph
	Mayfly nymph
	Caddisfly larva
	Riffle Beetle
	Dobsonfly Larva
	Right-Handed or Gilled snail
	Water Penny
	# of TAXA represented
	Weighting Factor (x4)

Group 2 - Moderately Intolerant

	Damselfly nymph
	Dragonfly nymph
	Scud
	Sowbug
	Cranefly larva
	Clam/Mussel
	Crayfish
	# of TAXA represented
	Weighting Factor (x3)

Group 3 - Fairly Tolerant

5	Leech
	Midge larva
2	Planaria/ Flatworm
	Black fly larva
	# of TAXA represented
2	Weighting Factor (x2)

Groups 4 - Very Tolerant

	Aquatic worm
2	Blood midge larva (red)
	Rat-tailed Maggot
4	Left-Handed or Pouch snail
	# of TAXA represented
2	Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group) 6

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

16/9/24

Date: 17 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing - Mirika Latitude: 27.273380° Longitude: 95.564508°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant	Group 2 - Moderately Intolerant	Group 3 - Fairly Tolerant	Groups 4 - Very Tolerant
☐ Stonefly nymph	☐ Damselfly nymph	4 Leech	☐ Aquatic worm
☐ Mayfly nymph	☐ Dragonfly nymph	☐ Midge larva	1 Blood midge larva (red)
☐ Caddisfly larva	☐ Scud	☐ Planaria/ Flatworm	☐ Rat-tailed Maggot
☐ Riffle Beetle	☐ Sowbug	☐ Black fly larva	☐ Left-Handed or Pouch snail
☐ Dobsonfly Larva	☐ Cranefly larva		
☐ Right-Handed or Gilled snail	☐ Clam/Mussel		
☐ Water Penny	2 Crayfish		
☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented	☐ # of TAXA represented
☐ Weighting Factor (x4)	1 Weighting Factor (x3)	1 Weighting Factor (x2)	1 Weighting Factor (x1)

Pollution Tolerance Index Rating

(Add the final index values for each group)

6

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

17/09/24

Date: 17 / 09 / 24 Volunteer ID: _____ Site ID: _____

Stream Name: Dihing - Gammon bridge Latitude: 27.311866° Longitude: 94.882183°

Time ____:____ AM / PM Time Sampling: _____ hrs Air Temp.: _____ °C

Current Weather: ☐ Clear/Sunny ☑ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Worst Weather (past 48 hours): ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (steady) ☐ Storm (Heavy)

Check Methods Used: ☑ Kick Seine Net (3 times) ☐ Dip Net (20 jabs or scoops)

Check Habitats Sampled: ☐ Undercut Banks ☐ Riffles ☐ Leaf Packs ☐ Snags/Vegetation ☐ Sediment

Pollution Tolerance Index (PTI)

Record the taxa (group) represented in your sampling by either entering the number of organisms you counted or a ✓

Group 1 - Intolerant		Group 2 - Moderately Intolerant		Group 3 - Fairly Tolerant		Groups 4 - Very Tolerant	
	Stonefly nymph		Damselfly nymph	3	Leech	4	Aquatic worm
	Mayfly nymph	2	Dragonfly nymph		Midge larva		Blood midge larva (red)
	Caddisfly larva		Scud		Planaria/ Flatworm		Rat-tailed Maggot
	Riffle Beetle	2	Sowbug		Black fly larva	5	Left-Handed or Pouch snail
	Dobsonfly Larva		Cranefly larva				
	Right-Handed or Gilled snail	4	Clam/Mussel				
	Water Penny		Crayfish				
	# of TAXA represented		# of TAXA represented		# of TAXA represented		# of TAXA represented
	Weighting Factor (x4)	3	Weighting Factor (x3)	1	Weighting Factor (x2)	2	Weighting Factor (x1)

Pollution Tolerance Index Rating
(Add the final index values for each group)

12

PTI Ratings	
Excellent	23 or More
Good	17 - 22
Fair	11 - 16
Poor	10 or Less

Please check other Biological Indicators you observed:

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

17/9/24