



इंडियन ऑयल कॉर्पोरेशन लिमिटेड

बोंगाइगॉव रिफाइनरी

डाकघर : बालीगोंग - 783 385

पिन : शिवंग (असम)

Indian Oil Corporation Limited

Bongaigaon Refinery

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रिफाइनरी प्रभाग  
Refineries Division

REF: IOC/BGR/ENV/MS Max/MoEF&CC/2023-24/01

Date: 27/12/23

To  
The Regional Officer,  
Ministry of Environment, Forest and Climate Change,  
Integrated Regional Office, Guwahati,  
4th Floor, House fed Building,  
GS Road, Rukminigaon Guwahati-781022

Subject: Half Yearly Report for the period of (1<sup>st</sup> April'23 and 30<sup>th</sup> September'23) for  
"MS Maximisation Project"

Dear Sir,

With reference to above, we are enclosing the Six Monthly Report for the period of 1<sup>st</sup> April'23 and 30<sup>th</sup> September'23 for your kind perusal.

The reports are being sent as per EIA Rules'2006 for the "Environmental Clearances" issued by MoEF&CC to Bongaigaon Refinery, (BGR) for "MS Maximisation Project".

Thanking you,

Yours faithfully,

(Biman Gogoi)

CM (HSE)

Ph: 9435122647

Copy to:

1. Member Secretary, Pollution Control Board, Assam  
Bamunimaidam, Guwahati - 781 021
2. Zonal Officer, Central Pollution Control Board  
Eastern Zonal Office, 'TUM-SIR', Lower Matinagar,  
Near Fire Brigade H.Q., Shillong - 793014

# **Half yearly Report for MS Maximisation Project**

**(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**



**Submitted by:**

**Indian Oil Corporation Limited**

**Bongaigaon Refinery**

**PO: Dhaligaon. District: Chirang. Assam**

## **Status of MS Maximisation Project**

**(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

Environmental Clearance for “Expansion of Pretreater & Reformer from 107,000 TPA to 160,000 TPA of Naphtha for Motor Spirit (MS) Maximisation Project” at Dhaligaon, Chirang, Assam by M/s Bongaigaon Refinery & Petrochemicals Ltd. vide MoEF’s letter No.J.11011/375/2006-IA-II (I) dated 22/03/2007;

**Project was commissioned on 31.01.2009**

### **INDEX:**

<b>Sl. No</b>	<b>Conditions</b>	<b>Status</b>
1.	General & specific conditions and Compliance status of MS Maximisation Project.	Annexure- A
2.	Six monthly Stack Monitoring/ Air Quality Data	Furnished in Appendix-A1
3.	Six monthly effluent discharged quantity, Quality	Furnished in Appendix-A2
4.	Tree Plantation Data	Furnished in Appendix-A3
5.	Additional Information	Furnished in Appendix-A4
6.	Fugitive Emission Data	Furnished in Appendix-A5
7.	Annual return of hazardous waste	Furnished in Appendix-A6(a)
8.	Authorization from PCBA under Hazardous and Other Waste, (Management and Transboundary Movement) Rules 2008	Furnished in Appendix-A6(b)
9.	Details of Waste water treatment and disposal system	Furnished in Appendix-A7
10.	Quarterly Noise Survey Report.	Furnished in Appendix-A8
11.	Status of Rainwater Harvesting	Furnished in Appendix-A9
12.	Screen Shot of IOCL Website upload of report	Furnished in Appendix-A10
13.	NABL certificate of QC Lab of Bongaigaon Refinery	Furnished in Appendix-A11
14.	Employees Occupational Health Check up Status	Furnished in Appendix-A12
15.	Test report of underground water in the surrounding areas	Furnished in Appendix-A13
16.	Flare system.	Furnished in Appendix-A14

## Annexure-A

Sr. No.	Specific Conditions	Compliance Status
(i)	The gaseous emissions (SO <sub>2</sub> , NO <sub>x</sub> , HC, VOC and Benzene) from various process units shall conform to the standards prescribed by the concerned State Pollution Control Board. All the measures detailed in the EMP and response to the Public Hearing shall be taken to control the point/stack and fugitive gaseous emissions from the proposed facilities, process plants and storage units etc. for ensuring that the ambient air quality around the Refinery due to the expansion is maintained at the predicted 24 hourly average maximum concentration.	Complied. The gaseous emission is within limits.  Emission and ambient air (VOC) data attached as <b><u>Appendix-A1</u></b> .  HC Fugitive data in <b><u>Appendix-A5</u></b> .
(ii)	There will be no increase in the pollution load for any parameter, except the waste water and solid waste generation, due to the expansion project.	Complied. No increase in emission pollutant load.
(iii)	No additional stack is envisaged for the revamp of Pretreater and Reformer.	Complied. No new stack in the project.
(iv)	The emission levels of the other pollutants shall remain within the existing levels.	Complied. The emission levels of the other pollutants are within the existing levels.
(v)	Low Sulphur internal fuel oil & fuel gas will be fired in process heaters and boilers.	Complied. Low sulphur fuel oil & low sulphur fuel gas is only burnt in the process heaters.
(vi)	Quarterly monitoring of fugitive emissions will be carried out by Fugitive Emission Detectors (GMI Leak Surveyor). Guidelines of CPCB will be followed for monitoring fugitive emissions.	Complied. Quarterly fugitive emissions Survey is being carried out regularly. The quarterly reports for the period of <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023</b> are attached as <b><u>Appendix-A5</u></b> .
(vii)	For control of fugitive emissions, all unsaturated hydrocarbons will be routed to the flare system. The flare system shall be designed for smokeless burning.	Complied. There is no open vent. All process systems are routed to the Flare Gas Recovery System (FGRS) for recovery of gas before flaring.
(viii)	Flare Gas Recovery System will be installed for reduction of Hydrocarbon loss and emissions of VOCs, NO <sub>x</sub> , SO <sub>2</sub> & CO <sub>2</sub> to the environment.	Complied. Flare Gas Recovery System (FGRS) was installed and commissioned on 2 <sup>nd</sup> August, 2009.

Sr. No.	Specific Conditions	Compliance Status
(ix)	Regular Ambient Air Quality Monitoring shall be carried out. The location and results of existing monitoring stations will be reviewed in consultation with the concerned State Pollution Control Board based on the occurrence of maximum ground level concentration and downwind direction of wind. Additional stations shall be set up, if required. It will be ensured that at least one monitoring station is set up in up-wind & in down-wind direction along with those in other directions.	Complied. Regular Ambient Air Quality Monitoring is being carried out. The locations of ambient station are decided on the basis of the highest ground level concentration of pollutants based on dispersion modeling in consultation with PCBA. Additional station is not envisaged.
(x)	Online data for air emission shall be transferred to the CPCB and SPCB regularly. The instruments used for ambient air quality monitoring shall be calibrated regularly. The monitoring protocol shall ensure continuous monitoring of all the parameters.	Complied. On-line stack emission data is being transmitted continuously to CPCB and SPCB servers. The analyzer instruments are calibrated regularly.
(xi)	The practice of acoustic plant design shall be adopted to limit noise exposure for personnel to an 8 hr time weighted average of 90 db (A).	Complied. Quarterly Noise Survey is being carried out regularly. Quarterly Reports for the period of <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023</b> are attached as <b><u>Appendix-A8</u></b> .
(xii)	All the Pumps and other equipment's where there is a likelihood of HC leakages shall be provided with LEL indicators and hydrocarbon detectors. Provision for immediate isolation of equipments, in case of a leakage will also be made. The company shall adopt Leak Detection and Repair (LDAR) programme for quantification and control of fugitive emissions.	Complied. Additional detectors have been installed after adequacy survey was carried out in addition to earlier installed detectors. LDAR program (Fugitive emission) is being conducted quarterly. The quarterly reports for the period <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023</b> are attached as <b><u>Appendix-A5</u></b> .
(xiii)	The product loading gantry shall be connected to the product sphere in closed circuit through the vapor arm connected to the tanker. Data on fugitive emission shall be regularly monitored and records will be maintained.	Not Applicable in this project. Quarterly monitoring of fugitive emissions is carried out. The quarterly reports for the period <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023</b> are attached as <b><u>Appendix-A5</u></b> .

Sr. No.	Specific Conditions	Compliance Status
(xiv)	The company shall ensure that no halogenated organic is sent to the flares. If any stream of the halogenated organic are present, then the respective streams may be incinerated. If there are no technically feasible or economically viable reduction/recovery options. Any stream containing organic carbon, other than halogenated shall be connected to proper flaring system, if not to a recovery device or an incinerator.	There is no halogenated organic component in the streams of this project.  All process systems are routed to the Flare Gas Recovery System (FGRS) for recovery of gas before flaring
(xv)	All new standards/norms that are being proposed by the CPCB for Petrochemical Plants and Refineries shall be applicable for the proposed expansion unit. The company shall conform to the process vent standards for organic chemicals including non-VOCs and all possible VOCs i.e. TOCs standards and process vent standards for top priority chemicals. Regular monitoring will be carried out for VOC and HC and On-line monitors for VOC measurements may be installed.	Complied.  New Emission & Effluent Standards'2008 are being complied.  Emission and ambient air (VOC) data attached as <b><u>Appendix-A1.</u></b>  HC Fugitive emission data in <b><u>Appendix-A5.</u></b>
(xvi)	No additional fresh water will be required for the expansion project. The total requirement of 197 m <sup>3</sup> /hr of fresh water will be met from the existing water withdrawal permissions.	Ensured & complied.  No additional fresh water is being consumed in this project.
(xvii)	Wastewater generation after the expansion project will be around 0.015 m <sup>3</sup> /hr, which will be treated in the existing ETP. Part of the treated effluent shall be recycled and remaining shall be disposed into the Tunia Nullah through closed pipeline.	Complied. No treated effluent being discharged outside, 100% recycled. Detail of WWTP is attached as <b><u>Appendix-A7.</u></b>
(xviii)	Regular monitoring of relevant parameters for the underground water in the surrounding areas will be undertaken and the results will be submitted to the relevant States Pollution Control Board.	Complied.  Samples from surrounding areas are being tested twice in a year and report is attached as <b><u>Appendix-A13.</u></b>
(xix)	Solid waste generated as Pretreater and Reformer Catalysts, Sulphur guard absorbent and Alumina Balls will be disposed off as per the authorisation from State Pollution Control Board.	Complied.  Please Refer <b><u>Appendix-A6(a).</u></b>
(xx)	Oily sludge shall be sent to melting pit treatment for recovery of oil. The recovered oil shall be recycled into the refinery system. The residual sludge will be stored in HDPE lined pit for disposal after treatment. The sludge will be incinerated in the premises only.	Complied.  As a measure of Haz. Waste Management, third party is engaged for processing of the oily sludge & recovery of oil from the oily sludge stored in the sludge lagoon on regular basis. During <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023, 3389.0 MT</b> of oily sludge has been processed by mechanised processing. Melting pit facility is also available for recovering oil from oily sludge.  A confined bio-remediation plant of 100 m <sup>3</sup> capacity was set up in collaboration with IOCL R&D in 2017 for treatment of oily sludge.  During <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023, 14 MT</b> of oily sludge has been processed in the Bio- reactor.

Sr. No.	Specific Conditions	Compliance Status
xxi)	Green belt shall be provided to mitigate the effects of fugitive emissions all around the plant in a minimum of 33% of the plant area in consultation with DFO as per CPCB guidelines.	<p>Greenbelt is already existed. More than 33% of plant area is having green cover.</p> <p>Tree Census has been carried out through DFO Chirang District in 2013 where 84545 nos. of grown up trees were enumerated.</p> <p>The company is planting more than 10000 nos. of tree every year as a part of its environment initiative.</p> <p>Post IndMax &amp; BS-VI project, following plantation done to achieve required greenbelt.</p> <p><b>In the financial year 2017-18 BGR has planted 29600 nos of Sapling</b></p> <p><b>In the financial year 2018-19, BGR has planted 30062 nos. of trees in and around the complex.</b></p> <p><b>In financial year 2019-20 BGR has planted 14340 nos. of tree sapling.</b></p> <p><b>In the FY 2020-21 BGR has planted 25606 nos. of tree sapling.</b></p> <p><b>In the current FY 2021-22 BGR has planted 1,00,000 nos. of tree sapling.</b></p> <p><b>In the current FY 2022-23 BGR has planted 27610 nos. of tree sapling.</b></p> <p><b>During the current FY 2023-24( 1<sup>st</sup> half) BGR has planted 75630 nos. of tree saplings</b></p>
(xxii)	The company shall strictly follow all the recommendations mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).	The company followed all the recommendation mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP) prior to coming of the Revised Standards applicable to refinery for Environment Protection.
(xxiii)	The Company shall harvest surface as well as rainwater from rooftops of the buildings proposed in the expansion project and storm water drains to recharge the ground water and use the same water for the various activities of the project to conserve fresh water.	<p>Complied.</p> <p>Total 23 nos. of Rainwater Harvesting Projects have been implemented covering roof area of 22267 SQM and surface area of 32900 SQM, having potential rainwater harvesting volume of 15659.3 M<sup>3</sup>/Yr.</p> <p>The harvested rainwater for ground water recharge is through recharge pits and recharge trench based on technical details and guidelines from Central Ground Water Board, North Eastern Region, Guwahati.</p> <p>Details attached as <b><u>Appendix-A9</u></b>.</p>
(xxiv)	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	<p>Complied.</p> <p>Details attached as <b><u>Appendix-A12</u></b>.</p>
(xxv)	The Company shall implement all the recommendations made in the EIA /EMP report and risk assessment report.	All recommendation has been complied.
(xxvi)	The company will undertake all relevant measures, as indicated during the Public Hearing for improving the Socio-economic conditions of the surrounding area.	<p>Complied.</p> <p>Taking care under CSR Program.</p>

### C. GENERAL CONDITIONS

Sr. No.	General Conditions	Compliance status
(i)	The project authorities must strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government.	Complied.
(ii)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	<p>Complied.</p> <p>EC was granted by MoEF&amp;CC to BGR for IndMax &amp; BS-VI projects vide letter F. no.J11011/48/2016-IA-II (I), Dated 19<sup>th</sup> Apr'2017.</p> <p><b>The project aims to enhance expansion of Crude processing from 2.35 to 2.7 MMTP, other associated projects, e.g. DHDT capacity from 1.2 to 1.8 MMTP, HGU from 25 KTPA to 30 KTPA, CRU-MSQ revamp and SDS(SRU) unit.</b></p> <p><b>All the units of the Project commissioned successfully.</b></p>
(iii)	At no time, the emissions should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the units, the respective unit should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved.	<p>Complied.</p> <p>Provision for emergency shutdown of unit is provided.</p>
(iv)	Adequate number of influent and effluent quality monitoring stations shall be set up in consultation with the SPCB. Regular monitoring shall be carried out for relevant parameters for both surface and ground water.	<p>Complied.</p> <p>All the stipulations made in the NOC issued by PCBA have been complied.</p> <p>Regular monitoring of all relevant parameters is being carried out and reports are being regularly submitted.</p>
(v)	Industrial wastewater shall be properly collected and treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.	<p>Complied.</p> <p>Industrial waste water disposal system is designed to conform to this norm.</p> <p>Detail of Waste water treatment and disposal system is attached as <b><u>Appendix-A7</u></b>.</p> <p>Treated Effluent water quality from refinery is attached as <b><u>Appendix-A2</u></b>.</p> <p>Treated effluent after Tertiary Treatment, reused 100% inside the complex as Cooling Water &amp; Firewater make up, unit housekeeping and for horticulture.</p>



Sr. No.	General Conditions	Compliance status
(vi)	The overall noise levels in and around the plant area shall be limited within the prescribed standards (85 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).	Complied. Taken care during implementation of the project. Quarterly Noise Survey is being carried out regularly. Quarterly Reports for the period of <b>1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023</b> are attached as <b><u>Appendix-A8</u></b> .
(vii)	The project authorities must strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended in 2008 for handling of hazardous chemicals etc. Necessary approvals from Chief Controller of Explosives must be obtained before commission of the expansion project. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	The rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 is complied.  Emergency Response & Disaster Management Plan (ERDMP) is in place at BGR and mock drills (on-site & off-site) conducted quarterly on various emergency scenarios.
(viii)	Authorization from the State Pollution Control Board must be obtained for collections/ treatment/ storage/ disposal of hazardous wastes.	Complied. Authorization under Hazardous and Other Waste (Management, and Transboundary Movement) Rules 2016 obtained from PCBA and valid up to 31 <sup>st</sup> March, 2027. Copy attached as <b><u>Appendix-A6(b)</u></b> .
(ix)	The project authorities will provide adequate funds both recurring and non-recurring 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.	Complied. Funds were made available for implementing all recommendations
(x)	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.	Soft copy of last six monthly compliance reports was submitted vide, document no. <b>IOC/BGR/ENV/MS MAX/MoEF&amp;CC/2022-23/02, Date: 28.06.2023</b> Same is also uploaded in IOCL website. Ref: <b><u>Appendix-A10</u></b>

Sr. No.	General Conditions	Compliance status
(xi)	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 <a href="http://www.envfor.nic.in">http://www.envfor.nic.in</a> . 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.	Complied.
(xii)	The date of Financial Closure and final approval of the project by the concerned authorities and the date of commencing the land development work as well as the commissioning of the project will be informed to the Ministry and its Regional Office.	Complied. <ul style="list-style-type: none"> <li>• Project commissioned on: 31.01.2009</li> <li>• Financial Closure: 29.07.2010</li> <li>• No land development activity was there in this project</li> </ul>
(xiii)	Proper Housekeeping and adequate occupational health Programme shall be taken up. Regular Occupational Health Surveillance Programme for the relevant diseases shall be carried out and the records shall be maintained properly for at least 30-40 years. Sufficient preventive measures shall be adopted to avoid direct exposure to emission and other Hydrocarbons etc.	Complied. BGR has implemented TPM across the refinery and proper housekeeping is an integral part of the system. Regular health check-up is carried out for the employees and records are maintained. Details attached as <b><u>Appendix-A12</u></b> . All necessary precautions/ preventive measures are taken to avoid direct exposure to emission and other Hydrocarbons etc.
(xiv)	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.	Complied. BGR is having a separate environmental management cell and a full-fledged laboratory to carry-out environment management and monitoring functions. BGR Environment Laboratory is accredited by NABL. (Copy attached as <b><u>Appendix-A11</u></b> )

**APPENDIX –A1****STACK MONITORING DATA: (1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)****A. SO<sub>2</sub> Emission (mg/Nm<sup>3</sup>)**

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 1700 For F.G. = 50	2.52	60.5	144.8
CDU-II		5.92	8.2	14.7
DCU-I		0.99	8.9	52.0
DCU-II		6.99	8.3	10.6
CPP		7.37	44.8	125.4
Reformer		0.00	29.1	129.6
HO-1		4.36	102.2	447.6
HO-2		Shut Down		
Isomerisation		0.5	35	149.7
DHDT		4.7	5.6	6.1
HGU		3.1	20.9	100.0
SRU		172	172	172
GTG		5.8	20.3	71.8
IGHDS		50	1.0	6.5
NHT	0.0		0.9	3.8
INDMAX	850	1.7	2.0	2.2

**B. NO<sub>x</sub> Emission (mg/Nm<sup>3</sup>)**

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 450 For F.G. = 350	0.98	25.4	42.4
CDU-II		2.68	6.18	11.2
DCU-I		1.78	15.7	164.6
DCU-II		8.94	9.01	9.1
CPP		21.0	27.6	31.5
Reformer		34.7	48.0	62.6
HO-1		16.5	89.4	119.4
HO-2		Shut Down		
Isomerisation		4.00	31.3	85.7
DHDT		5.99	7.2	8.01
HGU		10.0	34.7	118.1
SRU		No Analyser		
GTG		16.0	16.0	16.0
IGHDS		250	3.12	20.0
NHT	0.00		1.80	2.01
INDMAX	350	0.07	3.54	41.7

**C. PM Emission (mg/Nm<sup>3</sup>)**

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 100 For F.G. = 10	0.40	1.49	19.7
CDU-II		0.07	0.69	6.4
DCU-I		2.40	6.52	15.0
DCU-II		1.52	7.14	19.4
CPP		0.52	12.3	56.5
Reformer		1.99	5.11	8.32
HO-1		0.99	3.88	7.30
HO-2		Shut Down		
Isomerisation		1.25	5.05	11.07
DHDT		0.24	0.55	1.06
HGU		0.17	0.85	2.76
SRU		0.54	0.90	1.14
GTG		1.52	4.12	6.59
IGHDS		250	0.94	1.33
NHT	0.98		2.10	4.80
INDMAX	350	0.00	7.32	16.0

**STACK MONITORING DATA: (1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

**D. CO Emission (mg/Nm<sup>3</sup>)**

Stacks	Emission Std.	Observed value		
		Min	Avg.	Max
CDU-I	For F.O. = 200 For F.G. = 150	0.83	12.9	45.6
CDU-II		0.99	5.99	20.8
DCU-I		3.06	8.15	15.6
DCU-II		2.38	4.31	6.7
CPP		12.0	15.9	17.9
Reformer		3.74	39.6	199.3
HO-1		2.53	10.0	15.6
HO-2		Shut Down		
ISOMERISATION		2.04	10.2	15.9
DHDT		0.29	7.02	36.3
HGU		9.29	21.5	25.3
SRU		0.24	0.25	0.3
GTG		0.08	11.8	22.0
IGHDS		250	0.77	21.6
NHT	3.20		15.8	30.3
INDMAX	350	0.00	5.99	13.9

**STACK MONITORING DATA: (1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

**E. Ni + V Emission (mg/Nm<sup>3</sup>):**

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

**AMBIENT AIR QUALITY AROUND BGR COMPLEX**

(Average of monthly sample Schedule – VII)  
(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)

	Station	Continuous Monitoring Station	Near Tube Well No.14	Near LPG Bottling plant	Rural Health Centre	Bartala Rail Gate	Near TW No.7 in Township
<b>1</b>	<b>SO<sub>2</sub> (Std. 50/80 µg/m<sup>3</sup>)</b>						
	Min	0.06	9.0	8.5	9.1	8.6	8.7
	Average	0.91	12.3	11.5	10.7	11.0	10.5
	Max	5.33	17.2	14.8	12.9	14.3	12.9
	No. of observation	Continuous	42	42	42	42	42
<b>2</b>	<b>NO<sub>2</sub> (Std. 40/80 µg/m<sup>3</sup>)</b>						
	Min	2.59	14.4	14.3	14.5	14.1	13.1
	Average	3.95	19.2	19.9	18.2	18.1	15.3
	Max	5.61	23.9	23.6	21.2	21.7	19.9
	No. of observation	Continuous	42	42	42	42	42
<b>3</b>	<b>PM-10 (Std. 60/100 µg/m<sup>3</sup>)</b>						
	Min	14.5	66.7	67.9	67.0	70.0	61.3
	Average	37.8	73.9	73.5	75.4	75.5	66.1
	Max	69.4	77.9	77.1	80.1	79.8	74.5
	No. of observation	Continuous	42	42	42	42	42

	Station	Continuous Monitoring Station	Near Tube Well No.14	Near LPG Bottling plant	Rural Health Centre	Bartala Rail Gate	Near TW No.7 in Township
<b>4</b>	<b>PM-2.5 (Std. 40/60 µg/m<sup>3</sup>)</b>						
	Min	1.06	27.1	27.5	28.7	28.7	27.1
	Average	13.3	34.5	34.0	35.4	35.6	32.1
	Max	34.9	40.0	40.4	41.7	41.2	36.7
	No. of observation	Continuous	42	42	42	42	42
<b>5</b>	<b>Ammonia (Std. 100/400 µg/m<sup>3</sup>)</b>						
	Min	2.09	12.8	13.4	12.7	11.2	8.50
	Average	2.12	16.1	15.4	15.6	15.2	13.4
	Max	3.68	21.6	19.6	20.0	20.8	19.6
	No. of observation	Continuous	42	42	42	42	42
<b>6</b>	<b>Pb (Std. 0.5/1.0 µg/m<sup>3</sup>)</b>						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No. of observation		42	42	42	42	42
<b>7</b>	<b>Arsenic (As) (Std. 6 ng/m<sup>3</sup>)</b>						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No. of observation		42	42	42	42	42
<b>8</b>	<b>Ni (Std. 20 ng/m<sup>3</sup>)</b>						
	Min		BDL	BDL	BDL	BDL	BDL
	Average		BDL	BDL	BDL	BDL	BDL
	Max		BDL	BDL	BDL	BDL	BDL
	No. of observation		42	42	42	42	42
<b>9</b>	<b>CO (Std. 2/4 mg/m<sup>3</sup>)</b>						
	Min	0.00	0.09	0.11	0.01	0.06	0.01
	Average	0.06	0.14	0.14	0.06	0.14	0.04
	Max	0.36	0.17	0.17	0.14	0.17	0.08
	No. of observation	Continuous	42	42	42	42	42

	Station	Continuous Monitoring Station	Near Tube Well No.14	Near LPG Bottling plant	Rural Health Centre	Bartala Rail Gate	Near TW No.7 in Township					
<b>10</b>	<b>Ozone (Std.100/180 <math>\mu\text{g}/\text{m}^3</math> for 8 hrs/1 hr)</b>											
	Min	31.0	11.9	9.5	11.9	11.1	10.5					
	Average	35.0	15.7	11.1	14.8	14.3	14.3					
	Max	41.5	21.5	14.8	18.2	19.2	17.9					
	No. of observation	Continuous	42	42	42	42	42					
<b>11</b>	<b>Benzene (Std. 5 <math>\mu\text{g}/\text{m}^3</math>)</b>											
	Min	0.55	BDL	BDL	BDL	BDL	BDL					
	Average	0.60	BDL	BDL	BDL	BDL	BDL					
	Max	0.69	BDL	BDL	BDL	BDL	BDL					
	No. of observation	Continuous	42	42	42	42	42					
<b>12</b>	<b>Benzo (a) Pyrene (Std. 1 <math>\text{ng}/\text{m}^3</math>)</b>											
	Min		BDL	BDL	BDL	BDL	BDL					
	Average		BDL	BDL	BDL	BDL	BDL					
	Max		BDL	BDL	BDL	BDL	BDL					
	No. of observation		42	42	42	42	42					
<b>Average of Six Stations</b>												
Parameter	SO <sub>2</sub>	NO <sub>2</sub>	PM-10	PM-2.5	NH <sub>3</sub>	Pb	As	Ni	Benzo (a) Pyrene	CO	C <sub>6</sub> H <sub>6</sub>	O <sub>3</sub>
Unit	$\mu\text{g}/\text{m}^3$					$\text{ng}/\text{m}^3$			$\text{mg}/\text{m}^3$	$\mu\text{g}/\text{m}^3$		
NAAQ Std. 2009	50/80	40/80	60/100	40/60	100/400	0.5/1.0	Max 6	Max 20	Max 1	2/4	Max 5	100/180
Min	0.06	2.59	14.5	1.06	2.09	BDL	BDL	BDL	BDL	0.00	0.55	9.50
Average	9.50	15.8	67.0	30.8	13.0	BDL	BDL	BDL	BDL	0.10	0.60	17.5
Max	17.2	23.9	80.1	41.7	21.6	BDL	BDL	BDL	BDL	0.36	0.69	41.5

**APPENDIX-A2****Effluent Discharged (Figure in M<sup>3</sup>/Hr): (1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

A	Industrial Effluent M <sup>3</sup> /Hr	149.2
B	Domestic Effluent from BGR Township M <sup>3</sup> /Hr	52.6
C	Total Effluent Treated (A + B) M <sup>3</sup> /Hr	201.8
D	Treated Effluent Reused M <sup>3</sup> /Hr	201.8
E	Effluent Discharged M <sup>3</sup> /Hr	0.00
F	M <sup>3</sup> of Effluent discharged for 1000 tons of Crude processed	0.00

**1. Treated Effluent Quality****(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

Sl. No	Parameter	Std,2008	Min	Avg.	Max
1	p <sup>H</sup> value	6.0 - 8.5	6.50	7.26	7.80
2	Oil and Grease, mg/l	5.0	2.00	3.94	4.80
3	Bio-Chemical Oxygen Demand (3 Day at 27°C), mg/l	15.0	4.00	7.11	13.0
4	Chemical Oxygen Demand (COD), mg/l	125.0	20.0	56.3	117.0
5	Suspended solids, mg/l	20.0	5.00	12.1	18.0
6	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l	0.35	0.06	0.19	0.30
7	Sulphide (as S), mg/l	0.50	0.10	0.25	0.42
8	CN mg/l	0.20	0.02	0.02	0.02
9	Ammonia as N, mg/l	15.0	2.52	3.02	3.64
10	TKN, mg/l	40.0	7.28	8.46	9.24
11	P, mg/l	3.0	0.19	0.21	0.28
12	Cr (Hexavalent), mg/l	0.10	-	BDL	-
13	Cr (Total), mg/l	2.0	-	BDL	-
14	Pb, mg/l	0.10	-	BDL	-
15	Hg, mg/l	0.01	-	BDL	-
16	Zn, mg/l	5.0	0.21	0.26	0.29
17	Ni, mg/l	1.0		BDL	
18	Cu, mg/l	1.0	0.28	0.34	0.39
19	V, mg/l	0.20	-	BDL	-
20	Benzene, mg/l	0.10	-	BDL	-
21	Benzo (a) pyrene, mg/l	0.20	-	BDL	-



## 2. Final Outlet (From the Complex) storm water channel Quality

(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)

Sl. No.	Parameter	Std 2008	Min	Avg.	Max
1	p <sup>H</sup> value	6.0 - 8.5	7.22	7.36	7.46
2	Oil and Grease, mg/l	5.0	2.00	2.00	2.00
3	Bio-Chemical Oxygen Demand (3 Days at 27° C), mg/l	15.0	9.50	9.50	9.50
4	Chemical Oxygen Demand (COD), mg/l	125.0	10.0	16.0	30.00
5	Suspended Solids, mg/l	20.0	5.00	10.8	14.00
6	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l	0.35	BDL	BDL	BDL
7	Sulphide (as S), mg/l	0.50	0.35	0.35	0.35
8	CN, mg/l	0.20	BDL	BDL	BDL
9	Ammonia as N , mg/l	15.0	1.12	1.62	2.80
10	TKN, mg/l	40.0	6.16	7.06	7.84
11	P, mg/l	3.0	0.15	0.186	0.23
12	Cr (Hexavalent), mg/l	0.10	-	BDL	-
13	Cr (Total), mg/l	2.0	-	BDL	-
14	Pb, mg/l	0.10	-	BDL	-
15	Hg, mg/l	0.01	-	BDL	-
16	Zn, mg/l	5.0	0.15	0.22	0.26
17	Ni, mg/l	1.0	BDL	BDL	BDL
18	Cu, mg/l	1.0	0.17	0.18	0.20
19	V, mg/l	0.20	-	BDL	-
20	Benzene, mg/l	0.10	-	BDL	-
21	Benzo (a) pyrene, mg/l	0.20	-	BDL	-

## 4.0

## APPENDIX - A3

### **Tree Plantation (1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)**

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

Tree Census was done by Divisional Forest Office, Chirang in the year 2012-13. As per census, 84545 numbers of plants which include trees including shrubs, ocular estimated 33000 numbers bamboos in 1150 no. bamboo culms and also trees, planted by BGR during 2003 to 2012.

**To comply IndMax BS-VI EC conditions, BGR has planted 29600 nos of saplings in the FY 2017-18, in FY 2018-19, 30,062 nos, in FY 2019-20, 14340 nos, in FY 2020-21, 25606 nos, in FY 2021-22, 1,00,000 nos and in FY 2022-23 BGR has planted 26710 nos. of tree saplings of saplings planted in and around the complex**

**During the FY 2023-24(1st half) BGR has planted 75630 nos. of tree saplings.**

### Tree Plantation 2017-18



**Birhangaon State Dispensary Plantation 10000 nos in Aug'2017 and 5375 nos. (2nd Phase in August,2019), Sapling Planted by Miyawaki Method. Growth as on October,2023**

**Tree Plantation 2018-19**



**BGR TOWNSHIP PLANTATION, Planted Van mahotsav 2018, Growth as on November'2023**

**Tree Plantation 2019-20**



**North Bongaigaon High School, 5250 Sapling Planted by Miyawaki Method in the month of September,2019, Growth as on September,2023.**

**Tree Plantation 2020-21**



**On WED'2020, 3740 nos. of sapling planted in BGR Township, Growth as on November,2023.**

**Tree Plantation 2020-21**



**4810 nos of sapling Planted in the month of August'2020 at Hatipota Brahma Mandir, Growth as on October,2023.**

**Tree Plantation 2021-22(One Lacks sapling planted during FY 2021-22)**



**Planted on WED'2021, in BGR Township, Growth as on November,2023**

**Tree Plantation 2021-22(One Lacks sapling planted during FY 2021-22)**



**Planted on Aug,2021, in the complex, North side of new project(IndMax & BS-VI), Growth as on October,2023**

**Tree Plantation 2021-22(One Lacks sapling planted during FY 2021-22)**



**Planted on Aug,2021, in the complex, North side of new project(IndMax & BS-VI), Growth as on October,2023**

**Tree Plantation 2022-23**



**Planted on WED'2022, in BGR Township, Growth as on November,2023**

## APPENDIX – A 4

### Additional Information

(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)

Effluent reused during the period is **100%** of the total effluent treated which includes plant effluent as well as BGR Township sewer.

Under the Leak Detection and Repair programme (LDAR), BGR is conducting quarterly Fugitive Emission Survey. During the period from **1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023**, all potential leaky points checked and few Leaky points detected and rectified. By following LDAR programme in true spirit, the company could not only avoid potential loss of **661.86** KG/Day (approx.) of light Hydrocarbon to the atmosphere, through fugitive sources, but also able to keep healthy work environment in the plants.

To ensure work area quality and health of equipments, quarterly noise survey was conducted covering all the operating plants, control rooms and ambient surrounding the BGR. During **1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023**, Noise Survey for two quarters of **2023-24(Q-1 & Q-2)** has been completed and no major abnormality was reported.

As a measure of Hazardous Waste Management, A third party has been engaged for processing tank bottom sludge through mechanized treatment. Another third party is engaged for processing of the oily sludge & recovery of oil from the oily sludge stored in the concrete lagoon. Melting pit facility is available for recovering oil from oily sludge.

One old slurry thickener in ETP from Petrochemical section was converted to confined space bio-remediation reactor to treat oily sludge with help from IOCL-R&D. The process of bio-remediation started from July 2017. From **1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023**, **14.0** MT of oily sludge has been processed in the Bio-reactor.



**Bio-remediation facility of BGR**

Further two more Rain Water Harvesting (Ground Water Recharging) schemes in BS-VI project have been implemented during 2019-20 and Two more implemented in the FY 2020-21 in Admn. Building and inside BGR Township temple complex.

6.0

**APPENDIX –A5**

**Quarterly Fugitive emission survey Data (LDAR)**  
(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)



**Fugitive Emission  
urvey\_1st quarter\_2**



**Fugitive emission  
survey report 2nd q**



7.0

**APPENDIX-A6 (a)**

**Annual return of hazardous waste (2022-23)**



**IOCL BGR HW  
Return for 2022-23 ii**

8.0

**Annexure –A6 (b)**

**Authorization from PCBA for Hazardous Waste  
(Management and Transboundary Movement) Rules 2016**

No. WB/BONG/T-748/19-20/109

39



HW Auth. Certificate  
22-27.pdf



**Pollution Control Board:: Assam**  
**Bamunimaidam; Guwahati-21**  
(Department of Environment & Forests:: Government of Assam)  
Phone: 0361-2652774 & 3150318; Fax: 0361-3150319  
Website: [www.pcbassam.org](http://www.pcbassam.org)



No. WB/T-311/21-22/ 252

Dated Guwahati the, 08. 09. September, 2022

**FORM – 2**  
**[See Rule 6(2)]**

**[Grant of Authorization under the Provision of the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016]**

1. Number of Authorisation and date of issue : No. WB/T-311/21-22/ dtd. .09.2022
2. Reference of application (No. and date) : 634914
3. M/s Indian Oil Corporation Limited ( IOCL ), Bongaigaon Refinery, NH 31C (New NH 27), Dhaligaon, Chirang is hereby granted an authorisation based on the signed inspection report for Generation, storage and transportation of Hazardous or Other wastes or both.

**DETAILS OF AUTHORISATION**

Sl. No.	Category of Hazardous Waste as per the Schedules-I, II & III of these rules	Authorised mode of disposal or recycling or utilisation or co-processing, etc.	Quantity (ton/annum)	Mode of Management
1	Schedule-I, Sl.No. 4.1 : Oil sludge or emulsion	Generation, Storage & Transportation	7000 MT/Annum	Transportation to authorized actual user/Recyclers/ Disposal agencies/ reprocessing and recovery/Captive treatment,through Bio-remediation as per prescribed norms
2	Schedule-I, Sl.No. 4.2: Spent catalyst	Generation, Storage & Transportation	2500 MT/Annum	Transportation to authorized actual user/Recyclers in accordance with HOWM Rules,2016
3	Schedule-I, Sl.No. 4.3: Slop Oil	Generation, Storage & Transportation	32000 MT/Annum	Captive Utilization as per prescribed norms.
4	Schedule-I, Sl.No. 5.1: Used or spent oil	Generation, Storage & Transportation	20 MT/Annum	Transportation to authorized actual user/Recyclers
5	Schedule-I, Sl.No. 33.1:Empty barrels/containers/liners contaminated with hazardous chemicals/wastes	Generation, Storage & Transportation	7000 numbers/Annum	Transportation to authorized actual user/Recyclers

4. This authorisation shall be in force for the period of five years up to 31.03.2027 unless otherwise revoked or withdrawn within this period.

5. The authorisation is subject to the following general and specific conditions:

**A. GENERAL CONDITIONS OF AUTHORISATION:**

1. The authorised person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.
3. The person authorised shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.
4. The agencies should ensure that the barrels are decontaminated before collection in the premises of the occupier / generator equipped with adequate effluent treatment plant.
5. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorization.
6. The person authorised shall implement Emergency Response Procedure (ERP) for which this authorisation is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time
7. The person authorised shall implement Emergency Response Procedure (ERP) for which this authorisation is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time

১৩/৯/২২

9.0

**APPENDIX-A7**

**Detail of Waste water treatment and disposal system.**



ETP Description.pdf

10.0

**ANNEXURE-A8**

**Quarterly Noise Survey Data**

(1<sup>st</sup> April, 2023 to 30<sup>th</sup> September, 2023)

HSE (ENVIRONMENT) DEPARTMENT



**Noise Monitoring\_  
1st quarter\_2023-20:**



**Noise monitoring  
report 2nd quarter 20**

**ANNEXURE-A9**  
**Rain Water Harvesting Data**

BGR: Rain Water Harvesting till March 2021

Sl.No.	RWH systems	Area in m <sup>2</sup>	Recharging, m <sup>3</sup> /Yr	Total Recharging, m <sup>3</sup> /Yr	Status
1	Rainwater Harvesting at Mandir Complex Pond	7125	20743	99239.14	In operation
2	Manjeera Guest House	677	1849		
3	Deoshri Guest House	581	1585		
4	Rainwater Harvesting at Parivesh Udyan Pond	5775	16817		
5	Rainwater Harvesting at Eco-Park Pond	20000	58240		
6	Mandir Complex	833	2274	14597	In operation
7	Manas Guest House	639	1744		
8	BGR HS School, BGR Township	1361	3718		
9	DPS Block-I	704	1922		
10	DPS Block-II	1810	4941		
11	BGR Canteen, CISF Office & Scooter Shed	3134	8555	8556	In operation
12	Champa Club (Officers Club)	1100	3003	10046	In operation
13	Refinery Club cum Community Centre	2580	7043		
14	Employee Union Conference Hall Building	275	751	3003	In operation
15	CISF Quarter Guards Building	825	2252		
16	CISF Conference Hall & Barack	1050	2867	4541	In operation
17	BGR Community Centre	650	1775		
18	Foot Ball Stadium gallery	968	2697	2597	In operation
19	Volleyball Stadium Gallery				
20	Control Room – BS-VI	1372.5	3747	3747	Commissioned in June'2020
21	Substation – BS-VI	942	2572	2572	
22	Admin. Block-B	1730	4723	4723	Commissioned In Aug'2020
23	Temple Complex(NEW)	1015.1	2771	2771	Commissioned in March'2021
	TOTAL	55,167	156593	156592	

✓  
16/12/21  
CMLHSE

12.0

## ANNEXURE-A10

Screen Shot of IOCL Website upload of report

**Link:** <https://iocl.com/statutory-notice>

Industry x Industry Data Reports x PRICOL LTD. - Share Price | Ratio: x Statutory Notices: IndianOil x

iocl.com/statutory-notice

**IndianOil**  
The Energy Of India

About Us IndianOil For You IndianOil for Environment We are Listening

Home > Statutory Notices > Statutory Notices

### Statutory Notices

- > Six monthly compliances reports(2nd half FY 2022-23) of Bongaigaon Refinery
  - > Six Monthly Compliance report IndMax & BS-IV 2nd half 2022-23
  - > Six Monthly Compliance report MS Quality Improvement Project 2nd half 2022-23
  - > Six Monthly Compliance DHT 2nd half 2022-23
  - > Six Monthly Compliance report MS Maximisation Project 2nd half 2022-23
  - > Six Monthly Compliance (Refinery-II) 2nd half 2022-23

Type here to search

30°C Rain 4:08 PM 11-Jul-23

**ANNEXURE-A11**

NABL certificate of QC Lab of Bongaigaon Refinery



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**INDIAN OIL CORPORATION LIMITED, QC LABORATORY,  
BONGAIGAON REFINERY**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

P.O. DHALIGAON, BONGAIGAON, CHIRANG, ASSAM, INDIA

in the field of

**TESTING**

Certificate Number: TC-6027

Issue Date: 29/04/2022

Valid Until:

28/04/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Identity : Indian Oil Corporation Limited

Signed for and on behalf of NABL

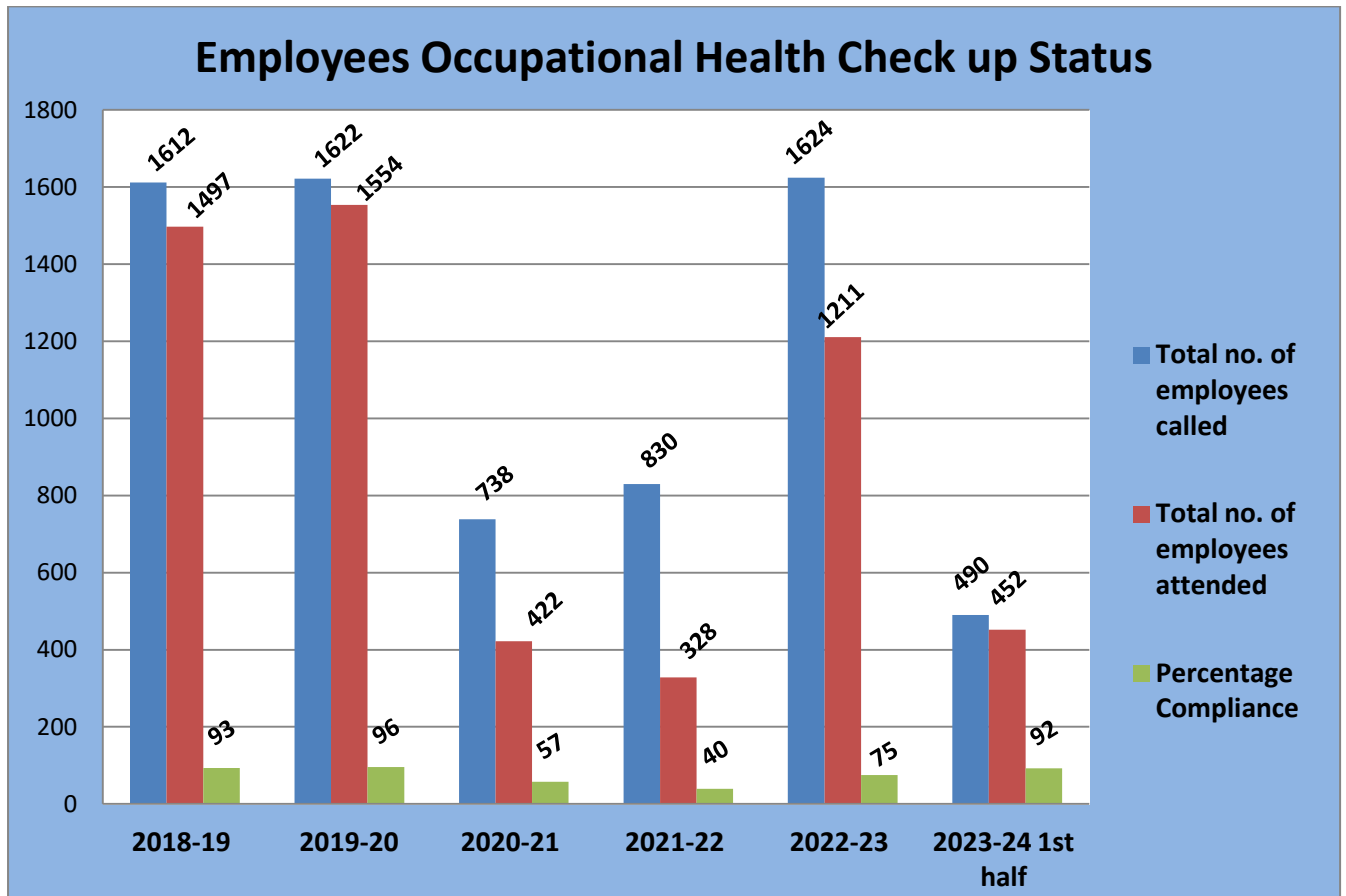


N. Venkateswaran  
Chief Executive Officer



Appendix-A12

Employees Occupational Health Check up Status



**Note: Employees occupational health check up program affected during the year 2020-22, due to the COVID-2019 pandemic situation.**

INDIAN OIL CORPORATION  
BONGAIGAOON REFINERY  
Quality Control Laboratory  
P. O. Dhaligaon-783385

Report No: QC/GW/01/2023  
Samples collected on: 20.01.2023

TEST REPORT  
Date: 01.02.2023

Requirement	Permissible Limit	Unit	Sample particulars, Aerial Distance/Source							
			Bageswari Temple (Ring Well), 6.5 KM S/E of BGR	Chikagaon, Haripara (Hand pump), 8.4 km East of BGR	Dhaligaon L. P. School (Hand Pump), 1.7 KM south of BGR	Baikhugaon (Hand Pump), 1.7 KM S/W of BGR	Barsan Gaon (Hand Pump), 7.7 KM of BGR	Namalpur, Sidli (Ring Well), 7.5 KM WEST OF BGR	Birhaigaon (Hand Pump), 3.5 KM North of BGR	
Taste	Agreeable		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Odour	Agreeable		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	6.5 -8.5		6.8	6.6	6.7	6.5	6.5	7.4	6.4	6.4
Turbidity	5 max	NTU	0.51	0.24	1.02	0.4	0.29	0.28	0.93	0.93
Total Hardness	200, Max as CaCO3	mg/L	76	40	34	30	24	56	22	22
TDS	500 max	mg/L	140	62	72	44	15	105	32	32
Chloride	250 max	mg/L	12.36	15.8	9.75	4.18	0.93	12.54	4.64	4.64
Fluoride	1.0 max	mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Sulphate	200 max	mg/L	0.81	0.68	0.62	0.73	1.05	0.8	0.8	0.8
Iron	0.3 max	mg/L	0.02	0.03	0.04	0.02	0.03	0.07	0.04	0.04
Arsenic	0.01 max	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Copper	0.05 max	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium	0.003 max	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	0.05 max	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Zinc	5 max.	mg/L	0.08	0.05	0.001	0.04	0.07	0.02	0.05	0.05
Lead	0.01 max	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Fecal Coliform	0	cfu	0	0	0	0	0	0	0	0
E. Coli	0	cfu	0	0	0	0	0	0	0	0

\*BDL - Below Detection Limit

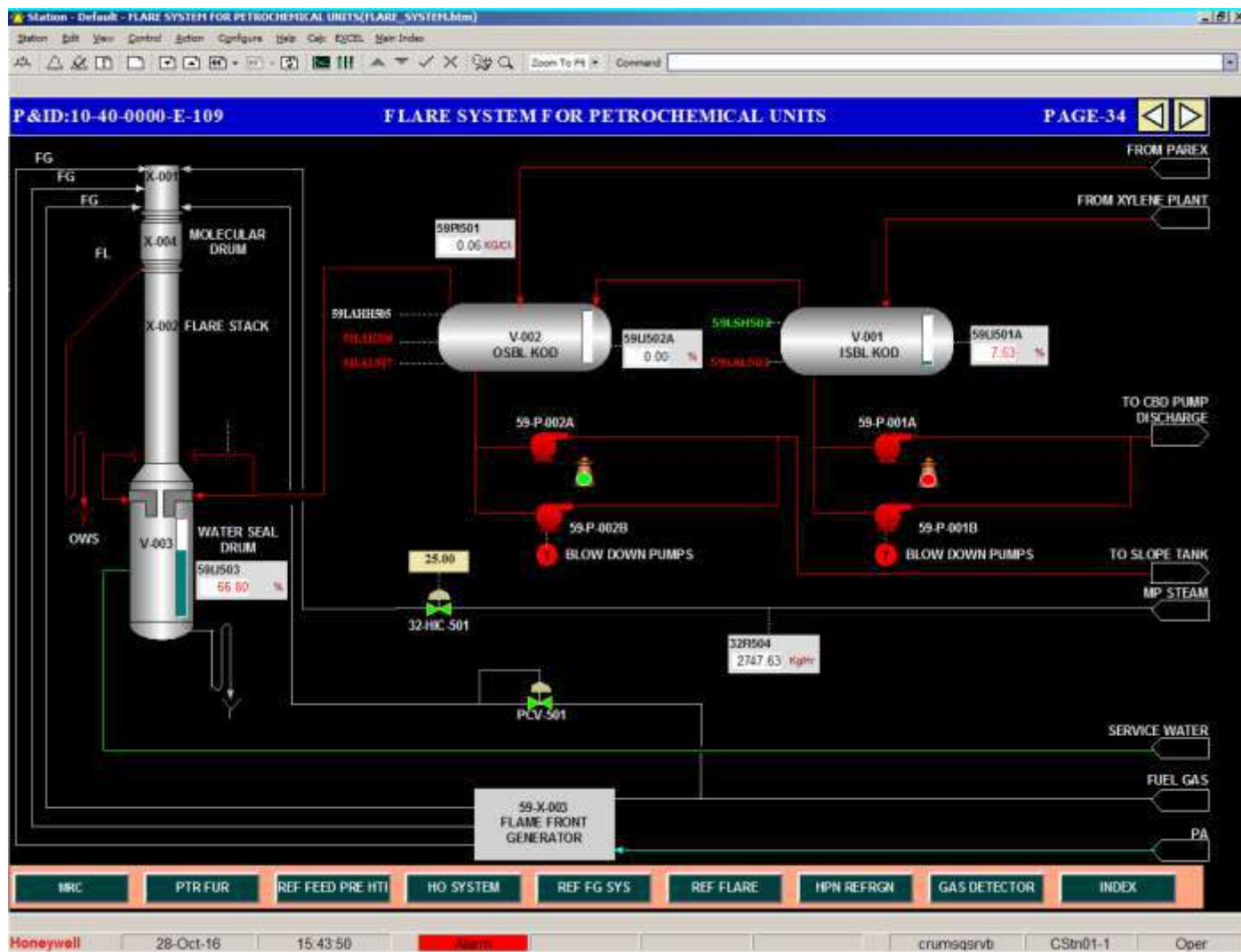
*M. N. Vankar*  
01.02.2023

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Area: Bongaigaon, P. O. Dhaligaon - 783385  
Dist: Chirang (Assam)

16.0

## Appendix-A13

Flare system.



THANKS