नुमालीगढ़ रिफाइनरी लिमिटेड
भारत सरकार का उपक्रम
নুমলীগড় ৰিফাইনেৰী লিমিটেড
ভাৰত চৰকাৰৰ এক প্ৰতিষ্ঠান

NUMALIGARH
REFINERY
LIMITED
A GOVERNMENT OF INDIA ENTERPRISE

CIN -U11202AS1993GOI003893

To

DATE: 07.06.2024

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

Ref. No: NRL/ENV/MOEFCC/24-25/02

Sub: Submission of Half Yearly Compliance status on Environment Stipulation during the period **October'23 to March'24.**

Dear Sir,

Kindly find enclosed herewith the point wise Half Yearly EC Compliance Status pertaining to the conditions of following ECs granted to Numaligarh Refinery.

SN	Project Name	MoEF&CC File No.	EC issued Date
1	Petroleum Refinery at Numaligarh (3 MMTPA)	J-11011/16/90-IA. II	May 31,1991 (EA)
2	BS-III Motor Spirit Project at NRL	J-11011/92/2003-IA II (I)	February 13, 2004
3	Coke-Calcination Unit (0.1 MMTPA)	J-11011/203/2003-IA II (I)	March 22, 2004
4	Diesel Quality Up-gradation Project (DQUP) at NRL	J-11011/272/2008-IA-II (I)	November 10, 2008
5	Paraffin Wax	J-11011/113/2009-IA-II (I)	September 5, 2012
6	Naphtha Splitter Unit	J-11011/534/2009-IA-II (I)	September 12, 2012
7	Installation of new LPG mounded bullet & up-gradation of existing LPG bottling plant and BS-IV HSD project at NRL	J-11011/150/2015-IA-II (I)	December 9, 2016
8	Expansion of the refinery from 3 MMTPA to 9 MMTPA	J-11011/274/2015–IA-II (I)	July 27, 2020

Hope, the above will meet the requirement.

Yours faithfully,

(Alok Nayan Nath)

Deputy General Manager (Tech Service-Environment)

Enclosure: *1. Noise monitoring (Annexure-I), 2.Stack Emission, Ambient & Effluent data (Annexure-II/III/IV),3. Fugitive & VOC monitoring (Annexure V), 4. CER Report (Annexure-C), 5. Env Expenditure (Annexure-D), 6. Form-4 (Annexure-E) 7. Form-V (Annexure-F)*

Cc: Member Secretary, PCBA, Assam

1. **Project Name: Petroleum Refinery at Numaligarh (3 MMTPA)**

   MoEF&CC File No.: J-11011/16/90-IA. II

   EC Issued Date: May 31st, 1991

Sl. No.	A. Specific Condition	Remarks
1	The layout of the refinery should be so planned within the proposed site so as to ensure that it is situated as far to the eastern side of the site as possible, to ensure that there is the maximum possible distance from the eastern boundary of the Kaziranga National Park. The layout of the site of refinery may be finalised in consultation with this Ministry.	The layout of the refinery was finalised in consultation with MoE&F. Longitude 93º 43' 30" E & Latitude 26º 37' 30" N. Latest plot plan submitted to IRO, GHY
2	The residential site as proposed should not be to the west of the refinery as it is only 19.5 kms from the boundary of Kaziranga National Park. It should be shifted further away,but keeping in view the distance from the Garampani Sanctuary, which is only 24 kms south of the proposed refinery site. The newly proposed site of the residential colony should be settled to the satisfaction of this Ministry.	The NOC for the residential site has been issued by MoE&F vide No.J-11014/2/91 IA.II dated 18th January1994 with six conditions. Details on the present status of compliance on these conditions are enclosed as **Annexure A.**
3	The National Highway-37 should be diverted away from the Kaziranga National Park and that portion of this road through and along the National Park (From Jakhalabandha to Bokakhat) to be denotified from all highway records and handed over to the National Park Authorities for regulating traffic. No movement of personnel, material or equipment for the project shall take place on the existing National Highway-37. The realignment of the National Highway-37 would be finalised in consultation with the Ministry of Environment and Forests, so that the wildlife habitat in the nearby Mikir Hills and areas rich in biological diversity therein are protected. Work on the diversion of NH-37 will start before construction of the refinery begins and the Ministry of Petroleum should ensure that the road is completed before the commissioning of the project.	The original NGT application no.174 of 2013 in this matter was disposed of in July'18. The same has been sent to IRO, GHY earlier.
4	A No Development Zone must be notified before the project construction starts within a radius of 15 kms all around the refinery site, except towards the northwest where the no development zone would extend into the Eastern boundary of the Kaziranga National Park.	The Govt. of Assam has already notified the "No Development Zone" on 19.01.95. The MoEF circular for the same is as on 5th July'1996.

5	No pipeline will be laid through the Kaziranga National Park and adjacent wildlife habitats in the Mikir Hills. Pipeline alignment shall be finalized in consultation with the Ministry of Environment and Forests to minimize impact on environment and forests.	NRL has not laid any pipeline through KNP.
6	The project authority must strictly adhere to the stipulations made by the SPCB and the State Government.	The stipulations laid down by SPCB, Assam and the State Govt. are adhered to. The status on the compliance report has been regularly sent to PCBA, Regional Office, Golaghat. **A copy is enclosed as Annexure B**.
7	Any expansion of the plant either with the existing product mix or new products can be taken up only with the prior approval of this Ministry.	This is complied with as and when a change or expansion is contemplated. Any expansion of the plant either with the existing product mix or new products will be taken up with prior approval of the Ministry.
8	The gaseous emissions from various process units should conform to the standard prescribed by the concerned authorities, from time to time. At no time, the level should go beyond the stipulated standards. 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 measures are rectified to achieve the desired efficiency.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. Monitoring reports of stack emissions are regularly submitted to the PCBA Regional Office, Golaghat, CPCB Regional Office alongwith Half yearly EC compliance report. Real-time emission data has been transmitted to CPCB server on continuous basis. **Monitoring data attached as Annexure-II/III**
9	A minimum of five air quality monitoring stations should be set up in the downwind direction as well as where maximum ground level conc. is anticipated. Furthermore, stack emission should be monitored by setting up of automatic stack monitoring units. The data on stack emission should be submitted to the SPCB once in three months and to this Ministry once in six months, along with the statistical analysis. The air quality monitoring stations should be selected on the basis of modelling exercise to represent the short-term ground level conc.	As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations: SS 1: Inside the refinery (Near WT No.5). SS 2: At the Eco-Park in NRL Township. SS 3: At the Raw Water Intake. SS 4: Near the NH-39 bypass. SS 5: Near the Kaziranga Wildlife Sanctuary at Agoratoli. -Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality.

		Automatic online stack analysers have been provided in all the major Stacks for continuous monitoring of SO_2, NOx, CO & SPM. The monitoring reports of emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong and to the MoEFCC Regional Office, Shillong alongwith Half yearly EC compliance report. NRL has installed one Continuous Ambient Air Monitoring System inside the refinery premises and realtime emission data has been transmitted to CPCB server on continuous basis. One additional Continuous Ambient Air Monitoring System inside the refinery premises as recommended by MoEFCC based on occurrence of maximum ground level concentration and down-wind direction of wind installed. **Monitoring reports for the period is enclosed as Annexure – II/III**
10	There should be no change in the stack design without the approval of SPCB. Alternate Pollution control system and proper design (Steam Injection System) in the stack should be provided to take care of excess emissions due to failure in any system of the plant.	Prior approval of SPCB will be taken for any change in the stacks design. Pollution control measures like – Low NOx burners, Steam Injection System, Low excess air firing, ID and FD fan, Stack dampers have been provided.
11	Only natural gas after de-sulphurization has to be used as fuel with low NO_X burners	Permission has been obtained from MoE&F, New Delhi vide No. J-11011/16/90-IA.II(I) dated 22 May,1996 to use Naphtha, which is produced in the refinery itself. Low NOx burners have been installed in all the refinery furnaces. Internal Fuel Oil with very low sulphur and Sweet Fuel Gas (with <10 ppm H2S) that is produced as a part of process by processing low sulphur Assam Crude also used in Mixed fuel furnaces as most of the furnaces of process units are operated with dual fuel firing. Refinery operation cannot be dependent on single fuel and alternate fuel is required for reliable and smooth operation of the refinery.
12	Fugitive emissions should be monitored continuously.	Regular monitoring of fugitive emission has been carried out using GMI since May, 2005 onwards. The GMI survey has been carried on all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals,

		hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, furnaces etc in line with the MoEF notification 2008. **Fugitive emission report attached as per Annexure V.**
13	All gaseous emissions in the system shall be taken to the flare system and the flare should be smoke-less and non-luminous.	All gaseous emissions have been taken to the flare system. A non-luminous ground flare has been installed as regular flare. However, additionally, an elevated flare has been also installed for using during emergencies.
14	A sulphur recovery plant should be commissioned along with the refinery.	The Sulphur Recovery Block (SRB) has been commissioned along with the refinery and has been under continuous operation since September'2000.
15	Zero discharge of effluents should be ensured and built into the system. In case the effluent has to be discharged due to process disturbances etc. the contributing unit shall be immediately stopped from operation and will not be re-started without bringing the system to normalcy. To meet the emergency needs adequate number of effluent quality monitoring stations must be set up in consultation with the SPCB	Treated water discharge to outside environment directly from ETP via dedicated pipeline has been discontinued since October'2006 and since April, 2007 township effluent also is being routed to the refinery ETP. Presently there is no dedicated facility for discharging Treated effluent from ETP directly to outside environment. About 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. Treated effluent quality is enclosed as **Annexure-IV.**
16	Guard ponds of sufficient holding capacity to take care of monsoon rains should be provided.	Guard ponds (of capacity: 5329 m3) and Surge tank (of capacity: 5760 m3) for oily water sewer (OWS) and contaminated rain water system (CRWS) have been provided in the Effluent Treatment Plant.
17	The solid waste from the ETP and waxy sludge should be incinerated.	The Chemical & Oily Sludge generated from ETP operations is disposed in the Secured Landfill. Tank Bottom Oily Sludge generated is disposed off through Bioremediation and is also sold through auction to CPCB approved recyclers. NRL has installed an Incinerator for disposal of non-hazardous incinerable wastes and the same is being operated on a continuous basis for which NRL has received the consent to operate from SPCB.

18	The solid waste (other than waxy sludge) dumping area should be made impervious so that the ground water, is not affected due to leaching and seepage of associated water containing pollutants. The solid waste disposal plan should be submitted to the Ministry once the process design and technological package is finalized.	As per the recommendation of NEERI's report on Solid Waste Management, scheme for disposal of solid waste through Secured Landfill had been prepared. As compliance of the same a Secured Landfill facility was constructed within the Refinery premises and commissioned on 4th March, 2004.The proposal of solid waste disposal by Secured Land Fill was submitted to MoE&F and PCB, Assam. NRL has installed another Secured Land Fill facility of capacity around 6000 m3 as per the latest CPCB guidelines. Also, NRL has constructed Bio-remediation facility in line with the requirement by applying "Oilzapper" for disposal of oily sludge generated during cleaning of tanks. Alternately, some quantity of oily sludge being disposed by selling to authorized recyclers. **Solid waste disposal plan prepared by NEERI in July 1999 submitted to IRO, GHY**.
19	The project authorities should recycle the waste to the maximum extent and the recycling plan should be submitted along with a comprehensive EIA.	All types of wastes generated from the refinery are recycled to the maximum extent possible. -The recycling plan for all types of wastes have been submitted to the MoE&F, Shillong vide letter no. NRL/NG/ENV/2.1/2 dated May'23, 2002
20	A detailed risk-analysis based on Maximum Credible Accident analysis should be submitted once the process design and the layout are frozen. Based on this a disaster management plan has to be prepared and after approval by the concerned nodal agency, s/hould be submitted to this Ministry.	NEERI was engaged for Quantitative Risk Assessment including Maximum Credible Accident (MCA)analysis, Hazard Assessment and Evaluation, Disaster Management Plan (DMP) and Emergency Preparedness Plan (EPP). The report was submitted to the MoE&F on 03.02.97. Quantitative Risk Assessment is carried out every 5 years. The Emergency Response and Disaster Management Plan was certified on 28.12.2022 and the certification is valid till 27.12.2025.
21	A comprehensive EIA report covering one year (4 seasons) data should be submitted once the process design and technology package and layout are frozen. The Ministry or any other competent authority may stipulate any further conditions after reviewing the comprehensive impact assessment report	CEIA report prepared by NEERI has been submitted to MoE&F on 22.04.96.

22	A comprehensive study of the ecological status and likely impact of development should be initiated in consultation with the Ministry of Environment and Forests. The proposal should be submitted to this Ministry within three months	This is included in the CEIA report and submitted.
23	A green belt with a minimum width of 500 mts should be provided and the green belt development plan taking into account various aspects including attenuation of noise and air pollution should be submitted to this Ministry within six months.	Initially, as per EC granted for the Numaligarh Refinery Project, MoEF had stipulated a 500m wide green belt all around the refinery based on the EIA of NRL carried out by NEERI. On request from NRL, the width of the Green Belt was later reduced from the suggested width of 500m to 100m because of the reason that almost all the surrounding areas are having tea garden with shade trees. A wide natural green belt already existed all around the refinery. Accordingly, a Green Belt covering a total area of around 56 hectares of land and around 100m width around the refinery and around 25m width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001). Periodically, massive plantation is carried out in the Green Belt so as to provide a natural barrier for attenuation of noise and air pollution. Nos. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Phase wise replantation is in progress in various locations in Green Belt, inside the refinery and in and around the township to increase the density. Initiatives for plantation under Compensatory Afforestation drive in degraded areas has been taken up at Nakkati Chapori, Golaghat (40 Ha) and Kandoli Reserve Forest, Nagaon(35 Ha).
24	The rehabilitation plan for the persons to be displaced from the project site including township should be prepared and submitted to the Ministry for approval within 3 months. Plan should inter-alia contain rehabilitation site details, the facilities and compensation package to be provided.	Rehabilitation of the displaced persons from the refinery site has been done by the State Govt. NRL has paid the compensation as fixed by Collector. Similar action has also been taken in case of those displaced from the Township site for which land acquired. Amenities like drinking water facility, building primary school,

		constructing roads in the villages etc. have been contributed by NRL.
25	The project authority must set up a laboratory facility for collection and analysis of samples under the supervision of competent technical person, who will directly report to the Chief Executive.	The laboratory facility had been set up for collection and analysis of samples under the supervision of competent personnel, reporting to the Chief Manager (QC) and who reports to the Chief General Manager (Technical). The QC lab is a NABL accredited Laboratory and it has been proposed to apply as Environmental Approved Laboratory under EPA act.
26	A separate environment management cell with suitably qualified people to carry out various functions should be set up under the control of senior executive who will report directly to the head of the organization.	A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safeguarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any and monitors the regular environmental activities
	a). The Ministry may revoke clearance if implementation of the conditions is not satisfactory.	Noted
	b). The above conditions will be enforced inter-alia under the provisions of the Water (Prevention & Pollution) Act, 1981, and Environment (Protection) Act, 1985 along with their amendments.	Noted
Sl. No.	**Condition**	**Remarks**
I	The hill slopes should not be used for civil construction purposes	Noted
Ii	Land use planning of the colony and the land around it should be finalized in construction with the State Town Planning Department.	Noted
Iii	More open space should be left and the building construction may be done by acquiring minimum land and the houses should be constructed on ground plus two floors basis.	Noted Open space left within the township is around 82% of the total area.

Iv	Township site should not involve any forest area.	Township is constructed only in the permitted area
V	The existing forest cover towards the west and north of the proposed colony site should not be disturbed.	It is not disturbed
Vi	No organized human settlement or private colonies should be allowed in the hill or the areas adjoining the hill. (Atleast in a radius of 10 kms).	The Govt. of Assam has already notified the “No Development Zone” on 19.01.95.

2. Project Name: BS III Motor Spirit Project at NRL

MoEF&CC File No.: J-11011/92/2003-IA. II (I)

EC Issued Date: February 13, 2004

Sl. No.	A. Specific Condition	Remarks
1	The company shall ensure strict implementation / compliance of the terms and conditions mentioned vide Ministry's letter No. J-11011/16/90-IA.II dated 31.05.1991.	Complied.
2	The company shall ensure that the total sulphur emission from the Assam refinery (including MS Quality Improvement Project) shall not exceed 128 kg/hr as sulphur (256 kg/hr as SO_2). M/s NRL should maintain regular record of sulphur balance in the refinery. Off gases from the proposed unit should be treated in amine absorption and regeneration unit meant for H_2S removal for desulphurization of off gases. Performance evaluation of sulphur recovery block should be done regularly. Data on VOC should be monitored and submitted to the Ministry. The continuous emission monitoring systems for SOx and NOx in the major stacks with proper calibration facilities should be installed. The low NOx burners should be installed in all the furnaces.	The total sulphur emission from the refinery including Motor Spirit Project being maintained below 128 kg/hr as Sulphur (256 kg/hr as SO_2). -Regular sulphur balance of the refinery is maintained and the average SO_2 emission from the refinery during this period is 97.8 kg/hr which is well below the limit. -Off gases from the proposed unit has been treated in the amine absorption and regeneration unit. -Performance evaluation of Sulphur Recovery Block is done on a regular basis. -**Fugitive emission/VOC data for MS is provided in Annexure V.** -Continuous emission monitoring for SO_2, CO, PM and NOx have been provided in all the stacks. -Ultra low NOx burners have been provided in all the furnaces.
3	Additional water requirement shall not exceed 1200 m3/hr. The total quantity of effluent generation should not exceed 3830 m3/day as indicated in the EMP of which (3530 m3/d from the existing and 300 m3/d from the proposed unit). Treated effluent should be recycled and rest should be discharged after primary, secondary and tertiary treatment into the Dhansiri river through 11 km long pipeline. The treated effluent should comply with the prescribed standards.	The additional water requirement due to this project is very minimal as compared to the present requirement and is maintained within the limits. Treated water discharge to outside environment directly from ETP via dedicated pipeline has been discontinued since October'2006 and since April, 2007 township effluent also is being routed to the refinery ETP.

		Presently there is no dedicated facility for discharging Treated effluent from ETP directly to outside environment. About 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. Treated effluent quality is enclosed as **Annexure-IV.**
4	As reflected in the EIA/EMP, the spent catalyst (0.33 TPM) along with small quantity of oily and chemical sludge should be disposed off in secured landfill site within the plant premises. The leachate from the landfill site should be sent back to the effluent treatment plant. The ground water quality around the secured landfill site should be monitored regularly and data submitted to the Ministry/CPCB/SPCB. The biological sludge generated from the ETP should be used as manure/fertilizer for the green belt.	The oily/chemical and Bio sludge generated in ETP is disposed off in the Secured Land Fill Facility (SLF) after recovering the oil by centrifuging. As per the requirement, leachate generated is routed back to the IRS of ETP for further processing. The ground water quality around the Secured Landfill site is monitored on a regular basis. Spent catalyst is disposed off through authorized recyclers as per Hazardous Waste Management Handling and Transboundary Movement Rules 2016.
5	Oil spill response facilities should be in place, in accordance with OISD guidelines with regard to the likely risks associated with transportation of finished products. All recommendations made in the risk analysis report should be complied with during design, construction and operation stages to contain the risk within the plant boundary.	Oily wastewater & contaminated rainwater from various units is routed through OWS (Oily Water Sewer) & CRWS (Contaminated Rain Water Sewer) to ETP for necessary oil removal and treatment in various sections. The slop oil is recovered in ETP and sent to OM&S for needful reprocessing in process units. The Storm Water Channel from various units are connected and channel through Oil Catchers and also Hay Filters& Oil absorbent booms are installed at various locations. The final outlet of storm water channel is closed immediately in case of any accidental oil carryover and is trapped in the oil catcher for necessary removal. The accumulated oil from the oil catchers is lifted with the help of MOSRU (Mobile Oil Spill Recovery Unit). Recommendations as per Risk Analysis report have been adhered to. Quantitative Risk Assessment is carried out every 5 years.
6	Green Belt of adequate width and density as per the CPCB guidelines should be provided to mitigate the effects of fugitive emission all around the plant in	A Green Belt of width around 100 m surrounding the refinery and around 25 m around the NRMT covering a total area of about

	consultation with the local DFO. The bio sludge should be used as manure in the Green Belt development.	56 hectares has been provided with adequate trees and proper density. Massive plantation has been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. Nos of local variety have been planted including some fruit bearing samplings in & all-around Greenbelt. Further, to increase the density in the Green Belt, fresh plantation is carried out at regular intervals. Within the NRL premises, few gardens have been developed near various units including one in ETP with varieties of flowering plants. Also, different varieties of saplings are planted in the roadside areas and through-out the refinery. Initiatives for plantation under Compensatory Afforestation drive in degraded area has been taken up at Nakkati Chapori, Golaghat (40Ha.) and Kandoli Reserve Forest (35 Ha.), Nagaon in coordination with State Forest Division.
7	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act and the West Bengal Factories Rules.	Health check-up is conducted and the records are maintained accordingly.
Sl. No.	**General Condition**	**Remarks**
1	The project authorities must strictly adhere to the stipulations made by the Assam Pollution Control Board and the State Government.	The stipulations made by the Assam Pollution Control Board and the State Government are strictly adhered to.
2	No further expansion or modernization in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.
3	The Company shall implement all recommendations made in the EMP and Risk Analysis reports.	Complied.
4	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.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2 NOx, CO & SPM with Real-time emission data transmitted to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly

		as per latest MoEF notification. Monitoring reports of stack emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office alongwith Half Yearly Compliance Report. **Monitoring data attached as Annexure-II/III.**
5	The overall noise levels in and around the plant area should be kept well within the 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).	The overall noise levels in and around the plant premises has been maintained below 85 dBA at 1 mtr distance from the source. Control measures like silencer to vent, low noise Rotary equipment have been provided. PPE use is mandatory in high noise areas and the same is ensured. The ambient noise levels all around the refinery are monitored regularly so as to maintain the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). Noise monitoring report conducted during the period is enclosed as **Annexure-I**
6	The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended in 1994 and 2000. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained.	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 1994 and 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the proposed unit have been obtained.
7	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collection/treatment/storage/disposal of hazardous wastes.	The rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management, handling & Transboundary Movement) Rules, 2016 are adhered to. **Annual return statements for Hazardous waste are also regularly sent to PCBA and attached as Annexure-E.** In regard to the same, authorization for collection/treatment/storage and disposal of hazardous wastes has been obtained from the PCBA. **Hazardous waste authorization is valid upto April 2026.**
8	The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment & 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.	Adequate fund has been provided for implementing the conditions stipulated by the MOEFCC and the State Govt and not diverted for any other purpose. **Environmental expenditure for the period is attached as Annexure-D**

9	The stipulated conditions will be monitored by the Regional Office of this Ministry at Shillong / Central Pollution Control Board/The State Pollution Control Board. A six-monthly compliance report and the monitored data should be submitted to them regularly.	A six-monthly compliance report on the Environmental Clearance conditions along with the monitored data is being submitted regularly to the MoEF Regional Office, CPCB, Shillong and the SPCB, Regional Office, Golaghat, Assam. The same is being displayed in the company's website also.
10	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 & Forests at http:/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 Regional office.	Advertisement regarding the environmental clearance for the Euro III MS Project was published in two local newspapers, The Assam Tribune (in English) and The Pratidin (in Assamese) on 18th Feb'04 and copies of both were forwarded to the MoE&F Regional Office, Shillong vide letter no NRL/NG/ENV/2.1/11 dated 20th Feb'04
11	The Project Authorities should 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 commencing the land development work.	The same has been complied. Project commissioned on June 2006.
12	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted
13	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions	Noted
14	The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	Noted

3. Project Name: Coke Calcination Unit (0.1 MTPA)

MoEF&CC File No.: J-11011/203/2003-IA. II (I)

EC Issued Date: March 22, 2004

Sl. No.	A. Specific Condition	Remarks
1	The company shall ensure strict implementation / compliance of the terms and conditions mentioned vide Ministry's letter No.J-11011/16/90-IA.II dated 31.05.1991 and letter no. J-11011/92/2003- IA.II (I) dated 13th February 2004.	Complied
2	The company shall ensure that the total sulphur emission from the Assam refinery (including Coke Calcination Unit) shall not exceed the existing level of 128 kg/hr as sulphur (256 kg/hr as SO_2).	The average SO2 emission during the period is 97.8 kg/hr which is well below the limit of 256 kg/hr.
3	The company should take adequate measures for control of fugitive emissions from the Coke handling system by installation of Bin vent filters and coke handling through closed conveyor system. Multiple cyclone separators should be installed for recovering coke particles from the Rotary Cooler Exhausts and bag filters to control suspended particulate matter from the waste heat recovery boiler exhaust gas.	To control the fugitive emission from the Coke Calcination Unit, the following measures have been taken – a) Bin vent filters provided to control even minor fugitive emissions from coke handling system. b) The major portion of coke handling is done through closed conveyor system. c) Cyclone separator provided for recovering coke particles from rotary cooler exhaust. d) Bag filters with automatic pneumatic back flushing system to control SPM from waste heat boiler at exhaust gas has been provided. e) The finished product of CPC has been packed in an automatic bagging machines, thus controls the fugitive emissions. f) A 100 m wide green belt all along refinery boundary wall and 25m around NRMT has been developed.
4	Water requirement of 15 m^3/hr should be met from the recycling of coke cutting water from Delayed Coker Unit. There should be no additional drawl of water for the CCU from the river Dhansiri	Coke cutting water from DCU is regularly used for quenching in CCU. There is no additional drawl of water beyond the permissible limit from the river Dhansiri for CCU.

5	The Company should install continuous stack monitoring system for online measurement for SPM, SO_2 and NOx.	Continuous stack monitoring systems for online measurement of SPM, SO_2 NOx and CO have been provided in the CCU stack with real time data transmission to CPCB.
6	The solid waste generated should be disposed off in the secured landfill site within the plant premises. The ground water quality around the secured landfill site should be monitored regularly and data submitted to the Ministry /CPCB/SPCB	Normally the solid waste generated in the CCU is recycled back with the feed. There is no such solid waste generated at present, however any small quantity which is not possible to recycle will be disposed off in the Secured Land Fill Facility. Ground water around the Secured landfill is monitored regularly.
Sl. No.	**General Condition**	**Remarks**
1	The project authorities must strictly adhere to the stipulations made by the Assam Pollution Control Board and the State Government	The stipulations made by the Pollution Control Board of Assam and the State Government are strictly adhered to.
2	No further expansion or modernization in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests
3	The Company shall implement all recommendations made in the EMP and Risk Analysis reports.	The recommendations made in the EMP of the Comprehensive Environmental Impact Assessment and the Risk Assessment reports have been implemented for the Numaligarh Refinery, which includes CCU also as an integral part of the refinery. Also, Quantitative Risk Assessment for NRL is carried out every 5 years.
4	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	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM with Real-time emission data transmission to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. Monitoring reports of stack emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office alongwith Half Yearly Compliance Report. **Monitoring data attached as Annexure-II/III/IV.**

5	The overall noise levels in and around the plant area should be kept well within the 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).	The major sources of noise generation in the CCU are the BFW pumps and the Air Blowers, having low duty. Strong foundations have been provided to mitigate the noise generation further. The equipments are monitored regularly at a distance of 01 mtr from the source and corrective measures are taken to maintain the noise level below 85 dBA. The ambient noise levels all around the refinery are monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). **Noise monitoring result carried out in the Refinery during the period is enclosed as Annexure I.**
6	The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended in 1994 and 2000. Prior approvals from the Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained.	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 1994, and 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the Numaligarh Refinery have been obtained.
7	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collection/treatment/storage/disposal of hazardous wastes.	The rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2016 are adhered to. **Annual return statements for Hazardous waste are also regularly sent to PCBA and attached as Annexure-E.** In regard to the same, authorization for collection/treatment/storage and disposal of hazardous wastes has been obtained from the PCBA. **Hazardous waste authorization is valid upto April 2026.**
8	The project authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment & 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.	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and not diverted for any other purpose. **Environmental expenditure for the period is attached as Annexure-D**
9	The stipulated conditions will be monitored by the Regional of this Ministry at Shillong /Central Pollution Control Board/State Pollution Control Board. A six-	A six-monthly compliance report on the Environmental Clearance conditions of NRL along with the monitored data has

	monthly compliance report and the monitored data should be submitted to them regularly.	been submitted regularly to the MoE&F Regional Office, Shillong.
10	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 & Forests at http:/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 Regional office.	The same has been complied. Advertisement regarding the environmental clearance for the Coke Calcination Unit was published in two local newspapers namely, The Assam Tribune (in English) and The Pratidin (Assamese) on the 26th March'04 and copies of both advertisements were forwarded to the MoEF Regional Office, Shillong vide letter no. NRL/TS/ENV/2.1/14 dated 27.03.04.
11	The Project Authorities should 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 commencing the land development work.	The same has been complied.
12	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted
13	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions	Noted
14	The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	Noted

4. Project Name: Diesel Quality Upgradation Project (DQUP) at NRL

MoEF&CC File No.: J-11011/272/2008-IA. II (I)

EC Issued Date: Nov' 10, 2008

Sl. No.	A. Specific Condition	Remarks
1	The company shall comply with new standards/norms Notified by the Ministry for Oil refineries vide G.S.R. 186(E) dated 18th March 2008.	NRL is complying with the new standards/norms as per the MoEF notification 2008. **The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure II/III/IV** **Fugitive emission data is attached as per Annexure V.** Compliance status of few other points are as follows: Secondary seals in IFRT and EFRT tanks -installation of double seals in EFRT, IFRT completed. LDAR-programme has been implemented. VOC recovery system in ETP has been implemented.
2	The company shall comply with all the stipulations of environmental clearances issued vide letter No. J-11011/92/2003-IA.II(I) dated 13th February 2004 and J-11011/203/2003-IA.II(I) dated 22nd March, 2004.	Complied.
3	The process emissions (SO2, 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.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM with real-time emission data transmission to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. 6 ambient air quality monitoring stations have been installed out of which 2 are on continuous monitoring basis. Monitoring reports of emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB

		Regional Office. **Monitoring data submitted in Annexure-II/III**
4	The Diesel Quality Up-gradation Project (DQUP) shall be through Hydrocracker from 1.1 to 1.45 MMTPA, Hydrogen Unit from 38,000 to 48150 TPA, CDU/VDU modification of CDU without any feed change to take out additional 0.35 MMTPA diesel for Hydrocracker, Sulphur unit 14.7 to 19.5 TPD and associated modifications for the utilities, offsite and flare facilities.	Complied.
5	Quarterly monitoring of fugitive emissions shall be carried out as per the guidelines of CPCB by fugitive emission detectors (GMI Leak Surveyor) and reports shall be submitted to the Ministry's regional office at Shillong.	Presently being practiced and complied. **Fugitive emission data has been provided as per Annexure V**
6	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.	Complied.
7	The company shall strictly follow all the recommendation mentioned in the charter on corporate responsibility for environmental protection (CREP).	Complied.
8	Occupational health surveillance of worker shall be done on a regular basis and records maintained as per the Factory Act.	Presently being practiced and complied.
9	Greenbelt shall be developed to mitigate the effect of fugitive emission all around the plant in a minimum 30% plant area in consultation with DFO as per CPCB guidelines.	A Green Belt covering a total area of around 56 hectares of land and around 100 m width around the refinery and around 25 m width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001). Massive Plantation have been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Further, it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead. Initiatives for plantation under compensatory afforestation drive in degraded areas in Nakkati Chapori, Golaghat(40 Ha.) and Kandoli Reserve Forest (35 Ha) Nagaon in coordination with State Forest division have been taken up.

10	The Company shall make the suitable arrangement for disposal of catalyst waste and other wastes. The report of waste disposal shall be submitted to Ministry's Regional Office at Shillong.	Spent catalysts are disposed off through CPCB approved recyclers. Other wastes are being disposed off as per Hazardous Waste Management, Handling, Disposal (Trans Boundary Movement), 2016 and the reports are being sent to Pollution Control Board. **Form IV (Annual return for Hazardous waste management) is being regularly submitted to PCBA and attached as Annexure E.**
11	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.	Adequate measures taken up by NRL for prevention of fire hazards. Knockout drums are installed in both the flare systems.
12	To prevent fire and explosion at Oil and Gas facility, potential ignition sources should be kept to a minimum and adequate separation distance between potential ignition sources and flammable material shall be in place	Complied.
13	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Complied.
Sl. No.	**General Condition**	**Remarks**
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 Pollution Control Board of Assam and the State Government are strictly adhered to.
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 alternations in the project proposal from those submitted to the Ministry for clearance, a fresh reference shall be made to the Ministry.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.
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	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for

	efficiency has been achieved. Provision of adequate height of stack attached to DG sets & flare is to be done.	continuous monitoring of SO_2, NOx, CO & SPM with Real-time emission data transmission to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. Monitoring reports of stack emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office. **Monitoring data attached as Annexure-II/III**
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.	Wastewater generated is routed through the existing ETP for proper treatment. Treated effluent quality is enclosed as **Annexure-IV.**
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).	Few noise generation sources in the project are the BFW pumps and the Air Blowers. Strong foundations are provided to mitigate the noise generation and the equipment are monitored regularly at a distance of 01 mtr from the source.). PPE use is mandatory in high noise areas and the same is ensured. The noise levels all around the refinery is being monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time) **Noise monitoring report for the period is enclosed in Annexure-I**
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.	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the Numaligarh Refinery have been obtained.
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.	The rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management, Handling & Trans Boundary Movement) Rules, 2016 are adhered to. **Hazardous waste authorization is valid upto April 2026 and submitted to IRO, GHY**
8	The project authorities will provide adequate funds as non-recurring 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	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and not

	for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	diverted for any other purpose. **Environmental expenditure for the period is attached as Annexure-D**
9	The company shall develop rainwater harvesting structures to harvest the runoff water for recharge of ground water.	Rooftop rainwater harvesting systems of capacity 20 KL/Day at LPG bottling plant implemented. Roof top rainwater harvesting from two major buildings having huge potential is being planned and action has been initiated for the same.
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.	A six-monthly compliance report on the Environmental Clearance conditions of the Numaligarh Refinery along with the monitored data is being submitted regularly to the MoE&F Regional Office. The same is being displayed in the company's website also.
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.	Advertisement regarding the environmental clearance for the Diesel Quality Upgradation Project (DQUP) was published in two local newspapers namely, The North East Times (in English) and The Amar Asom (Assamese) on the 16th November'08 and copies of both advertisements were forwarded to the MoE&F Regional Office, Shillong vide letter no. NRL/TS/ENV/2.3/07 dated 17.11.08.
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.	A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by a Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safeguarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any and monitors the regular environmental activities.

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.	The same has been complied.

5. **Project Name: Paraffin Wax Type (43,300 TPA) and Semi-Microcrystalline Wax Type A (4500 TPA) within the existing premises of 3MMTPA NRL**

MoEF&CC File No.: J-110011/113/2009-IA. II (I)

EC Issued Date: Sept' 5th, 2012

Sl. No.	A. Specific Condition	Remarks
1	Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J011011/16/90-1A.ll dated 31st May, 1991, J011011/92/2003-1A.ll (I) dated 13th February, 2004, J011011/203/2003-IA. II (I) dated 22nd March, 2004, J011011/272/2008-IA. II (I) dated 10nd November, 2008 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.	Complied. Half yearly compliance report of all ECs regularly being sent to MoEF,RO along with the monitoring reports and also displayed on NRL's website.
2	M/s Numaligarh Refinery Limited shall comply with new standards/norms for oil Refinery Industry and petrochemical industry notified under the Environment (protection)-Rules 1986.	The same is being complied as per the requirement.
3	Environmental clearance is subject to their obtaining prior clearance from wildlife angle due to nearby location of Kaziranga National Park (KNP) and clearance from the Standing Committee of the National Board for Wildlife as applicable.	The matter has been discussed with Chief Wildlife Warden of Assam and Director, Kaziranga National Park. As the proposed project has been constructed within the existing refinery premises, it does not require any additional land. As such, the requirement of approval from wild-life angle is not envisaged. Moreover, Approval from SC-NBWL is required for projects falling within 10 km radius from the boundary of PAs in compliance to Supreme Court's order dated 4th December, 2006 against Writ Petition (Civil) no.460/2004 Numaligarh Refinery is located at distance more than 10 km radius (22.5 km) from the boundary of Kaziranga National Park-Hence no approval from SC-NBWL is required.
4	No heavy equipments shall be routed through Kaziranga National Park, for which only the route identified earlier shall be used.	Complied.

5	Adequate stack height shall be provided to fuel gas fired heaters as per CPCB/Assam pollution Control Board (APCB) guidelines to disperse waste heat into atmosphere. Low NOx burners shall be installed with on-line analyzers. Low sulfur fuels shall be used in boiler.	All the stacks are provided with adequate stack heights (min. 60 & 77 meters against the requirement of 30 meters). Low NOX burners are installed in all the stacks. Online SO2, NOx, CO, SPM analysers are installed in all the stacks with realtime data transmission to CPCB server. NRL is using low sulfur fuels in the boilers.
6	Continuous on-line stack monitoring equipment shall be installed for the measurement of particulate matter, VOCs, SO2, NOX, non-methanated Hydrocarbons (Benzene, Xylene and Toluene).	SO2, NOx, CO, PM analysers are installed in all the stacks with online monitoring and real time data transmission to CPCB server. For continuous monitoring of VOCs, Non-methanated hydrocarbon (Benzene, Xylene and Toluene), online analysers are available with the existing CAAQMS. **Data attached as Annexure-II/III**
7	Fugitive emissions from HVGO, MVGO and MIBK shall be recovered and controlled. Fugitive emissions in the work environment from product raw material storage area etc. shall be regularly monitored. The emissions shall conform to the limits imposed by Assam Pollution Control Board.	Fugitive emission survey for HVGO and MVGO is being carried out with the help of GMI Gaskoseeker as a part of monitoring and control of fugitive emission. The GMI survey has been carried in all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals, hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, furnaces etc. In case of any leak observed, the same is attended immediately in line with the requirement. Work environment monitoring is also conducted. **Fugitive emission data attached as per Annexure V.**
8	The process emissions [SO2, NOx, HC (Methane& Non-methane)] VOCs and Benzene from various units shall conform to the standards prescribed under the Environment Protection Act. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control systems 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.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM with real-time emission data transmitted to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. 6 ambient air quality monitoring stations have been installed out of which 2 are on continuous basis. Monitoring reports of emissions are regularly submitted to

		the PCBA Regional Office, Golaghat and CPCB Regional Office along with Half Yearly Compliance report. **Monitoring data submitted in Annexure-II/III**
9	Ambient air quality monitoring stations [SPM, SO2, NOx, H2S, mercaptan, non-methane-HC, and Benzene shall be set up in the complex in consultation with Assam Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modelling exercise to represent short term GLCS. Ambient air quality shall also be carried in one location at Kaziranga National Park for SO", NO", SPM, CO and HC.	As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations: SS 1 : Inside the refinery (Near WT No.5). SS 2 : At the Eco-Park in NRL Township. SS 3 : At the Raw Water Intake. SS 4 : Near the NH-39 bypass. SS 5 : Near the Kaziranga Wildlife Sanctuary at Agartoli. Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. NRL has installed one Continuous Ambient Air Monitoring System inside the refinery premises and real time emission data has been transmitted to CPCB server on continuous basis. One additional continuous Ambient Air Monitoring System inside the refinery premises as recommended by MoEFCC based on occurrence of maximum ground level concentration and down-wind direction of wind installed. **Ambient air quality for the period is enclosed as Annexure-III.**
10	Ambient air quality data shall be collected as per NAAQMSs standard notified by the Ministry on 16th September, 2009 and trend analysis w.r.t past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area	Ambient air quality data is monitored in line with NAAQS, 2009 in totality and trend analysis is carried out.
11	Monitoring of fugitive emission 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 emissions all unsaturated hydrocarbon will be routed to the flare system and the flares system shall be designed for smoke less burning.	Presently being practiced as per the requirement. Regular monitoring of fugitive emission has been carried out using GMI. The GMI survey has been carried on all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals, hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, and furnaces etc. as per the guidelines. In case

		of any leak observed, the same is attended immediately in line with the requirement. Hydrocarbons are routed to the flare system and the flare system has been designed for smoke less burning. **Fugitive emission data attached as per Annexure V.**
12	A proper Leak Detection and Repair (LDAR) Program shall be prepared and implemented. Focus shall be given for prevention of fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to.	Presently being practiced in line with MoEF notification, 2008.
13	Methyl lso Butyl Ketone (MIBK) solvent should be handled as per the standard procedure and guidelines issued time to time. MIBK solvents should be stored in cool and dry place, recovered from process through solvent recovery unit and reused in the system.	The system is designed to strictly follow standard procedure & statutory guidelines for handling & storage of MIBK solvent, and is adequate. Also, a highly efficient solvent recovery unit has been implemented to recover and re-use MIBK solvent from foots oil & wax.
14	Total freshwater requirement from River Dhansiri for the proposed unit shall not exceed 60 m3/hr. and prior permission shall be obtained from the competent authority. The industrial effluent generation shall not exceed 5 m3/hr. The industrial effluents shall be treated in the ETP and the treated effluent shall meet the prescribed standards. Treated effluents hall be recycled/reused within the factory premises. Domestic sewages hall be treated in sewage treatment plant (STP).	NRL has already obtained consent from State Government for drawl of max. 1200 m3/hr of water. Additional water requirement and treated effluent discharged is maintained within the limits. The treated effluent quality is maintained within the prescribed standards and about 60-70% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup. Domestic sewages are treated in STP and the effluent is routed to refinery ETP.
15	No effluent shall be discharged outside the factory premises and Zero Water Concept shall be adopted.	Treated effluent discharge to outside environment directly from ETP via dedicated pipeline has been discontinued since October'2006 and since April, 2007 township effluent also is being routed to the refinery ETP. Presently there is no dedicated facility for discharging Treated effluent from ETP directly to outside environment. About 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. **Treated effluent quality is enclosed as Annexure-IV.**

16	Oil catchers/oil traps shall be provided at all possible locations in rain/ storm water drainage system inside the factory premises.	Oil catchers/oil traps are installed in various locations in the storm water channel to avoid any oil carry over to the open channel. Construction of 6 nos additional oil catcher completed. Additionally, NRL has installed a series of hay filers in the storm water channel and oil absorbent booms are used as precautionary measures. Insignificant quantities of emulsified oil generated if any has been recovered with the help of MOSRU (Mobile Oil Spill Recovery Unit).
17	Methyl-lso-Butyl Ketone (MIBK) shall not be allowed to mix with the effluents as well as with storm water and ground water.	Due consideration has been taken in the unit design to avoid MIBK carryover along with effluent. Moreover, a dedicated MIBK close blow-down facility along with recovery system has been incorporated to avoid intermixing of MIBK with streams of storm water and ground water thereby preventing contamination.
18	Oily sludge shall be disposed off into coker. Annual oily sludge generation and shall be submitted to the Ministry's Regional Office and CPCB.	NRL produces Anode grade coke which is further processed in Coke Calcination Unit (CCU) to get high value Calcined Petroleum coke (CPC). Trial run for processing of sludge in Delayed Coker Unit (DCU) was carried out on an experimental basis. However, the process led to the deterioration of the CPC quality to a great extent and the experiment had to be called off. Instead, NRL follows a robust sludge handling process for disposal wherein oily sludge is suitably disposed in Secured Landfill and also through bioremediation or is being sold to CPCB authorized recyclers. To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19. **Form-IV Annual return on hazardous waste is being submitted to PCBA regularly and attached as Annexure-E**. **Hazardous waste authorization is valid till April, 2026.**
19	The Company should strictly comply with the rules and guidelines under Manufacture, and import of Hazardous storage chemical Rules, 1989 as amended in october,1994 and January, 2000. Hazardous waste should be disposed of as per Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and amended time to time.	The rules and regulations under MSIHC1989 as amended in 2000 and Hazardous waste management rules 2016 are strictly adhered to.

20	The membership of common TSDF should be obtained for the disposal of hazardous waste. Otherwise, secured land fill should be created at the site as per the guidelines of CPCB and obtain authorization from the SPCB. Copy of authorization or membership of TSDF should be submitted to Ministry's Regional office at Shillong.	No such common TSDF Facilities are available in NER. NRL has constructed a Secured Landfill Facility as recommended by NEERI in 2004 for a safe and systematic disposal of hazardous materials and authorization is accorded from the concerned authorities and renewed as per the requirement. NRL has installed another SLF of capacity 6000 m3 as per CPCB recommendation.
21	Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products of and ensure regular monitoring.	Proper oil spill prevention management in place. Alternately, a MOSRU is used in case of emergency situation if any. Nos. of Oil catchers and Hay filters installed in various locations. Oil absorbent boom is also placed in many locations. Further, OWS & CRWS systems are very effectively constructed to divert the spilled material to ETP for further treatment.
22	The company shall strictly follow all the recommendation mentioned in the charter of Corporate Responsibility for Environmental Protection (CREP).	The same is being complied.
23	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.	Adequate measures taken up by NRL for prevention of fire hazards. Knockout drums are installed in both the flare systems.
24	To prevent fire and explosion at oil and gas facility, potential ignition sources shall be minimum and kept to a adequate separation distance between potential ignition sources and flammable material shall be in place.	Complied.
25	Green belt shall be developed at least in 33% of the total plant area in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around units. Selection of plant species as per the CPCB guidelines	Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI. On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery. Accordingly, a Green Belt covering a total area of around 56 hectares of land and around 100 mtrs width around the refinery

		and around 25 mtrs width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001). Massive Plantation has been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead. Initiatives for plantation under Compensatory Afforestation drive in degraded areas has been taken up at Nakkati Chapori, Golaghat (40 Ha.) and Kadoli Reserve Forest, Nagaon (35 Ha) in coordination with State Forest Division.
26	Company shall prepare project specific environmental manual and a copy should be made available at the project site for the compliance.	Project specific environmental manual prepared and also Submitted to IRO,GHY
27	All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.	All recommendations have been implemented. Moreover, Quantitative risk assessment is carried out every 5 years. The Emergency Response and Disaster Management Plan was certified on 28.12.2022 and the certification is valid till 27.12.2025.
28	All the issues raised and committed made during the public hearing/consultation meeting held on 14th July, 2011 shall be satisfactorily implemented. Accordingly, provision of budget to be kept.	Complied.
29	Company shall adopt Corporate Environment policy as per the Ministry's O M. No. J- 11013/41/2O06-IA(l) dated 26th April, 2011and implemented.	NRL has already adopted a Env. policy as per the requirement of Environment Management ISO 14001.
30	Provision shall be made for the housing of construction labour within the site with infrastructure and all necessary facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Complied.
Sl. No.	**General Condition**	**Remarks**

1	The project authorities must strictly adhere to the stipulations made by the State pollution Control Board (SPCB) Stale Government and any other statutory authority.	The stipulations made by the Pollution Control Board of Assam and the State Government are strictly adhered to.
2	No further expansion or modification in the project shall be carried out without prior approval from the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance a, fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environment protection measures required if any.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.
3	The project authorities to strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2008 as amended subsequently. Prior approvals from Chief Inspector of Factories Chief Controller of Explosives Fire Safety Inspector must be obtained wherever applicable.	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the Numaligarh Refinery have been obtained.
4	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 PAR ules,1 989v iz.75 dBA (daytime) and 70 dBA (nighttime).	The major sources of noise generation in the proposed project are the pumps and the blowers. Strong foundations provided to mitigate the noise generation further. The equipment being monitored regularly at a distance of 01 mtr from the source and corrective measure being taken to maintain the noise level below 85 dBA. The ambient noise levels all around the refinery is being monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). **Noise report for the period has been enclosed as per Annexure I.**
5	A separate Environmental Management Cell equipped with full fledged laboratory facilities must be setup to carry out the environmental management on monitoring functions.	A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safeguarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the

		environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any, regarding the environment and monitors the regular environmental activities.
6	Adequate funds shall be earmarked towards capital cost and recurring cost/ annum for environment pollution control measures and shall be used 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 shall not be diverted for any other purposes.	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and not diverted for any other purpose. **Environmental expenditure Submitted as Annexure-D for the period.**
7	The Regional office of this Ministry/Central Pollution Control Board//State Pollution Control Board will monitor the stipulated conditions. A six-monthly compliance report and the monitored data along with statistical interpretations shall be submitted to them regularly.	Six monthly compliance report is being sent to the Regional Office of this Ministry/Central Pollution Control board/State Pollution Control Board as per the requirement.
8	A copy of clearance letter shall be sent by the proponent to concerned Panchayat/ Zila Parishad/ Municipal Corporation/ Urban Local Body and the local NGO if any, from whom suggestion/representation if, any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	Copy of the clearance letter sent to concerned Panchayat/ Zila Parishad/ Circle Office.
9	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely SPM, RSPM, SO2, NOx, HC (Methane& Non-methane), VOCs (ambient levels as wel1 as stack emissions) or critical sectoral parameters indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	Complied.
10	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB. The Regional office of this Ministry/ CPCB/ SPCB shall monitor the stipulated conditions	Six monthly report on the status of compliance of environmental conditions along with monitored data is submitted regularly. The same is being displayed in the company's website also.

11	The environmental statement for each financial year ending 31st March, in form-IV as is mandated to be submitted by the project proponent to the concerned state pollution control board as prescribed under the Environment (Protection) Rules 1986 as mended subsequently shall also be put in the website of the company alongwith the status of compliance of environmental conditions and shall also be sent to the respective Regional offices of the MoEF by e-mail.	Environmental Statement for each financial year ending 31st March, in form-V is being sent to SPCB every year as per the requirements. The same is being displayed in the company's website also. **The environmental statement for financial year, 22-23 as per Form-V submitted and attached as Annexure- F**
12	The Project Proponent shall inform the public that the project has been accorded environmental clearance by Ministry and copies of the clearance letter area available with the SPCB and may also be seen at website of the Ministry of Environment & Forests at http:/ envfor.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 locally concerned and a copy of the same shall be forwarded to the Regional Office.	The same has been complied. Advertisement regarding the environmental clearance was published in two local newspapers namely, The Assam Tribune (in English) dated 13.09.2012 and The Amar Axom (Assamese) dated 12.09.2012. Copies of both advertisements were forwarded to the MoEF Regional Office.
13	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 commencing the land development work.	Complied.
14	The Ministry may revoke or suspend the clearance, if implementation of any of the above Conditions is not satisfactory	The same has been noted.
15	The Ministry reserves the right to stipulate additional conditions if found necessary. Company in a time bound manner shall implement these conditions.	The same has been noted.
16	The above conditions will be enforced inter-alia under the provisions of Water (Prevention & Control of pollution) Act 1974, Air (Prevention & control of Pollution) Act' 1981' the Environment (Protection) Act 1986, Hazardous Waste (Management Handling and Transboundary Movement) Rules 2008 and the Public Liability Insurance Act 1991 alonwith their amendments and rules	The same has been noted.

6. **Project Name : Naphtha Splitter Unit (160,000 TPA) within the existing 3 MMTPA Refinery**

MoEF&CC File No.: J-11011/534/2009-IA. II (I)

EC Issued Date: Sept 12, 2012

Sl. No.	A. Specific Condition	Remarks
1	Compliance to all the environmental conditions stipulated in the environmental clearance letter nos J011011/16/90-IA.II dated 31st May, 1991, J011011/92/2003-IA.II dated 13th February, 2004, J011011/272/2008-IA.II (I) dated 10th November, 2008 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.	Half yearly compliance report of all ECs along with monitoring reports are regularly being sent to MoEF.
2	Environmental clearance is subject to their obtaining prior clearance from Wildlife angle due to location of Kaziranga National Park (KNP) nearby including clearance from the Standing Committee of the National Board for Wildlife as applicable.	The proposed project will be constructed within the existing refinery premises, hence it does not require any additional land. As such, the requirement of approval from wild life is not envisaged. Moreover, Approval from SC-NBWL is required for projects falling within 10 km radius from the boundary of PAs in compliance to Supreme Court's order dated 4th December, 2006 against Writ Petition (Civil) no.460/2004 Numaligarh Refinery is located at distance more than 10 km radius (22.5 km) from the boundary of Kaziranga National Park- Hence no approval from SC-NBWL is required.
3	No heavy equipments shall be routed through Kaziranga National Park, for which only the route identified earlier shall be used.	Complied.
4	M/s Numaligarh Refinery Limited shall comply with new standards/norms for oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide GSR 186 (E) dated 18th March, 2008.	NRL is complying with the new standards/norms as per the MoEF notification 2008. **The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure II/III/IV** **Fugitive emission report is also enclosed as Annexure V** Compliance status of few other points are as follows:

		Secondary seals in IFRT and EFRT tanks -installation of double seals in EFRT, IFRT completed. LDAR-programme is implemented. VOC recovery system in ETP has been implemented.
5	Continuous online stack monitoring for SO2 and SPM of all the stacks shall be carried out. SO2 on-line analysers shall be installed in all the furnace stacks. Low NOx burners shall be installed with online analysers to monitor NOx emissions shall be provided.	Low NOx burners have been provided in all the furnaces. Online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO and SPM with realtime data transmission to CPCB.
6	The process emissions [SO2, NOx, HC (Methane & Non-methane)], VOCs and Benzene from various units shall conform to the standards prescribed under the Environment (Protection) Act, 2008. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control systems(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.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM with Real-time emission data has been transmitted to CPCB server on continuous basis.Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. 6 ambient air quality monitoring stations have been installed out of which 2 are on continuous basis. Monitoring reports of emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office. **Monitoring data submitted in Annexure-II/III.**
7	Ambient air quality monitoring stations [SPM, SO2, NOx, H2S, Mercaptan, non-methane-HC, and benzene] shall be set up in the complex in consultation with Assam State Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs. Ambient air quality shall also be carried out in one location at Kaziranga National Park for SOx, NOx, SPM, CO & HC.	As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations: SS 1:Inside the refinery (Near WT No.5). SS 2:At the Eco-Park in NRL Township. SS 3:At the Raw Water Intake. SS 4:Near the NH-39 bypass. SS 5: Near the Kaziranga Wildlife Sanctuary at Agartoli. -Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. Automatic online stack analysers have been provided in all the major Stacks for continuous monitoring of SO_2, NOx, CO & SPM. The monitoring reports of emissions are regularly

		submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong and to the MoEFCC Regional Office, Shillong. NRL has installed one Continuous Ambient Air Monitoring System inside the refinery premises and realtime emission data has been transmitted to CPCB server on continuous basis. One additional continuous Ambient Air Monitoring System inside the refinery premises as recommended by MoEFCC based on occurrence of maximum ground level concentration and down-wind direction of wind installed. **Monitoring reports for the period is enclosed as Annexure – III**
8	Ambient air quality data shall be collected as per NAAQMS notified by the Ministry on 16th September, 2009 and trend analysis wrt. past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area.	Ambient air quality data is monitored in line with NAAQMS, 2009 in totality and trend analysis is carried out.
9	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 emissions, all unsaturated hydrocarbon will be routed to the flare system and the flare system shall be designed for smoke less burning.	Presently being practiced as per the requirement. Regular monitoring of fugitive emission has been carried out using GMI. The GMI survey has been carried on all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals, hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, and furnaces etc. as per the guidelines. In case of any leak observed, the same is attended immediately in line with the requirement. Hydrocarbon are routed to the flare system and the flare system has been designed for smoke less burning. **Fugitive emission data attached as per Annexure V.**
10	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 SO2 emissions. Sulphur recovery units shall be installed for control of H2S emissions. Leak detection and Repair programme shall be implemented to control HC/VOC	Regular fugitive emission survey is being carried out with the help of GMI Gaskoseeker as a part of monitoring and control of fugitive emission. The GMI survey is being practiced in all the Process Units, Tankage areas, Marketing Terminal, and other important locations. Gas detectors are also installed at strategic locations. Low sulphur fuels is being used in all the furnaces to

	emissions. Work zone monitoring shall be carried out near the storage tanks besides monitoring of HCs/VOCs in the work zone.	minimize SO2 emissions. SRU is already installed during the commissioning of the refinery. LDAR programme is implemented. Work environment monitoring in all major areas is carried out.
11	As proposed, record of sulphur balance shall be maintained at the Refinery as a part of the environmental data on regular basis. The basis component of sulphur balance includes sulphur input through feed (sulphur content in crude oil), sulphur output from Refinery through products, byproduct (elemental sulphur), and atmospheric emissions.etc.	The total sulphur emission from the refinery is maintained below 128 kg/hr as Sulphur (256 kg/hr as SO_2). **SO2 emission from the refinery is 97.8 kg/hr avg for the period.** Regular sulphur balance of the refinery is maintained.
12	The total water requirement shall not exceed 11907 m3/day and prior permission shall be obtained from the competent authority. The wastewater shall be treated in the waste water treatment plant and the treated effluent shall meet the prescribed standards. Treated effluent shall be recycled/reused within the factory premises. Domestic sewage shall be treated in sewage treatment plant (STP).	NRL has already obtained consent from State Government for drawl of max. 1200 m3/hr of water. Additional water requirement and treated effluent discharged is maintained within the limits. The treated effluent quality is maintained within the prescribed standards and about 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup. Domestic sewages are treated in STP and the effluent is routed to refinery ETP.
13	No effluent shall be discharged outside the factory premises and "zero water concept" shall be adopted.	Treated effluent discharge to outside environment directly from ETP via dedicated pipeline has been discontinued since October'2006 and since April, 2007 township effluent also is being routed to the refinery ETP. Presently there is no dedicated facility for discharging Treated effluent from ETP directly to outside environment. About 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. **Treated effluent quality is enclosed as Annexure-IV.**
14	Oil catchers/oil traps shall be provided at all possible locations in rain/storm water drainage system inside the factory premises.	Oil catchers/oil traps are installed in various locations in the storm water channel to avoid any oil carry over to the open channel. Construction of 6 nos additional oil catcher completed. Additionally NRL has installed a series of hay filters in the storm water channel and used oil absorbent booms as precautionary

		measures. As a step towards conservation of water, construction of a holding pond near the storm water channel is completed.
15	Oily sludge shall be disposed off into Coker. Annual Oily Sludge generation and disposal data shall be submitted to the Ministry's Regional Office and CPCB.	NRL produces Anode grade coke which is further processed in Coke Calcination Unit (CCU) to get high value Calcined Petroleum coke (CPC). Trial run for processing of sludge in Delayed Coker Unit (DCU) was carried out on an experimental basis. However, the process led to the deterioration of the CPC quality to a great extent and the experiment had to be called off. Instead, NRL follows a robust sludge handling process for disposal wherein oily sludge is suitably disposed in Secured Landfill and through bioremediation or is being sold to CPCB authorized recyclers. To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19. **Form-IV Annual return on hazardous waste is being submitted regularly to PCBA and attached as Annexure-E.**
16	The project authorities must strictly comply with the rules and regulation with regard to handling and disposal of Hazardous Waste (Management, Handling and Tran boundary Movement) Rules, 2008 wherever applicable. Authorization from the State Pollution Control Board must be obtained for collection/treatment/storage/disposal of hazardous wastes	The rules and regulations under the Hazardous Waste (Management, handling and Trans-boundary Movement) Rules, 2016 are adhered to. Approvals from State Pollution Control Board for authorization (management, handling & disposal) of hazardous waste as per the requirement) has been obtained. **Hazardous waste Authorisation certificate valid upto April, 2026.**
17	Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products and ensure regular monitoring.	Proper oil spill prevention management in place. Alternately, a MOSRU is used in case of emergency situation if any. Nos. of Oil catchers and Hay filters installed in various locations along the storm water channel. Oil adsorbent boom is also placed in many locations. Further, OWS & CRWS systems are very effectively constructed to divert the spilled material to ETP for further treatment.
18	The company shall strictly follow all the recommendation mentioned on the Charter on corporate Responsibility for Environmental protection (CREP).	Complied.
19	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	Adequate measures taken up by NRL for prevention of fire hazards.

	stack with knockout drums shall be installed to minimize gaseous emissions during flaring.	Knockout drums are installed in both the flare systems.
20	To prevent fire and explosion at oil and gas facility, potential ignition sources shall be kept to a minimum and adequate separation distance between potential ignition sources and flammable material shall be in place.	Complied.
21	Green belt shall be developed at least in 33% of the plant area in and around plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines.	Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI. On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery. Accordingly, a Green Belt covering a total area of around 56 hectares of land and around 100 mtrs width around the refinery and around 25 mtrs width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001). Massive Plantation have been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead. Initiatives for plantation under Compensatory Afforestation drive in degraded areas has been taken up at Nakkati Chapori, Golaghat and Kadoli Reserve Forest, Nagaon in coordination with State Forest Division.
22	Company shall prepare project specific environmental manual and a copy shall be made available at the project site for the compliance.	Project specific environmental manual prepared and also **Submitted to IRO,GHY**

23	All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.	All recommendations have been implemented. Morever, Quantitative risk assessment is carried out every 5 years. The Emergency Response and Disaster Management Plan was certified on 28.12.2022 and the certification is valid till 27.12.2025.
24	All the issue raised in the public hearing/consultation meeting held on 14th July, 2011 shall be satisfactorily implemented.	Complied.
25	Company shall adopt Corporate Environment Policy as per the Ministry's O.M No. J-11013/41/2006-IA.II (I) dated 26th April, 2011 and implemented.	NRL has already adopted a Env. policy as per the requirement of Environment Management ISO 14001.
26	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structure to be removed after completion of the project.	Complied.
Sl. No.	**General Condition**	**Remarks**
1	The project authorities must strictly adhere to the stipulations by the State Pollution Control Board (SPCB), State Government and any other statutory authority	The stipulations made by the Pollution Control Board of Assam and the State Government are strictly adhered to
2	No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.
3	The project authorities must strictly comply with the rules and regulations under Manufacturer, Storage and Import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspector of Factories, Chief Controller of Explosives, Fire Safety Inspectors etc. must be obtained, whenever applicable	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the Numaligarh Refinery have been obtained.
4	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustics hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall	The major sources of noise generation in the proposed project are the pumps and the Air coolers. Strong foundations have been provided to mitigate the noise generation further. PPE use is

	conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	mandatory in high noise areas and the same is ensured. The equipment are monitored regularly and the ambient noise levels all around the refinery is being monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). **Noise monitoring report for the period enclosed as Annexure-I**
5	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must me set up to carry out the environment management and monitoring functions.	A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by a Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safe guarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any, regarding the environment and monitors the regular environmental activities.
6	Adequate funds shall be earmarked towards capital cost and recurring cost/annum for environment protection control measures and shall be used 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 shall not be diverted for any other purposes.	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and shall not be diverted for any other purpose. **Environmental expenditure Submitted as Annexure-D for the period.**
7	The Regional Office of this Ministry/Central Pollution Control board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	Six monthly compliance report along with monitoring reports is being sent to the Regional Office of this Ministry/Central Pollution Control Board/State Pollution Control Board as per the requirement.
8	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestion/ representation, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	Copy of the clearance letter sent to concerned Panchayat/ Zila Parishad/ Circle Office and also available in NRL website.

9	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO2, NOx, HC (Methane & Non-methane), VOCs (ambient levels as well as stack emission) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	The same is complied.
10	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry/ CPCB/ SPCB/ shall monitor the stipulated conditions.	A six monthly compliance report on the Environmental Clearance conditions of the Numaligarh Refinery along with the monitoring data is being submitted regularly to the MoE&F Regional Office. The same is being displayed in the company's website also.
11	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986. As amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.	Environmental Statement for each financial year ending 31st March, in form-V is being sent to SPCB every year as per the requirements. The same is being displayed in the company's website also. **The environmental statement for financial year, 22-23 as per Form-V submitted and attached as Annexure- F.**
12	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.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 locally concerned and a copy of the same shall be forwarded to the Regional Office	The same has been complied. Advertisement regarding the environmental clearance for the Naphtha Splitter Unit (NSU) was published in two local newspapers namely, The Assam Tribune (in English) and The Dainik Janambhumi (in Assamese (on the 21st September'12and copies of both the advertisements were forwarded to the MOEF Regional Office, Shillong.
13	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 commencing the land development work.	Complied.

7. Project Name: Installation of new LPG Mounded Bullet and up-gradation of existing LPG Bottling Plant and BS-IV HSD project by adding DHT unit at NRL

MoEF&CC File No.: J-110011/150/2015-IA. II (I)

EC Issued Date: Dec' 9th, 2016

Sl. No.	A. Specific Condition	Remarks
1	NRL shall comply with new standards/norms for Oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide G.S.R. 186(E) dated 18th March, 2008.	NRL is complying with the new standards/norms as per the MoEF notification 2008. **The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure II/III/IV** **Fugitive emission report is also enclosed as Anenxure V** Compliance status of few other points are as follows: Secondary seals in IFRT and EFRT tanks -installation of double seals in EFRT, IFRT completed. LDAR-programme is implemented. VOC recovery system in ETP has been implemented.
2	Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J011011/16/90-1A.ll dated 31.05.1991, J011014/2/1991-1A (I) dated 18.01.1994, J011011/92/2003-1A.ll (I) dated 13.02.2004, J011011/203/2003-IA. II (I) dated 22.03.2004, J011011/272/2008-IA. II (I) dated 10.11.2008, J011011/113/2009-IA. II (I) dated 05.09.2012, J011011/534/2009-IA. II (I) dated 12.09.2012 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.	Half yearly compliance report of all ECs and monitoring reports are regularly being submitted to MoEF, RO.
3	Continuous on-line stack monitoring for SO2, NOx and CO of all the stacks shall be carried out. Low NOx burners shall be installed	Low NOx burners installed in all the stacks. Online SO2, NOx, CO and SPM analyser installed in all the stacks with realtime data transmission to CPCB server.

4	The process emissions [SO2, NOx, HC (Methane & Non-methane)], VOCs and Benzene from various units shall conform to the standards prescribed under the Environment (Protection) Act. In the event of failure of pollution control system(s) adopted bythe unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency of the pollution control device has been achieved.	All the emissions parameters are monitored on continuous basis and are well within the prescribed limits. Adequate stack heights are provided in all the furnaces. Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM with Real-time emission data has been transmitted to CPCB server on continuous basis. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. 6 ambient air quality monitoring stations have been installed out of which 2 are on continuous basis. Monitoring reports of emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office. **Monitoring data submitted in Annexure-II/III.**
5	Leak Detection and Repair programme shall be prepared and implemented to control HC/VOC emissions. Focus shall be given to prevent fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to. Fugitive emissions of HC from product storage tank yards etc. must be regularly monitored. Sensors for detecting HC leakage shall be provided at strategic locations.	LDAR program implemented. Fugitive emissions survey is conducted in all major locations and monitoring report is also prepared and submitted. Gas detectors for detecting HC leakages have been installed at strategic locations of the refinery.
6	SO2 emissions after expansion from the plant shall not exceed 256 kg/hr and further efforts shall be made for reduction of SO2 load through use of low sulphur fuel. Sulphur recovery unit with tail gas treating facilities having 99.9% efficiency shall be provided.	SO2 emission for this period is 97.8 kg/hr avg. which is well below the allowable limit of 256 kg/hr. TGTU implemented.
7	As proposed, record of sulphur balance shall be maintained at the Refinery as part of the environmental data on regular basis. The basic component of sulphur balance include sulphur input through feed (sulphur content in crude oil), sulphur output	Regular Sulphur balance for the refinery is carried out and record maintained. Also, overall sulphur balance post DHDT is prepared.

	from Refinery through products, byproduct (elemental sulphur), atmospheric emissions etc.	
8	Ambient air quality monitoring stations, [PM10, PM2.5, SO2, NOx, H2S, mercaptan, non-methane-HC and Benzene] shall be set up in the complex in consultation with Maharashtra Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind	As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations: SS 1: Inside the refinery (Near WT No.5). SS 2: At the Eco-Park in NRL Township. SS 3: At the Raw Water Intake. SS 4: Near the NH-39 bypass. SS 5: Near the Kaziranga Wildlife Sanctuary at Agoratoli. -Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. Automatic online stack analysers have been provided in all the major Stacks for continuous monitoring of SO_2, NOx, CO & SPM. The monitoring reports of emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong and to the MoEFCC Regional Office, Shillong. NRL has installed one Continuous Ambient Air Monitoring System inside the refinery premises and realtime emission data has been transmitted to CPCB server on continuous basis. One additional continuous Ambient Air Monitoring System inside the refinery premises as recommended by MoEFCC based on occurrence of maximum ground level concentration and down-wind direction of wind installed. **Monitoring reports for the period is enclosed as Annexure – III**
9	The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution.	Complied as per CPCB standard.
10	Fresh water requirement from Dhansiri River shall not exceed 688 m3/hr after expansion and prior permission shall be obtained from the competent authority. Industrial effluent generation will be 130 m3/hr and treated in the Effluent Treatment Plant. Treated effluent shall be fully reused/recycled as make-up water for raw water cooling towers.	NRL has already obtained consent from State Government for drawl of max. 1200 m3/hr of water. Additional water requirement and treated effluent discharged is maintained within the limits. The treated effluent quality is maintained within the prescribed standards and about 40-50% treated effluent is being

		reused/recycled in miscellaneous refinery activities and as Fire water makeup. **Permisssion letter submitted to IRO, GHY.**
11	No effluent shall be discharged outside the plant premises and Zero effluent discharge concept shall be followed	Treated effluent discharge to outside environment directly from ETP via dedicated pipeline has been discontinued since October'2006 and since April, 2007 township effluent also is being routed to the refinery ETP. Presently there is no dedicated facility for discharging Treated effluent from ETP directly to outside environment. About 40-50% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. **Treated effluent quality is enclosed as Annexure-IV.**
12	Comprehensive water audit to be conducted on annual basis and report to the concerned Regional Office of MoEF&CC. Outcome from the report to be implemented for conservation scheme	Water audit completed. Audit report submitted to IRO, GHY
13	Automatic /online monitoring system (24 x 7 monitoring devices) for flow measurement and relevant pollutants in the treatment system to be installed. The data to be made available to the respective SPCB, Regional Office of MoEFCC and in the Company's website.	Flowmeter in the treated effluent line installed in Nov'18. For pollutant level measurement pH & TOC (for measurement of COD & BOD) analyser already exist. TSS analyser installed in Nov'18.
14	Oil catchers/oil traps shall be provided at all possible locations in rain/ storm water drainage system inside the factory premises.	Oil catchers/oil traps are installed in various locations in the storm water channel to avoid any oil carry over to the open channel. Additionally, NRL has installed a series of hay fliters in the storm water channel and used oil absorbent booms as precautionary measures. Insignificant quantities of emulsified oil generated if any has been recovered and reused with the help of MOSRU (Mobile Oil Spill Recovery Unit). **Construction of 6 nos new oil catcher Near CDU, HCU, OMS north, near ETP, near PH-3, near storm water final O/L completed.**
15	Oily sludge shall be disposed off into Coker. Annual Oily sludge generation and disposal data shall be submitted to the Ministry"s Regional Office and CPCB.	NRL produces Anode grade coke which is further processed in Coke Calcination Unit (CCU) to get high value Calcined Petroleum coke (CPC). Trial run for processing of sludge in Delayed Coker Unit (DCU) was carried out on an experimental basis. However, the process led to the deterioration of the CPC

		quality to a great extent and the experiment had to be called off. Instead, NRL follows a robust sludge handling process for disposal wherein oily sludge is suitably disposed in Secured Landfill or is being sold to CPCB authorized recyclers. To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19. **Form-IV Annual return on hazardous waste is being regularly submitted to PCBA and attached as Annexure -E**
16	The Company should strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended in October, 1994 and January, 2000. Hazardous waste should be disposed of as per Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and amended time to time	The rules and regulations under MSIHC1989 as amended in 2000 and Hazardous waste management rules 2016 are adhered to. **Hazardous waste authorization is valid till April,2026.**
17	The membership of common TSDF should be obtained for the disposal of hazardous waste. Copy of authorization or membership of TSDF should be submitted to Ministry‟s Regional Office at Shillong. Chemical/inorganic sludge shall be sent to treatment storage disposal facility (TSDF) for hazardous waste. Spent catalyst shall be sent to authorized recyclers/re-processors.	No common TSDF facility is available in the NER. NRL has its own SLF for disposal of oily sludge. NRL has constructed a Secured Landfill Facility as recommended by NEERI in 2004 for a safe and systematic disposal of hazardous materials and authorization is accorded from the concerned authorities and renewed as per the requirement. NRL has installed another SLF of capacity 6000 m3 as per CPCB recommendation.
18	Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products and ensure regular monitoring	Proper oil spill prevention management in place. Alternately, a MOSRU is used in case of emergency situation if any. 6 Nos. of additional Oil catchers and Hay filters installed in various locations. Oil adsorbent boom is also placed in many locations. Further, OWS & CRWS systems are very effectively constructed to divert the spilled material to ETP for further treatment.
19	Acoustic enclosure /silencer shall be installed wherever it is possible	Complied
20	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act	Health checkup of workers is carried out and records are maintained on a regular basis.
21	The company should make the arrangement for protection of possible fire and explosion hazards during construction and operation phase.	Complied.

22	The company shall strictly follow all the recommendation mentioned in the charter of Corporate Responsibility for Environmental Protection (CREP).	Complied.
23	Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines	Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI. On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery. Accordingly, a Green Belt covering a total area of around 56 hectares of land and around 100 mtrs width around the refinery and around 25 mtrs width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001). Massive Plantation have been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead. Grren belt detail submitted to IRO,GHY. Initiatives for plantation under Compensatory Afforestation drive in degraded areas has been taken up at Nakkati Chapori, Golaghat (40 Ha.) and Kandoli Reserve Forest, Nagaon(35 Ha.) in coordination with State Forest Division.
24	All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.	The same has been noted & being implemented. Moreover, Quantitative Risk Assessment is being carried out every 5 years. The Emergency Response and Disaster

		Management Plan was certified on 28.12.2022 and the certification is valid till 27.12.2025.
25	At least 2.5 % of the total cost of the project shall be earmarked towards the Enterprise Social Commitment (ESC) based on local needs and action plan with financial and physical breakup/details shall be prepared and submitted to the Ministry"s Regional Office at Shillong. Implementation of such program shall be ensured accordingly in a time bound manner. Detailed action plan to be submitted to MOEFCC Regional Office, Shillong.	Comprehensive plan prepared. Action plan with financial and physical breakup/details with time line submitted to IRO,GHY.
Sl. No.	**General Condition**	**Remarks**
1	The project authorities must strictly adhere to the stipulations made by the State pollution Control Board (SPCB) Stale Government and any other statutory authority	The stipulations made by the Pollution Control Board of Assam and the State Government are strictly adhered to.
2	No further expansion or modification in the project shall be carried out without prior approval from the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance a, fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environment protection measures required if any.	Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.
3	The project authorities to strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2008 as amended subsequently. Prior approvals from Chief Inspector of Factories Chief Controller of Explosives Fire Safety Inspector must be obtained wherever applicable	The rules and regulations under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 2000 are adhered to. Approvals from Chief Inspectorate of Factories, Chief Controller of Explosives etc as applicable for the Numaligarh Refinery have been obtained.
4	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 PAR ules,1 989v iz.75 dBA(day time) and 70 dBA (nighttime).	The major sources of noise generation in the proposed project are the pumps and the blowers. Strong foundations shall be provided to mitigate the noise generation further. The equipment shall be monitored regularly at a distance of 01 mtr from the source and corrective measure shall be taken to maintain the noise level below 85 dBA. The ambient noise levels all around the refinery is being monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). **Noise report for the period attached as per Annexure I.**

5	A separate Environmental Management Cell equipped with full fledged laboratory facilities must be setup to carry out the environmental management on monitoring functions	A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safe guarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any, regarding the environment and monitors the regular environmental activities.
6	Adequate funds shall be earmarked towards capital cost and recurring cost/ annum for environment pollution control measures and shall be used 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 shall not be diverted for any other purposes.	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and shall not be diverted for any other purpose. **Environmental expenditure Submitted as Annexure-D for the period.**
7	The Regional office of this Ministry/Central Pollution Control Board//State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretations shall be submitted to them regularly.	Six monthly compliance report along with monitored data is being sent to the Regional Office of this Ministry/Central Pollution Control board/State Pollution Control Board as per the requirement.
8	A copy of clearance letter shall be sent by the proponent to concerned Panchayat/ Zila Parishad/ Municipal Corporation/ Urban Local Body and the local NGO if any, from whom suggestion/representation if, any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	Copy of the clearance letter sent to concerned Panchayat/ Zila Parishad/ Circle Office.
9	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely SPM, RSPM, SO2, NOx, HC (Methane& Non-methane),VOCs (ambient levels as wel1 as stack emissions) or critical sectoral	Six monthly compliance report along with monitored data is being sent regularly to the Regional Office of this Ministry/Central Pollution Control board/State Pollution Control Board as per the requirement. The same is also displayed in NRL website. The critical pollutant parameters are also displayed near the Refinery Main gate.

	parameters indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	
10	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry/ CPCB/ SPCB/ shall monitor the stipulated conditions	A six-monthly compliance report on the Environmental Clearance conditions of the Numaligarh Refinery along with the monitored data is being submitted regularly to the MoEFCC Regional Office. The same is being displayed in the company's website also.
11	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986. As amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail	Environmental Statement for each financial year ending 31st March, in form-V is being sent to SPCB every year as per the requirements. The same is being displayed in the company's website also. **The environmental statement for financial year, 22-23 as per Form-V submitted and attached as Annexure-F.**
12	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.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 locally concerned and a copy of the same shall be forwarded to the Regional Office.	Advertisement regarding the environmental clearance for the DHDT Unit was published in two local newspapers namely, The Assam Tribune (in English) and The Dainik Janambhumi (in Assamese (on the 26th December, 2016 of both the advertisements were forwarded to the MOEF Regional Office, Shillong.
13	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 commencing the land development work.	Project commissioned in March,2018.
14	The Ministry may revoke or suspend the clearance, if implementation of any of the above Conditions is not satisfactory.	The same has been noted.
15	The Ministry reserves the right to stipulate additional conditions if found necessary. Company in a time bound manner shall implement these conditions.	The same has been noted.
16	The above conditions will be enforced inter-alia under the provisions of Water (Prevention & Control of pollution) Act 1974, Air (Prevention & control of Pollution) Act' 1981' the Environment (Protection) Act 1986, Hazardous Waste (Management Handling and Transboundary Movement) Rules 2008 and the Public Liability Insurance Act 1991 alonwith their amendments and rules.	The same has been noted.

8. Project Name : Expansion of the Refinery from 3 MMTPA to 9 MMTPA

MoEF&CC File No.: J-11011/274/2015 –IA II (I)

EC Issued Date: July 27th, 2020

Sl No	Conditions	Compliance status
13(i)	The EC granted to the project/ activity is strictly under the provisions of the EIA Notification 2006 and its amendments. It does not tantamount / construe to approvals/ consent/ permissions etc. required to be obtained or standards/ conditions to be followed under any other acts/ Rules/ Subordinate legislations, etc., as may be applicable to the project.	Noted.
13(ii)	The effluent shall be treated and recycled/ reused to meet the requirement of different industrial operations and Zero Liquid Discharge shall be achieved. The treated effluent of 300 cum/hr, if discharged to Dhansiri river through pipeline (to downstream only), shall conform to the standards prescribed under the Environment (protection) Rules, 1986. If Zero Liquid Discharge is not followed, the Project Proponent shall submit plan for achieving Zero Liquid Discharge with its techno-economic feasibility within 3 months before the EAC/Ministry.	A Zero Liquid Discharge techno-economic feasibility study has been carried out through M/s EIL. The feasibility report with recommendations submitted to MoEF, Delhi on 02.11.2020. Recommendation of feasibility report are- Although Zero Liquid Discharge is better option in terms of water recovery and no wastewater disposal to the Dhansiri River, however, disposal of RO-DM plant reject/ wastewater is proposed in view of the following considerations: • Insignificant impact on the river water quality (~0.3 ppm TDS during wet weather and ~12 ppm TDS during dry weather) due to disposal of RO-DM plant reject water. • Less consumption of input energy (steam, power, etc.) required for disposal of RO-DM plant reject water (as compared to ZLD plant option).

		• Less fuel requirement for additional power requirement (as compared to ZLD plant option wherein more fuel shall be required for generation of power and steam) and lesser emissions. • No requirement of secured landfill for disposal of significant quantity (30 TPD) of salt generation as in case of ZLD plant option. • No possibility of ground water contamination in the areas nearby secured landfill site as in case of ZLD plant option. • Lower CAPEX and OPEX involved in plant installation and operation (as compared to ZLD plant option). • Very little maintenance or operator's attention requirement (as compared to ZLD plants which are more prone to downtime). As advised by MoEF, NRL applied online for EC amendment on 04.03.2021. The proposal was appraised by EAC committee(I-2) in the ministry in its meeting held on 18 th March'2021. The EAC after deliberations, recommended the amendment in EC as proposed by NRL. Based on the recommendation MoEF accords approval to the proposed amendment on 06.05.2021 as stated below- The effluent shall be treated and recycled/reused to meet the requirement of different industrial operations. The RO-DM reject of 300 cum/hr to be discharged to Dhansiri River through pipeline (to downstream only), shall conform to the CPCB guidelines.
13(iii)	The project proponent shall finalize and submit the details of sites to be utilized for associated activities of the refinery in the NDZ area within six months. Preference shall be given to the sites which is adjoining / adjacent to the	Land documents submitted to MoEFCC on 28.06.2022.

	refinery area. The project proponent shall submit MoU/commitment from the stackholders regarding transfer of the land.	
13(iv)	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.	Noted for compliance.
13(v)	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 & boiler, continuous stack monitoring, Sulphur recovery plant, etc. shall be installed / ensured.	Noted for compliance.
13(vi)	Total fresh water requirement after expansion shall not exceed 2508 cum/hr to be met from Dhansiri river. Fresh water requirement shall be reduced by recycling/reuse of water. Necessary permission for freshwater procurement shall be obtained from the concerned regulatory authority.	Permission obtained from State Irrigation Dept. Approval letter for drawl of water from River Dhansiri on 21.07.1995 and 02.05.2019 submitted to IRO,GHY
13(vii)	Process effluent/ any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.	Noted for compliance.
13(viii)	Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arrested shall be provided on tank farm, and solvent transfer to be done through pumps.	Noted for compliance.
13(ix)	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.	Noted for compliance.
13(x)	Fly ash should be stored separately as per CPCB guidelines so that it should not adversely affect the air quality, becoming air borne by wind or water regime during rainy season by flowing along with the storm water. Direct exposure of workers to fly ash & dust should be avoided.	The refinery complex of NRL does not have solid fuel (coal, coke, biomass etc.) fired heaters or boilers. As such, there is no fly ash generation from the NRL refinery complex. Hence, selling back ash from boiler to brick manufacturer/cement industry does not arise.

	The ash from boiler shall be sold to brick manufacturers / cement industry.	
13(xi)	The company shall undertake waste minimization measures as below:- a) Metering and control of quantities of active ingredients to minimize waste. b) Reuse if by-products from the process as raw materials or as raw material substitutes in other processes. c) Use of automated filling to minimize spillage. d) Use of Close Feed system in to batch reactors. e) Venting equipment through vapour system f) Use of high pressure hoses for equipment cleaning to reduce waste water generation.	Noted for compliance.
13(xii)	The green belt of 5-10m width shall be developed in the total project area, mainly along the plant periphery, in downwards wind direction, and along road sides etc. The project proponent shall ensure 40% 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 consultant with the State Forest Department.	Noted for compliance. An MoU was signed on 14.09.2020 between NRL and Golaghat Social Forestry Division,Govt. of Assam for compensatory afforestation of 40 Hectares of land in Nakkati Chapori, Khumtai Revenue Circle, Golaghat for plantation of 1 lakh tree saplings. Another MoU was signed between NRL and Nagaon Forest Division for Compensatory afforestation drive in 35 Ha land in Kandoli PRF on 23.08.2021 for plantation of 65000 saplings.
13(xiii)	As proposed, at least Rs. 36.51 crore shall be allocated towards Corporate Environment Resposibility (CER). As proposed, the CER allocation shall be spent mainly for addressing the issue raised during public consultation/ hearing including assistance/ infrastructure for transport facility, drinking water, social/ environmental activities, education & skill development, etc.	CER model prepared. **CER report for the period has been attached as per Annexure C.**
13(xiv)	For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB	Noted for compliance.

	guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.	
13(xv)	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.	Noted for compliance.
13(xvi)	Continuous onlne (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 serve. For online continues monitoring of effluent, the unit shall installed 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.	Monitoring data shall be submitted after project completion and commissioning of new 6 MMTPA refinery train. Existing data for 3 MMTPA being submitted regularly with half yearly EC compliance status. **Monitoring reports attached as per Annexure II, III,IV.**
13(xvii)	Process safety and risk assessment studies shall be further carried out using advanced models, and the mitigating measures shall be undertaken/implemented accordingly.	Quantitative Risk Assessment study is carried out every 5 years. Same shall be carried out for new 9 MMTPA refinery after project completion & commissioning.
13(xviii)	The project proponent shall implement the Site-Specific Conservation Plan for conservation of Schedule I Species in the study area and obtain approval from the State Chief Wildlife Warden of the Department. The recommendations of the approved Site-Specific Conservation Plan shall be implemented in consultation with the State Wildlife Department. The implementation report shall be furnished along with the six-monthly compliance report.	Noted for compliance. Site specific conservation plan for Schedule I species as per EIA report for NREP, submitted to Principal Chief Conservator of Forests (PCCF), Assam for approval.
13(xix)	The PP should improved 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 SPCB/CPCB.	Noted for compliance.
13(xx)	Fly Ash Brick making plant shall be installed for proper disposal of fly ash.	As clarified above (reply to 13x), as NRL does not generate fly ash. Hence, installing fly ash brick making plant does not arise.

General Conditions		
13.1(i)	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. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	Noted for compliance.
13.1 (ii)	The energy source for lighting purpose shall be preferably LED based, or advance having preference in energy conservation and environment betterment.	Noted for compliance.
13.1 (iii)	The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board)SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.	Noted for compliance.
13.1 (iv)	The National Ambient Air Quality Emission Standards issued by the Ministry vide GSR No. 826(E) dated 16th November, 2009 shall be followed.	Noted for compliance.
13.1 (v)	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 Environment (Protection) Act, 1986 Rules, 1989 viz 75dBA (day time) and 70 DBA (night time).	Noted for compliance.

13.1 (vi)	The company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and to utilize the same for process requirements.	Roof top rainwater harvesting from two major buildings having huge potential is being planned and action has been initiated for the same.
13.1 vii)	Training shall be imported to all employees on safety and health aspects of chemicals handling. Pre- employment and routine periodical medical examinations for all employees shall be undertaken or regular basis. Training to all employees on handling of chemicals shall be imparted.	Noted for compliance.
13.1(viii)	The company shall also 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 managements, and risk mitigation measures relating to the project shall be implemented.	Noted for compliance.
13.1 (ix)	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.	CER model prepared. **CER activity report for the period enclosed as per Annexure C.**
13.1 (x)	The company shall undertake eco-development measures including community welfare measures in the project area for the overall improvement of the environment.	Noted for compliance.
13.1 (xi)	A separate Environmental Management Cell having qualified person with Environmental Science/ Environmental Engineering / specialization in the project area) equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.	Noted for compliance. Environmental management cell already exists.
13.1 (xii)	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	Noted for compliance.

	conditions stipulated herein. The funds so diverted for any other purpose.	
13.1(xiii)	A copy of the clearance letter shall be sent by the project proponent to concern 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.	Copy of clearance letter submitted to Letekujan Gaon Panchyat, Rongbong Gaon Panchyat, Ponka Gaon Panchyat, Morongi Circle Office on 19.08.2020. Copy submitted to IRO,GHY
13.1(xiv)	The project proponent shall also submit six monthly report on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored date (both in hard copies we 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.	-Noted for compliance. Half yearly EC conditions compliance status is being submitted regularly and also available in NRL website.
13.1 (xv)	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.	-Noted for compliance. Environmental Statement for each financial year ending 31st March, in form-V is being sent to SPCB every year as per the requirements. The same is being displayed in the company's website also. **The environmental statement for financial year, 22-23 as per Form-V submitted and attached as Annexure-F**
13.1(xvi)	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 on shall be in the vernacular language of the locality concerned and a copy of	The advertisement of granting of EC grant broadly published in widely circulated local newspapers - **Amar Asom**, **Pratidin, Dainik Asom, Asomia Khobor, Dainik Agradoot, Dainik Janambhumi, Niyamia Barta** (Assamese) and The **Assam Tribune** and **The Sentinel** (English) on 30th July, 2020 for information to public. The copy of EC letter and paper advertisement sent to MoEF,RO on 06.08.2020

	the same shall be forwarded to the concerned Regional Office of the Ministry.	
13.1(xvii)	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.	Noted for compliance
13.1(xviii)	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.	Noted

Annexure -A : NOC Compliance Status for Township

Annexure-A

COMPLIANCE STATUS OF THE SIX CONDITIONS GIVEN WITH THE DEVELOPMENT OF TOWNSHIP OBTAINED VIDE LETTER NO. J-11014/2/91-IA.II DATED 18TH JANUARY, 1994 FROM MOEF NEW DELHI.

CONDITIONS:

i) The hill slopes should not be used for civil construction purposes

- Noted.

ii) Land use planning of the colony and the land around it should be finalized in construction with the State Town Planning Department.

- Consultation was done, but minutes of the same are not available at present.

iii) More open space should be left and the building construction may be done by acquiring minimum land and the houses should be constructed on ground plus two floors basis.

- Noted.

Open space left within the township is around is around 82% of the total area.

iv) Township site should not involve any forest area.

- Township is constructed only in the permitted area.

v) The existing forest cover towards the west and north of the proposed colony site should not be disturbed.

- It is not disturbed.

vi) No organized human settlement or private colonies should be allowed in the hill or the areas adjoining the hill. (Atleast in a radius of 10 kms).

- The Govt. of Assam has already notified the "No Development Zone" on 19.01.95.

Annexure -B : NOC PCBA to Existing Refinery Compliance Status

Annexure B

POINT-WISE STATUS OF CONDITIONS MENTIONED IN THE "NO OBJECTION CERTIFICATE" VIDE NO. WB/T-843/89-90/154 DATED 01.09.1990 OF POLLUTION CONTROL BOARD, ASSAM

1. No Air, Water, Soil pollution shall be created by the industry beyond the permissible limits prescribed by this Board. The industry would incorporate adequate pollution control measures before they put the plant into operation.

- This has been complied. For abatement of pollution, the following environment initiatives have been incorporated:

- *Effluent Treatment Plant with tertiary treatment facilitie. This is further enhanced by implantation of ETP modernization and VOC recovery system in ETP. .*
- *Sulphur Recovery Block*
- *Ambient Air Quality monitoring*
- *Automatic online stack monitoring system*
- *Green Belt around refinery and NRMT*
- *Non-illuminating ground flare*
- *Low NOx burners incorporated in design*
- *Township sewage treatment plant and composting plant*
- *Hazardous oily waste and other solid waste management by Secured Landfill Facility, Bio-remediation and selling to approved recyclers.*

2. To maintain the environmental and ecology in the area provision for planting selected species of these within the compound and approaches along with provisions for park, garden and fountain shall have to be made. Massive afforestation will have to be made by the industry in the factory and township.

-Within the refinery premises, few gardens have been developed near various units like Hydrocracker(HCU), Captive Power Plant (CPP), Effluent Treatment Plant (ETP), QC lab, Central Control Room (CCR) etc. Plantation of different variety of saplings have been widely carried out mainly along the all roadside areas all throughout the refinery. Fountain has been made in front of the Administrative Building. Massive plantations have been also carried out on all along the road sides in the Township and plantation also have been done in wide scale in the Butterfly Valley, Herbal garden, public places and club premises and few other places in the Township.

3. **As per provisions of water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 any officer empowered, by this Board in its behalf shall without any interruption, the right at any time to enter the industry for inspection, to take samples for analysis and may call for any information etc. Violation of this right will be withdrawal of the "NO OBJECTION CERTIFICATE".**

-This has been followed without any exception.

4. **As per provisions of the Acts, regular monitoring are to be done by the industry from the locations/points fixed by this Board and the reports to be submitted to the Board timely as prescribed.**

- Regular monitoring of air pollution and effluent quality has been carried out and results are submitted to the PCBA Regional office, Golaghat in every month.

5. **Effluent carrying drains must be segregated from storm water drains and effluent must be disposed in effluent pond. In no case, effluent will be discharged into nearby nullah / natural watercourse etc. without treatment and bringing it within ISI permissible limits or limits fixed by the Board.**

-Effluent collection and segregation philosophy was submitted to PCBA. Discharge of any effluent ex-refinery into the River Dhansiri has been stopped since October, 2006.

6. **Standard linings and flat embankment of effluent pond shall have to be provided in the pond to prevent and control of overflow, seepage and leakage of effluent to the nearby areas.**

-This was incorporated in the design of the storage ponds of the Effluent Treatment Plant and constructed accordingly.

7. **To regularise the subsequent process, the legal provisions of CONSENT LICENCE and RETURNS shall have to be timely adhered to.**

-Submission of application for revalidation of Consent from PCB, Assam for running of the various units and Returns are being timely adhered to.

8. **Gaseous pollutants due to the burning of the fuel to run engine, boiler, etc. should be controlled by adopting preventive measures.**

-Low NOx burners have been installed in all the furnaces and also, low sulfur fuels are being used.

9. **Solid waste that arises during the operation should be properly graded and disposed off scientifically without causing nuisance.**

-Solid waste has been properly graded, hazardous oily waste and other solid waste disposed off through the Secured Land Fill facility and bio-remediation after taking due authorization from PCBA. Spent catalyst is disposed off through approved recyclers and few quantity of oily sludge has been sold to approve recyclers.

10. **For low-lying areas, special care is to be taken by the Industry to prevent any overflow, seepage and leakage of the effluent**.

-Does not arise.

Presently no effluent is discharged from the refinery and township into the River Dhansiri or any water Body.

11. **For warning systems (Alarm, Siren) is to be installed by the Industry to guard against accidental pollution/mishap together with fire fighting devices.**

-Sirens have been installed at the refinery site and Township to alert workers on emergency and a complete fire fighting network has been installed. Fire tenders are readily available at site and in operation.

12. **All pipes connections, joints, fittings etc in the factory and plant are to be frequently checked and leak proof all the time by the industry.**

-These are being physically checked on regular basis and in case of any leakage corrective action is taken at the earliest. However, for the detection of very minor gas/vapour leak - fugitive emission monitoring is done on regular basis by using Gas Measuring Instrument and rectified the leaking points on priority. In additions, acoustic survey is also carried out in various units in regular intervals.

13. **Proper house keeping and adequate maintenance has to be ensured/ enforced as per provisions of the Acts.**

- This is complied.

14. **All unwanted/toxic chemicals/fluid/gases are to be neutralized and flared up as necessary.**

-The point is adhered to without any deviation.

15. **Production process is to be monitored and in the event of danger, immediate shutdown is to be ensured by the Industry.**

-Production process is continuously being monitored from the Control Room and applicable step is initiated as per requirement.

16. Provisional "NO OBJECTION CERTIFICATE" will be valid till the proposed date of commissioning of the plant.

-Noted

17. The provisional "NO OBJECTION CERTIFICATE" has been issued being on the particulars furnished by the applicant and subject to imposition of further/more conditions if warranted by the subsequent development.

-Noted

18. Healthy working environment for the workers must be maintained and there should not be health hazard to the workers for inadequate arrangements for ventilation, dust removal etc. Arrangements should be adequate and full proof for the health of the workers. Their health should be regularly monitored.

- NRL follows OISD – GDN – 166 Guideline for Occupational Health Hazard monitoring to provide specific level of occupational health & hygiene services to the employees and necessary health care.

This includes:

a) Work Environment monitoring – Occupational hygiene.
b) Pre-employment / Pre-placement medical examination.
c) Periodic health check-up / examination.
d) Infrastructure for occupational health monitoring.

The Frequency for Periodic health check-up / examination of NRL has been decided as follows:

Sl. No.	*Area*	*Frequency*
1.	*Hazardous*	*Half- yearly*
2.	*Less hazardous*	*Annually*
3.	*Non- hazardous*	• *Annually the employees of age 50 yrs and above.* • *Once in 2 yrs for employees of age group 40 – 50 yrs.* • *Once in 3 yrs for employees of age group below 40 yrs.*

19. The Industry must submit compliance report of action taken on the conditions given by the Board before commissioning of the Plant.

-Complied.

20. Adequate trees should be planted and maintained in the vacant spaces of the premises and all around the factory and township.

Massive plantation of different variety has been carried out mainly along the roadside areas, vacant places, in ETP and in the gardens within the Refinery as well as Township also.

21. The Board will be at liberty to withdraw the "NO OBJECTION CERTIFICATE" at any time without notice if necessary steps for prevention of pollution and preservation of environment is not taken by the Industry as per mentioned condition.

-Noted.

22. The issuance of this NOC does not convey any property right in either real or personal property or any exclusive privileges nor does it authorises any injury to private property nor any invasion right nor any infringement of Central, State or Local Laws or Regulations.

-Noted.

23. The NOC does not authorize or approve the construction of any physical structures of facilities or the undertaking of any work in any natural watercourse except of the works specially instructed herein.

-Noted.

24. Effluent treatment plant must be constructed before commissioning of the plant and the treated effluent must conform to the MINAS and IS: 2490 all the time.

-The Effluent Treatment Plant equipped with tertiary treatment facilities constructed before the commissioning of the plant. Treated effluent quality is checked regularly as per new MOEF notifications before every discharge from ETP for reuse in the Laboratory and has been intimated regularly to PCB, Assam and CPCB, Shillong on monthly basis. It is worth-mentioning that since October, 2006 no effluent has been discharged outside the refinery. This is further enhanced by implantation of ETP modernization and VOC recovery system in ETP.

25. Construction of Effluent Treatment Plant must be started before starting the construction of the Refinery itself.

-That has been complied

26. Treated effluent shall be discharged through a closed pipeline into the mid-stream of river Brahmaputra after confluence point of Dhansiri river and arrangement is to be made by the Refinery authority for proper mixing.

-Permission has been obtained from PCB, Assam to discharge treated effluent at the downstream of jetty in the mid-stream of river Dhansiri through a closed pipeline.

However, no treated effluent has been discharged since October, 2006 into the River Dhansiri or any other natural water body as 100% reuse of treated effluent is sustained.

27. The applicant shall provide sampling arrangement in the treated effluent carrying closed pipeline at two sites i.e. near NH crossing and before the final outfall point at Dhansiri mukh. Easy access for the sample collection at these two sites will have to be made by the Refinery Authority.

-Provision for sampling has been made at various locations in the EDPL at the initial point of the pipeline, near Township and at the final discharge point. However, the requirement is not applicable at present as no treated effluent is discharged outside the refinery. 100% reuse of treated effluent is sustained.

28. Regular monitoring is to be done for the parameters, TOC and others as mentioned in MINAS and reports are to be submitted fortnightly to the Board.

- *The relevant parameters for treated effluent have been monitoring regularly as per the latest CPCB norms and the monitoring reports are being submitted regularly to the PCBA, Regional Office, Golaghat, CPCB Zonal Office, Shillong on monthly basis as per requirement stipulated in the Consent for the refinery.*

29. The detailed design of the ETP will have to be submitted to the Board before starting construction of ETP.

- The same has been submitted before starting the construction of ETP.

30. The time schedule for construction and commissioning of the ETP should be submitted to the Board quarterly.

- This has been complied.

31. Necessary arrangements for sample collection at the following points are to be provided by the industry before commissioning of the plant.

a) Before entering ETP
b) Before aerobic system of ETP
c) After leaving ETP (on EDPL)
d) At interim point of effluent carrying pipeline near NH crossing
e) Ultimate point of effluent discharge

-Sampling points as required have been provided.

32. Samples will have to be collected and analyzed by the industry from the above points as per condition 31 above and as well as from the following points.

a) Near each village situated on the bank of the Dhansiri River.
b) Receiving water course (i.e. Brahmaputra) after it receives effluent from the refinery.

The applicant is to submit the monitoring results to the Board fortnightly.

-The discharge of treated effluent from the Refinery and from the STP, NRL Township has been stopped since October, 2006 and April, 2007 respectively, as such Monitoring of Dhanisiri water becomes irrelevant. Request has been placed to PCBA for discontinuation of the same.

33. Recording and monitoring activities and results:

a) M/s. IBP Co. Ltd., are to monitor effluent everyday and maintain records of all information resulting from monitoring activities.

b) The industry is to record for each measurement for samples to be taken to the requirement of this NOC with the following information.

i) The date, exact place and time of sampling
ii) The dates on which analysis performed
iii) Who perform the analysis
iv) Method used for the analysis
v) The results of all required analysis

c) The industry is to retain for minimum of five years of all records of monitoring activities and results including all records. This period of retention shall be extended during course of any unresolved litigation regarding the discharge of Pollutants by the applicant or when required by the Board.

Regular monitoring of effluent quality has been carried out and records are kept properly.

34. Monitoring information shall be submitted and reported by submitting a discharge monitoring report form duly filled in and signed to the Boards Office.

- This is complied.

35. The applicant will have to install automatic pH recorder, flow recorder and TOC analyzer on the effluent carrying line.

-Flow recorder, TOC analyser and automatic pH recorder have been installed in ETP to monitor the effluent quality going through the Effluent Disposal Pipeline (EDPL). However, the discharge of treated effluent from the Refinery and from the STP, NRL Township has been stopped into River Dhansiri since October, 2006 & April, 2007 respectively.

36. The applicant shall not discharge effluents in excess defined as harmful in the NOC. In addition the refinery shall not discharge hazardous substances into watercourses in quantities defined as harmful in the NOC given by the Board.

- There is no discharge of effluent from the refinery into River Dhansiri since October, 2006. No hazardous substances are discharged into any watercourses.

37. Nothing in this NOC shall be deemed to preclude than institution of any legal action nor receive from any responsibilities or penalties to which the industry is or may be liable.

-Noted.

38. Applicant shall take adequate and efficient measures so that sulfur is recovered fully and there will not be any release of Sulfide in the effluent. Special monitoring arrangement is to be carried out by the applicant after the coagulation unit as well as at final outlet before disposal.

-To minimize sulphur pollution, a Sulphur Recovery Block has been installed and is functioning continuously. Monitoring of sulphide in the effluent is done regularly before every reuse and sulphide level in the final treated effluent is maintained well within the standards.

39. The applicant must take special care to contain all the untreated effluent within their compound at the time of malfunctioning of ETP and must be treated to the prescribed limit before disposal.

-Guard ponds and Surge Tanks of sufficient holding capacity have been provided in ETP to cater for emergency need. This is further enhanced by implantation of ETP modernization and VOC recovery system in ETP.

40. Refinery authority must take special care to keep the noise level within permissible limit all the time. As suggested by NEERI, Green belt development is to be taken up right from the time of construction.

- *A Green Belt covering a total area of around 60 hectares of land and around 100 mtrs width around the refinery and around 25 mtrs width around the NRMT has been developed as per the Green Belt Development Plan. (The Green Belt Development Plan has been submitted to MoEF along with the Half Yearly Report to MOEF on the 15th October, 2001).*

Massive Plantation have been carried out in the Green Belt so as to it can provide a natural barrier for attenuation of noise and air pollution. Nos of local variety have been planted including some fruit bearing samplings in & all around Green Belt.

Phase wise replantation is in progress in various locations in Green Belt to increase the density.

-Noise monitoring inside the work zone has been carried out on a regular basis, and if required, corrective action is taken accordingly.

41. Authority shall take adequate care to keep the impact of noise within the limit at the time of loading/unloading and transportation etc.

-Adequate care has been taken.

42. IBP Ltd. shall construct and commission the sewage treatment plant for their Township area and the treated effluent must confirm IS standards before discharging, special care must be taken to contain the pathogens and coliforms within count before discharge.

-A separate Sewage Treatment Plant for Township area has been constructed and in operation. No effluent is discharged into River from STP, the same has been routed back to ETP at refinery.

43. Disposal of Sludge:

a) Intake Water Treatment:

Solids, sludges, dust, silt or other pollutants separated from or water prior to use by IBP Ltd. shall be disposed off in such a manner as to prevent any pollutant from such materials from entering any such water. Any live fish or other animals

collected or trapped as a result of intake water screening or treatment may be returned to water body habitat.

-This has been complied.

b) Waste /Water Treatment:

For disposal of sludge from the treatment plant, IBP Ltd., shall have to take separate specific permission from this Board. IBP Ltd. shall apply for such permission giving three months time for detailed scrutiny of their proposal for disposal off should be intimated to the Board immediately. Detailed proposal for sludge disposal shall be submitted by IBP Ltd. immediately.

-Based on NEERI's report on Solid Waste Management, one Secured Land Fill was constructed for disposal of sludge from the treatment plant / solid waste. Proposal of the same was submitted to both i.e. MoE&F and PCB, Assam and due permission for disposal of sludge in the Secured Landfill was received from PCB, Assam. NRL has installed another SLF of capacity 6000 m3 as per CPCB recommendations.

c) Hazardous waste disposal:

For disposal of hazardous waste generated from the refinery, IBP Ltd. shall have to take specific permission from the Board separately.

-Hazardous waste disposal was incorporated in the above proposal and authorization has been granted for disposal of sludge in the Secured Landfill by PCB, Assam. Some quantity has been sold to authorised recyclers.

d) Spent Catalyst:

Spent Catalysts must be disposed off through sale only. No spent catalyst should be disposed at landfill site and must not be buried underground in concrete silo/bunker under any circumstances.

- *Spent catalyst has been sold to the CPCB registered purchasers.*

e) Sewage Treatment:

Solid waste generated in the sewage treatment plant should be disposed off in a proper scientific manner so that it will not create any health hazard in the environment.

-Sludge drying beds have been provided in the Sewage Treatment Plant at Township

44. Before applying "Consent To Operate" after commissioning for discharge of treated effluent, the applicant must clarify to the Board that IBP Ltd. have installed an alternative electric power source sufficient to operate all the facilities utilized by the applicant to maintain compliance with terms and conditions of this NOC.

- *Complied.*

45. Arrangements are to be made for analysis of bottom sludge of their units particularly of the heavy metals.

- Equipment for analysis of heavy metals in bottom sludges like Atomic Absorption Spectrophotometer, Flame Photometer and Spectrophotometer have been procured.

46. The applicant shall analyze the solid waste and submit the report to the Board regularly.

-Analysis of solid waste has been carried out regularly and submitted to Pollution Control Board.

47. The applicant shall take adequate care to contain the raw materials, chemical products etc within the site itself and proper protection arrangements will have to be made around the raw material, product storage area. No seepage/leakage shall take place from this area.
Raw materials and products are stored in their respective tanks with all the necessary precautions required for.

48. Height of chimneys shall be such that it allows proper dilution of the emitted as and it shall not be less than 30 mtrs under any circumstances.

-All the chimney heights are much more than 30 mtrs.

49. Stack emissions from the industry must meet the standards prescribed by PCB and Dept. of Environment, Govt. of India all the time.

-Monitoring of stack emission has been carried out regularly as per the latest MOEF notification and are well maintained within the standards. The monitoring results are submitted regularly to the PCBA Regional Office, Golaghat, Shillong as per the requirements.

50. **The applicant is to contain the total sulphur emission into the atmosphere as SO_2 within 256 kg/hr.**

-This is complied

51. Fugitive emissions from the refinery should not be more than 6.11 kg/hr.

- *Regular monitoring of fugitive emission has been carried out in various locations inside the refinery using GMI.*

The GMI survey has been carried on all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals, hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, furnaces etc.

52. Ground Level conc. of SO_2 and NO_X at Kaziranga National Park, due to the release of gases from the refinery shall not exceed 2.25 and 3.51 microgram per cubicmetre resp. during highly unstable condition. Also, during stable condition, SO_2 and NO_X shall not exceed 25.0 and 39.0 microgram per cubicmetre resp.

-As a compliance of the above, an Air Quality Monitoring Station has been installed at Agratoli, near Kaziranga to monitor the required parameters on a regular basis. The same have been monitored regularly and the value found within limit. Action initiated to install another CAAQMS inside the refinery premises in the down wind direction.

53. The refinery authority must also contain the CO, HC within the specified limit and as per NEERI's report.

-CO and HC are monitored along with the parameters SO_2, NOx and SPM in the ambient air quality monitoring. The same are found to be within standards as prescribed in the Consent for Numaligarh Refinery by PCB, Assam.

However, NRL has started monitoring of ambient air quality in line with NAAQS-2009 in totality since April' 2011. Further, real time emission data has been transmitted to CPCB server on continuous basis.

54. IBP Ltd. must install automatic SO_2 and flow measuring device at all the stacks. If at any stage SO_2 exceeds the permissible limits immediate shutdown of operations will have to be ensured.

-Automatic SO_2 online analysers have been installed in all the refinery unit stacks. The total SO_2 emission in terms of kg/hr from the stacks is done on the basis of fuel consumption in the furnaces and sulphur content in the fuel.

55. Systematic Green Belt development is to be made by the applicant in and around the refinery site as well as in Township area. Selected trees should be of fast growing with thick canopy cover, perennial and evergreen, with large leaf area, resistant to specific air pollutants.

-A Green Belt of around 100 mtrs width around the refinery and around 25 mtrs width around the NRMT covering a total area of land around 60 hectares has been developed. The Green Belt has been developed & maintain as per the Green Belt development plan.

56. **The applicant will have to take Socio-Economic Development of the area.**

-Various forms of Community Development Schemes have been carried out regularly.

57. Ambient Air Quality Monitoring is to be done daily by the industry in and round factory as well as at Kaziranga National Park and results must be submitted monthly to the Board.

- The ambient air quality monitoring is being carried out at 5 locations at a frequency of 8/9 samples per month, taken twice a week 24 hourly at uniform interval. (This is as per the statutory requirement of CPCB, where the minimum no. of samples to be analyzed for a station is 104 samples in a year). The monitoring results are submitted regularly to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong in every month.

However, NRL has started monitoring of ambient air quality in line with NAAQS-2009 in totality since April' 2011. However, NRL has started monitoring of ambient air quality in line with NAAQS-2009 in totality since April' 2011. Further, real time emission data has been transmitted to CPCB server on continuous basis.

58. **Stack Monitoring is to be done daily and results must be submitted fortnightly to the Board.**

-This has been complied.

59. **The applicant is to submit the detailed Environmental Management Plan, Disaster Management Plan, and Project Report before commissioning the refinery**

-The reports have been submitted.

60. The applicant will have to install water meters at all the water carrying pipelines before commissioning the refinery.

-Water meters have been installed on all the water carrying pipelines.

61. Automatic pH monitoring of effluent should be provided for by installing automatic pH indicator and recorder.

-Automatic pH analyzer has been installed.

62. Suitable flow measuring arrangements with automatic measuring devices should be installed in the outlets to measure accurately the quantities of effluents discharged. No effluent shall remain unmeasured and records of daily flow should be maintained.

- *Flow meter with totalizer has been installed on the effluent discharge pipeline and records are maintained daily. The treated effluent is reused in the Refinery premises only, there is no discharge into River Dhansiri.*

63. The applicant is to take special care to raise the height of Electric Poles including towers so that animals can pass the area safely. If necessary, alternative arrangements is to be made for safe movement of animals.

-*Steps have been taken accordingly.*

64. The refinery authority will have to strictly adhere to the provisions of the Water (Prevention and Control of Pollution) Act, 1974; Water (Prevention and Control of Pollution) Amendment Acts, 1978 &1980; Air (Prevention and Control of Pollution) amendment Act, 1981; Environment (Protection) Act 1986.

- *This is complied.*

65. The Board will be at liberty to withdraw the "NO OBJECTION CERTIFICATE" at any time without notice if necessary steps for Prevention and Control of Pollution and preservation of environment is not taken by IBP Ltd. as per above mentioned conditions.

-*Noted.*

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Annexure -C : CER Report

2024

ANNUAL REPORT

Report on Corporate Environment Responsibility

NUMALIGARH REFINERY LIMITED
A GOVERNMENT OF INDIA ENTERPRISE

NRL

CONTENTS

A. INTRODUCTION

Corporate Environment Responsibility (CER) denotes the obligation of corporations and companies to contribute to the economic, social, and environmental development of areas impacted by their projects. On May 1, 2018, the Ministry of Environment, Forest, and Climate Change, Government of India, issued Office Memorandum F. No. 22-65/2017-IA.III. This memorandum provides a standardized framework for determining corporate environmental responsibility for both Greenfield and Brownfield projects.

On July 27, 2020, the Expert Appraisal Committee (EAC) of the Ministry of Environment, Forest, and Climate Change (MoEF) recommended granting Environmental Clearance to the prestigious ₹22,594 crore Numaligarh Refinery Expansion Project (NREP) through notification F. No. J-11011/274/2015-IAII(I). This notification proposed an allocation of ₹36.51 crores towards the Corporate Environment Responsibility (CER) of the NREP. The competent authority of NRL approved the modalities for implementing CER through approval dated September 21, 2020. Subsequently, a steering committee was constituted to identify, assess, recommend, and monitor CER activities as per circular HR/CER/2020/01 dated November 10, 2020. Additionally, a CER approval system was implemented at NRL, with the portal becoming operational by the end of July 2021.

The Environmental Clearance (EC) for the NREP, referenced in F. No. J-11011/274/2015-IAII(I), specified that the proposed ₹36.51 crores would primarily address issues raised during public consultations and hearings. These issues include providing assistance and infrastructure for transportation facilities, drinking water, socio-environmental activities, education, and skill development.

In alignment with the Environmental Clearance (EC) of the NREP, extensive discussions were held with the Deputy Commissioner of Golaghat, officials from Gaon Panchayat, the Block Development Officer, representatives from the Assam State Rural Livelihood Mission (ASRLM), and local organizations. These discussions aimed to identify activities that would contribute to the socio-economic and environmental upliftment of the community surrounding Numaligarh Refinery Limited. Suggestions were received for various initiatives related to rural development, scientific cultivation and livestock farming assistance for farmers, promotion of sports, education and skill development, health support, and activities with a positive environmental impact. However, the primary focus of these discussions was to address the adverse impacts of the COVID-19 pandemic. This included introducing various income-generating schemes for unemployed youth and women, thereby improving their livelihoods.

The first steering committee meeting was held on 25-06-2021. In that meeting based on above discussions following broad heads were identified

1. Agri-allied and Livelihood
2. Environment
3. Education and Skill development
4. Rural development
5. Sports, Health & Culture

In line with the aforementioned planning, several activities were identified and discussed in steering committee meetings. The agreed-upon proposals were then sent for approval from the competent authority. Once approved, these proposals are being executed and reviewed in subsequent steering committee meetings. The process of identifying new activities and obtaining the necessary approvals is also ongoing. Below is a head-wise brief description of the NREP CER initiatives undertaken in the financial year 2022-2023.

B. AGRI-ALLIED ACTIVITIES

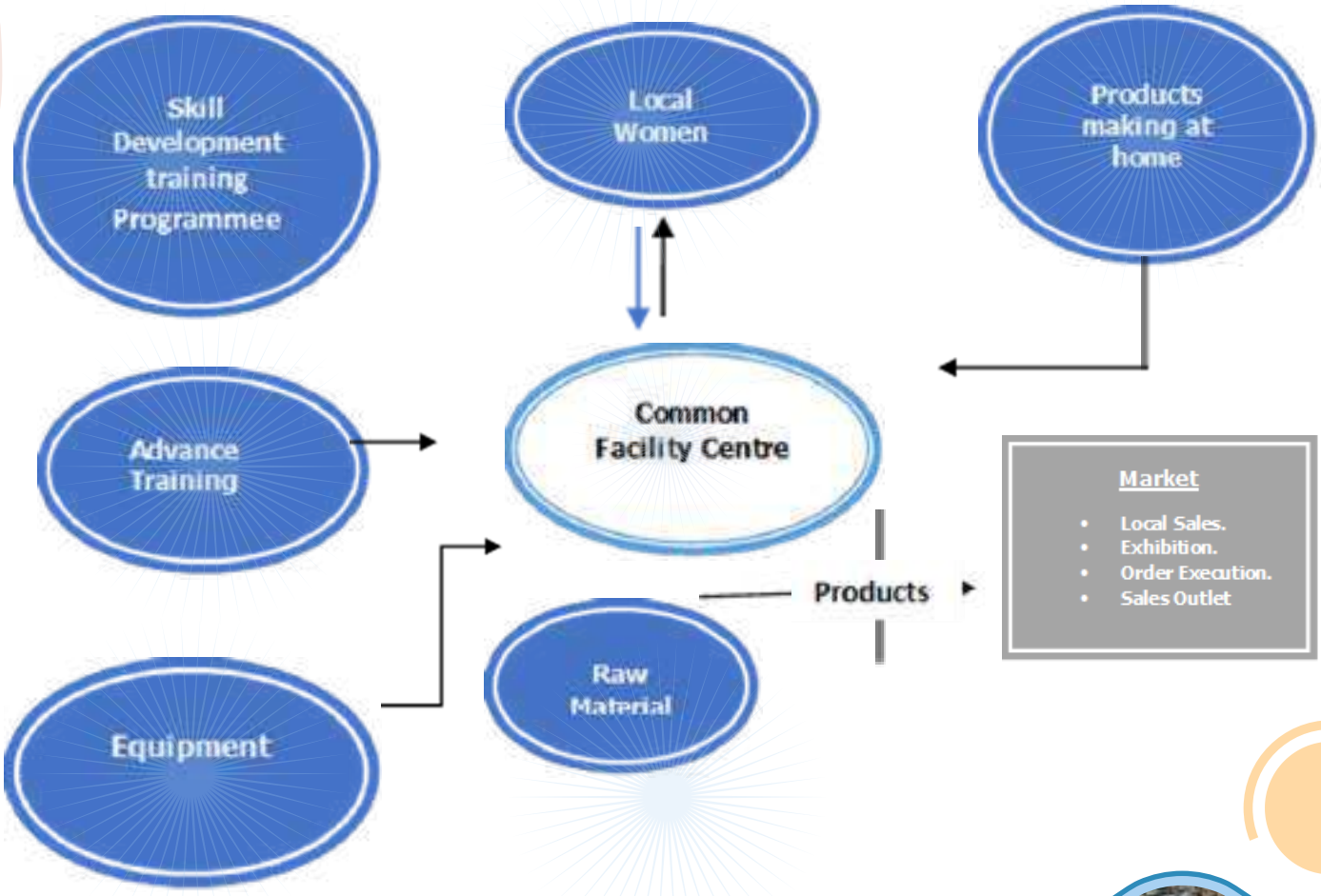
1.1. Water Hyacinth Project

Livelihood enhancement is a critical area for the socio-economic development of the communities surrounding the refinery. Water hyacinth handicraft has been identified as an effective livelihood support initiative, enabling women to produce various products using fibers from water hyacinth. Consequently, Numaligarh Refinery Limited (NRL), in collaboration with the Assam State Rural Livelihood Mission (ASRLM), has undertaken initiatives under Corporate Environment Responsibility (CER) to promote water hyacinth craft as a sustainable livelihood option for women in Rongbong Gram Panchayat.

The project commenced on August 29, 2021, with a duration of 18 months. Four Self-Help Groups (SHGs) were selected with the assistance of ASRLM, Morongi, focusing on the commercial production of various water hyacinth fiber products. The availability of water hyacinth in nearby water bodies was assessed and confirmed.

Approved Amount	Rs. 24,80,000.00
Released Amount FY 2021-22	Rs.4,89,986.98
Released Amount FY 2022-23	Rs. 6,54,122.00
Released Amount FY 2023-24	Rs. 3,51,576.00
Total Released Amount till Date	Rs. 14,95,684.98

IMPLEMENTATION MODEL



The project commenced with a 25-day skill development and advanced training program held at the Common Facility Centre in Jackson Grant Bokial, from January 25, 2022, to February 23, 2022. A total of 40 local women participated in this training. The necessary machinery, raw materials, and consumables were provided. Training was conducted by two outsourced trainers certified by NEDFi.

Following the training program, the women have become proficient in making various products, with the quality of these products steadily improving. These products are now being sold in markets, exhibitions, and to high-level officers. The project has been well-received by customers.

Current Status as on 30th April, 2024 : Currently, the members of the Jagron Producer Group are engaged in producing high-demand items such as shopping bags, ladies' bags, yoga mats, trays, and pen stands. The group has focused on improving the quality of their water hyacinth products, including enhancing tagging and branding. Water hyacinth is collected from Bokial, as well as from Borgoria and Doigrung, yielding approximately 2-3 quintals of dry hyacinth.

Recently, the corporate office of NRL in Guwahati purchased a total of 112 products, including bags, trays, and pen stands, and the group has generated approximately ₹4 lakhs by selling their products in the local market throughout the project period. Additionally, the artisans of the Jagron Producer Group are now training two new producer groups and conducting workshops at other institutions in Nogaon. Their products were displayed and highly appreciated at the CPSEs Roundtable in Delhi. Over the past year, the producer group has earned approximately ₹4 lakhs from the sale of water hyacinth products.

Water Hyacinth Products displayed at Book fair Golaghat.

Water Hyacinth Products displayed at CAU Regional Agri. Fair, Dimapur,Nagaland

NEDFI Dignitaries offering W.H. flattering machine to the members of Producer Group

Glimpse of Product Preparation

Water hyacinth product displayed at Bhugali Mela,Township

Providing training to school students on Water
hyacinth product preparation

Revenue earned from different Water Hyacinth Products in the year 2024

Item & Product	Total Production (Nos.)	Rate/Unit(Rs.)	Total sale(Rs.)
Cap	80	600	48000
Decorative item	LS	LS	29000
Dinning table mat	49	1500	73500
Gift Box	65	450	29250
Coaster	85	130	11050
Hand Bag(Big & Small)	287	700	200900
Others	LS	LS	9000
		Total	400700

1.2. Project “Self Help Group & Beyond”

"SHG’s and Beyond" is a joint initiative project by NRL and ASRLM, Morongi Development Block, inaugurated on November 23, 2021, aimed at providing financial assistance to 30 Self Help Groups (SHGs). Each SHG is allocated a total amount of ₹1.5 lakh, distributed in installments based on performance evaluations. A core monitoring and support team has been assigned to provide necessary assistance to the SHG members. The project has a duration of two years and an estimated budget of ₹45,00,000 (grant per SHG with 10 women: ₹1,50,000).

The theme of the project is to support various income-generating schemes for selected Self Help Groups (SHGs) in nearby Gram Panchayats. In the first phase, a total of 30 SHGs were selected from Ponka, Letekujan, and Rongbong Gram Panchayats. The Project is revitalizing SHGs and empowering rural women.

Financial Involvement of the Project:

Proposal No.	Details of the project	Applicant	Approved A mount	Released Amount FY 2021-23	Released Amount FY 2022-23
CER2122200006	Financial support for various livelihood schemes to SHGs of Rongbong GP.	Respective SHG under Rongbong GP	13,50,000.00	9,00,000.00	4,50,000.00
CER2122200007	Financial support for various livelihood schemes to SHGs of Letekujan GP.	Respective SHG under Letekujan GP	15,00,000.00	10,00,000.00	5,00,000.00
CER2122200008	Financial support for various livelihood schemes to SHGs of Ponka GP.	Respective SHG under Ponka GP	16,50,000.00	11,00,000.00	5,50,000.00
Total			45,00,000.00		

Current Status as on 30th April, 2024: Currently, monitoring activities are underway at the sites of SHGs supported by Numaligarh Refinery Limited to analyze their status and further uplift rural women and youth. To date, most SHGs financially supported by NRL have increased their annual income by maintaining consistency in their income-generating activities, setting a strong example of sustainable livelihood enhancement.

THE INCOME OF DIFFERENT SHGS AS ON DATE IS GIVEN BELOW:

LETEKUJAN GAON PANCHAYAT			
SHG NAME	ADDRESS	SCHEME	INCOME
SIKH ATMA SAHAYAK GUT	2 NO DOIGRUNG	CUTTING & TAILORING	300000-350000
BOGIDHOLA ADARSHA SHG	BOGIODHOLA	PIGGERY	100000-120000
MADHAVDEV MOHILA ATMA SAHAYAK GUT	PHULANI GAON	WEAVING	70000-90000
KALYANI SHG	2 NO DOIGRUNG	HANDLOOM	300000-350000
NABA DRISHTI	2 NO DOIGRUNG	GOTTERY	60000-70000
NABAJYOTI MOHILA SHG	PHULONI GOAN	FISH&DUCKERY FARMING	40000-50000
SRISHTI SHG	BAHBARI	PIGGERY	100000-150000
SEWALI SILAI KENDRA	LETEKUJAN	CUTTING&TAILORING	250000-300000
PRABHATI	PHULANI GAON	WEAVING	40000-50000
GYANJYOTI SHG	2NO DOIGRUNG	WEAVING	300000-350000

RONG BONG PANCHAYAT			
SHG NAME	ADDRESS	SCHEME	INCOME
JYOTI SHG	1 NO RONG BONG	GOATTERY	150000-170000
RADHIKA SHG	NARAYANPUR	FISHERY	85000-100000
LUCKY	1 NO RONG BONG	AGRI FIRMING	225000-250000
TRISHNA	4 NO RONG BONG	GOATTERY	150000-170000
RUPALI MOHILA SHG	5 NO RONG BONG	GOATTERY	50000-70000
TORALI	2 NO PONKAGRANT	GOATTERY	100000-120000
RUPAHI MOHILA	5 NO RONG BONG	PIGGERY	60000-70000
SABIKA	4 NO RONG BONG	GOATTERY	150000-170000
PARTHANA	4 NO RONG BONG	GOATTERY	150000-170000

PONKA PANCHAYAT			
SHG NAME	ADDRESS	SCHEME	INCOME
PUBALI MOHILA SHG	2 NO PONKAGRANT	FOOD PACKING	70000-100000
JUNAK MOHILA SHG	BISHNUPUR	WEAVING	100000-120000
LAKHIMI	GANDHIGAON	GOATTERY	130000-150000
BOHAGI	1 NO PONKAGRANT	POULTRY	50000-60000
PANCHALI	2 NO PONKAGRANT	GOATTERY	120000-150000
BISHNUJYOTI	BISHNUPUR	DUCK FARMING	80000-100000
RINIKI	2 NO PONKAGRANT	DUCK FARMING	90000-120000
RAJABARI OUGURI ARADHANA SHG	OUGURI	GOATTERY	130000-150000
BORNALI	2 NO PONKAGRANT	GOATTERY	80000-100000
TRISHNA	PONKA GRANT	WEAVING	70000-90000
PRATIMA	2 NO PONKAGRANT	GOATTERY	100000-120000

PHOTOGRAPHS OF ACTIVITY

SHGs involved in Weaving

SHGS INVOLVED IN CUTTING AND TAILORING

SHGS INVOLVED IN LIVESTOCK FARMING

1.3. Establishment of Vermicompost Hub cum lab at Garmurgaon, Bokakhat

Vermicomposting is a method of preparing enriched compost with the use of earthworms. It is one of the easiest methods to recycle agricultural wastes and to produce quality compost. Earthworms consume biomass and excrete it in digested form called worm casts. Worm casts are popularly called as black gold. The casts are rich in nutrients, growth promoting substances, beneficial soil micro flora

and having properties of inhibiting pathogenic microbes. Vermicompost is stable, fine granular organic manure, which enriches soil quality by improving its physiochemical and biological properties. Vermicompost is becoming popular as a major component of organic farming system. NRL has undertaken a project for establishment of Vermicompost Hub cum lab by providing infrastructure for producing Vermicompost.

Financial Involvement of the Project:

Implementing Agency	**Career care, Bokakhat**
Approved Amount	**Rs. 4,98,298.00**
Released Amount FY 2023-24	**Rs. 4,98,298.00**

1.4. Livelihood support to Individual Beneficiaries and others:

NRL has initiated an Individual Livelihood Scheme, providing support in various trades to enhance individual incomes. Project wise details are as below:

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Livelihood support to Debojit Bora for welding shop.	Debojit Bora, Bishnupur	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Abdul Azad Ali, Borgoria Gaon , Letekuchapori for construction of Grocery shop at Letekuchapori.	Abdul Azad Ali, Borgoria Gaon , Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Apurba Kr. Boruah for setting up of Piggery farm at 02 no Doigrung.	Apurba Kr. Boruah, 02 no Doigrung	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Bitul Lohar for construction of Grocery Shop at Leteku Chapori, Golaghat, Assam	Bitul Lohar	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Bitupon Bora for setting up of Piggery farm at Ponkial gaon	Bitupon Bora, Ponkial gaon	1,25,000.00	1,25,000.00	-	Successfully Running
Livelihood support for setting up of Goatery shop at Bishnupur.	Brahmondrajit Bora, Bishnupur	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Bulbuli Saikia for Construcation of Dairy Farm at Morangi	Bulbuli Saikia, 03 no Koivatya gaon	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Dharmadhaj Chetry, Letekuchapori for construction of Goatary Farm at Letekuchapori.	Dharmadhaj Chetry, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Dhruba Chetry, Letekuchapori for construction of Dairy Farm at Letekuchapori.	Dhruba Chetry, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Faguni Murah for constraction of Dairy Farm at Leteku Chapori, Golaghat, Assam	Faguni Murah	1,25,000.00	50,000.00	75,000.00	In Progress

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Livelihood support to Himakshi Bora for setting up of Goat Farming, Kalioni Block gaon	Himakshi Bora, Kalioni Block gaon	1,00,000.00	50,000.00	50,000.00	In Progress
Construction of Dairy farm at Letekuchapori.	Huramat Ali, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Jugal Bailung, Letekuchapori for construction of Dairy Farm at Letekuchapori.	Jugal Bailung, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to kamala Chetry, Letekuchapori for construction of Dairy Farm at Letekuchapori	Kamala Chetry, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support for setting up a Beauty Salon at 01 no Ponka grant, Bishnupur	Looks Professional Unisex Salon, 1 No Ponka Grant(Bishnupur)	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Monju Bailung, Letekuchapori for construction of Dairy Farm at Letekuchapori.	Manju Bailung, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Mina Ganju, Borgoria Gaon , Letekuchapori for construction of Dairy Farm at Letekuchapori.	Mina Ganju, Borgoria Gaon , Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Nagen Tanti for setting up of Grocery shop at 02 no Doigrung.	Nagen Tanti, 02 no Doigrung	1,25,000.00	1,25,000.00	-	Successfully Running
Livelihood support for setting up of Poultry Farm at Letekuchapori	Ranjana Begum, Borgoria Gaon , Letekuchapori	1,25,000.00	1,25,000.00	-	Successfully Running
Livelihood support to Renu Chetry, Letekuchapori for construction of Dairy Farm at Letekuchapori.	Renu Chetry, Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Livelihood support to Ruchana Begum, Borgoria Gaon , Letekuchapori for construction of Dairy Farm at Letekuchapori.	Ruchana Begum ,Borgoria Gaon , Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress
Livelihood support to Sariful Rahman for construction of Poultry farm at Leteku Chapori, Golaghat, Assam	Sariful Rahman	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Sarif uddin Ahmed for construction of Poultry farm at Leteku Chapori, Golaghat, Assam	Sarif uddin Ahmed	1,25,000.00	50,000.00	75,000.00	In Progress
Livelihood support to Sobita Roy,Borgoria Gaon , Letekuchapori for construction of Dairy Farm at Letekuchapori.	Sobita Roy, Borgoria Gaon , Letekuchapori	1,25,000.00	1,00,000.00	25,000.00	In Progress

Livelihood support to Jugmita Gogoi for Establishment of a Beauty Saloon at Bishnupur

Livelihood support to Abdul Basti Mazumdar for construction of a grocery store

Livelihood support to Amir Tanti for construction of a grocery store

Livelihood support to Kebal Chetry for development of a computer shop

Livelihood support to Musliha Choudhury for poultry farming

Livelihood support for Goatery Farming to Brahmandrajit Bora at 3 no Koibarta Gaon

Napather Weaving centre

1.5. Joint Liability Groups and Others

A Joint Liability Group (JLG) is a group of individuals–usually from similar socioeconomic backgrounds or communities–who come together to avail themselves of small loans for entrepreneurial or income- generating activities. Each member of the group is jointly liable for the repayment of loans taken by any member of the group. The following livelihood activities are carried out by Numaligarh Refinery Limited through Joint Liability Groups and other NGOs and Societies:

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Livelihood support to setting up of a Piggery farm at Hautaley Habichuwa gaon.	Dhanshiri Jutia Dayabadha Swabalambi Gut	3,90,000.00	3,90,000.00	-	Successfully Running
Stitching of boiler suit through Jonaki Chilai Kendra, Doigrung, Golaghat.	Jonaki Chilai Kendra, Doigrung, Golaghat.	4,62,000.00	3,80,200.00	81,800.00	In Progress
Stitching of boiler suit through Jononee Silai Kendra, Gandhiya gaon, Dergaon.	Jononee Silai Kendra, Gandhiya gaon, Dergaon	4,62,000.00	4,62,000.00	-	Successfully Running
Livelihood support to Jugal ati Min palan & Besa Kina Samabai Samity Ltd., Bokakhat for Integrated fish cum Duck farming at Jugalati gaon, Bokakhat.	Jugal ati Min palan & Besa Kina Samabai Samity Ltd.	4,84,900.00	4,73,400.00	11,500.00	In Progress
Training aid to Jononee Silai Kendra, for Stitching of boiler suit through	Jononee Silai Kendra, Gandhiya gaon, Dergaon	4,62,000.00	4,62,000.00	-	Successfully Running
Providing Bar bending and Bar cutting machine to local youths for self employment.	M/s P. J Construction, Rajabari Borgoria	3,86,804.00	3,53,764.00	33,040.00	In Progress
Providing Bar bending and Bar cutting machine to local youths for self employment.	MARANGI CHA BAGISHA UNNAYAN SAMITY	3,86,804.00	3,45,000.00	41,804.00	In Progress
Establishment of Vermicompost Hub cum Lab facility at Garmur gaon, Bokakhat	Career care, Bokakhat	4,98,298.00	4,98,298.00	-	Successfully Running

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Providing Bar bending and Bar cutting machine to local youths for self employment.	MILONJYOTI ENTERPRISES	3,86,804.00	3,53,764.00	33,040.00	In Progress
Livelihood support to PANCHARATNA GROUP for small bakery industry	Pancharatna group,01 no Ponka grant	3,90,000.00	1,30,000.00	2,60,000.00	In Progress
Providing Bar bending and Bar cutting machine to local youths for self employment.	PB ENGINEERING & CONSTRUCTION	3,86,804.00	3,53,764.00	33,040.00	In Progress
Stitching of boiler suit through Rupantar Chilai Kendra & uniform House, Numaligarh	Rupantar Chilai Kendra & uniform House, Numaligarh	4,62,000.00	3,04,050.00	1,57,950.00	In Progress
Financial assistance to Women of Udgiran Mahila Samittee for Cultivation of Ginger, Turmeric & Colocasia at Doigrung.	Udgiran Mahila Samiti	4,31,960.00	1,00,000.00	3,31,960.00	In Progress
Establishment of Vermicompost Hub cum Lab facility at Garmur gaon, Bokakhat	Career care, Bokakhat	4,98,298.00	4,98,298.00	-	Successfully Running

Piggery Farming

Agri. Farming by Udgiran Mahila Samittee

Small bakery industry by Pancharatna group at telgaram

Piggery Farming at Hautoley

1.6. Livelihood support to livestock farming to farmers of 4 no and 5 no Rongbong under ponka GP:

Livestock farming involves the raising and domestication of animals to obtain products such as meat, eggs, milk, and more. It plays a crucial role in the mixed farming system that defines agriculture in Assam, with approximately 8.8% of the population, mainly in rural areas, engaged in this sector for income generation.

Since 2019, NRL has undertaken a project to support rural farmers in the vicinity of the Refinery, in collaboration with the State Veterinary Dispensary, Ponka. Beneficiaries for pig, goat, and poultry farming have been selected by the Veterinary Department based on the interests of the farmers.

Name of Farming	Nos. of Beneficiaries	Location
Pig	21	04 & 05 No Rongbong
Goat	28	
Poultry	06	

Financial Involvement of the Project:

Implementing Agency	State Veterinary Dispensary, Ponka
Approved Amount	Rs. 24,75,000.00
Released Amount FY 2022-23	Rs. 92,500.00
Released Amount FY 2023-24	Rs. 16,52,400.00
Total Released Amount till Date	Rs. 8,22,600.00

Current status as on April, 30th '2024:

i) 1st and 2nd instalment has been transferred from NRL to each beneficiary for construction of goatery, piggery and poultry shed after utilization of beneficiary share.
ii) Currently the beneficiaries have utilized the provided fund for completion of the construction of farming shed and rearing livestock

Glimpses of activity of the project

Piggery Farming by Rupa Saikia

Goatery Farming by Jugal Saikia

Piggery Farming by Sagorika deka

Goatery Farming Dibakor Saikia

1.7. Stitching of boiler suit

NRL is focusing on social development through the means of providing training and subsequently, employment under its tailoring project. This initiative primarily engages unemployed women and youth in the trade of tailoring, enabling them to earn a livelihood by providing tailoring services to the community.

Presently, there is a growing need to involve more unemployed youths in tailoring jobs to support their livelihoods. NRL addresses this need by providing source materials and utilizing the services of these groups, who produce boiler suits for NRL employees. Below are the details of the groups involved and their financial contributions:

Beneficiary/Implementing Agency	Project details	Approved Amount	Released Amount (Rs)
Jononee Silai Kendra, Gandhiya gaon, Dergaon	Stitching of boiler suit	4,62,000.00	4,62,000.00
Rupantar Chilai Kendra & uniform House, Numaligarh		4,62,000.00	3,02,100.00
Jonaki Chilai Kendra, Doigrung, Golaghat.		4,62,000.00	3,80,200.00

Some glimpses of Stitching of Boiler suits

1.8. Electricity connection and other items provided to Solar Cold storage operating at Field Trial Station (FTS), Panbari

The Solar Cold Storage facility installed by NRL at the Agriculture Field Trial Station in Panbari proves beneficial for small and marginal farmers in the Bokakhat area. An increasing number of farmers are utilizing this facility to store their products. However, during prolonged periods of bad weather when adequate sunshine is not available, the Solar Cold Storage may not function optimally. To address this, NRL has provided financial support for electric connection and other miscellaneous items to ensure the products remain in good condition during extended periods of adverse weather. The Field Trial Station is operated by the Office of the Deputy Director of Agriculture, F.T.A., Panbari.

Financial involvement of the Project:

Implementing Agency	**Office of The Deputy Director of Agriculture F.T.S, Panbari, Bokkhat**
Approved Amount	**Rs. 3,42,599.00**
Released Amount FY 2023-24	**Rs.2,84,800.00**

Some glimpses of the Project

C. Education & Skill Development

An education and skill development project is an initiative designed to augment the knowledge, abilities, and employability of individuals through structured educational and skill-building programs. These endeavors are tailored to address diverse demographics, including children, youth, adults, and marginalized communities. NRL has embarked on several projects in line with this program, as outlined below:

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status as on Date
Conducting 5 month Coaching classes at Telgaram for the students of class 4 and 5 for qualifying the entrance examination of Jawahar Navodaya Vidalaya and Sainik school. Covering Student: Contract Workmen Children and others nearby areas)	Accord Refinery Worker's Union	4,99,499.00	4,99,499.00	-	Successfully accomplished
Financial assitance to Coaching for Entrance Examination of Sainik School and Jawahar Navodaya Vidyalaya under the supervision of Accord Refinery Workers Union at Telgaram	Accord Refinery Workers Union	4,65,739.00	2,20,000.00	2,45,739.00	Successfully conducting
Providing Primary education to underprivilege women of Purabangla Parbotipur at Mount Zion Play school	Assam Tea Tribes Women's Association, Marangi Branch	37,000.00	18,500.00	18,500.00	Successfully conducting
Financial assistance for coaching class of class IX and X standard students of nearby areas of the Refinery.	Siksha, NGO	4,00,000.00	1,92,000.00	2,08,000.00	Successfully conducting
Providing Coaching classes from class I to Class V of Tea garden coummuniy of nearby areas of the Refinery.	Letekujan Smile Foundation	4,60,000.00	1,15,000.00	3,45,000.00	Successfully conducting

1.1. Coaching classes for Entrance Examination of Sainik School, Goalpara and Jawahar Navodaya Vidyalaya.

The Accord Refinery Worker's Association, Telgaram, organized five-month coaching classes in Telgaram for students in grades 4 and 5 to prepare them for entrance examinations at Jawahar Navodaya Vidyalaya and Sainik School. The target audience includes children of contract workmen and students from neighboring areas of the Refinery.

Result of Jawahar Navodaya Vidyalaya Entrance Examination,

	JNV ENTRANCE EXAM QUALIFIED STUDENTS.			
SL NO.	NAME OF THE CANDIDATE	ROLL NO.	DATE OF BIRTH	FATHER'S NAME
1	PRITOM SAIKIA	1172849	11-11-2012	C/O. BHABEN SAIKIA
2	JYOTIMAY BORUAH	1172843	19-11-2012	C/O. INDESWAR BORUAH
3	KUNAL KISHOR KAMP	1172839	24-05-2012	C/O. RATUL KAMP
4	BORNIL AKASH SAIKIA	1172846	25-12-2012	C/O. BIMAN SAIKIA

RESULT OF SAINIK SCHOOL ENTRANCE EXAMINATION

SAINIK SCHOOL ENTRANCE EXAM QUALIFIED STUDENTS				
Sl No.	Name of the Candidate	Roll No.	Date of Birth	Father's Name
1	TINKU SONOWAL	1408010225	25-06-2012	MINTU SONOWAL
2	SAIBUR RAHMAN	1408010007	20-09-2012	SAHEDUR RAHMAN
3	BORNIL AKASH SAIKIA	1408010104	25-12-2012	BIMAN SAIKIA
4	SHABANA AZMI HAZARIKA	1408010107	14-05-2012	DHRUNU DAYAL HAZARIKA

SOME GLIMPSES OF THE PROJECT

COACHING CLASSES TO CLASS IX & X STUDENTS BY SIKSHA NGO

1.2. Construction of covered Stage as a part of Open-Air Theatre in Union Govt. High School premises, Ranasahi Sadar Block, Balasore, Odisha. Financial involvement of the Project

Implementing Agency	Union Govt High School premises, Ranasahi Sadar Block, Balasore, Odisha
Approved Amount	Rs. 3,50,000.00
Released Amount FY 2023-24	Rs.1,16,666.67

1.3. Earth work excavation, dressing, shifting and leveling at Ouguri Sadow Bonua L.P. School.

Financial involvement of the Project:

Implementing Agency	Ouguri Sadow Bonua L.P. School
Approved Amount	Rs. 1,34,820.00
Released Amount FY 2023-24	Rs. 1,34,820.00

D. Environment:

Environment-related projects span a broad spectrum of initiatives aimed at conserving natural resources, mitigating climate change, promoting sustainability, and addressing environmental challenges. Below are the projects launched by NRL to foster environmental sustainability.

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance
Plantation of Muga Host Plant at Bogidhola Muga VGR by Sericulture dept.Golaghat	Office of the Asstant Director of Sericulture , Golaghat	3,70,285.00	1,08,400.00	2,61,885.00
Plantation seedless Lemon tree sapling at Bogidhala Muga VGR	Sericulture dept./ Gaon Panchyat/ Marangi Development Block/ NGO	21,00,000.00	11,80,000.00	9,20,000.00
Plantation of 5000 Nos som tree, 2000 Nos of greenbell tree at Bogidhola Muga VGR	Bogidhala Muga VGR management committee	18,11,640.00	4,50,000.00	13,61,640.00
Plantation of fruit bearing tree saplings at Kamargaon area	Prajanma,NGO	5,00,000.00	5,00,000.00	

1.1. Construction of 02 no's Eco-Friendly meeting shade at Bogidhola Muga VGR

At the Bogidhala Muga Village Grazing Reserve (VGR) in Marangi, Numaligarh Refinery Limited (NRL) is undertaking various activities. One major initiative involves promoting the rearing and reeling of Assam silk (Muga), which includes planting Muga trees within the VGR. NRL has also planted a large number of lemon trees to serve as bio-fencing around the VGR premises. The ongoing project is regularly reviewed and monitored by the management team. Two eco-friendly meeting shades have also bee constructed in the VGR using bamboo and roof tins, leveraging the abundant availability of bamboo in the North Eastern Region. These sheds can also serve as suitable venues during visits by guests, officials & VIPs and other visitors to the area.

Financial involvement of the Project:

Implementing Agency	**Bogidhola Muga VGR Management Committee**
Approved Amount	**Rs. 4,87,652.00**
Released Amount FY 2023-24	**Rs. 4,28,002.00**

On going projects at Bigidhola Muga VGR Plantation of Assam Lemon Saplings

Assam Lemon, locally known as Nemu Tenga in Assamese, comprises lemon cultivars grown and cultivated in Assam. Among the most popular varieties are 'Gol Nemu' and 'Kaji Nemu'. These lemons hold a significant place in Assamese cuisine and are renowned for their distinct aroma. Assam lemons are commonly used to prepare refreshing drinks, pickles, and as garnishes for curries and other dishes.
In the Bogidhola Muga VGR site, Assam lemon saplings are planted for two specific purposes. Firstly, they serve as a bio-fencing measure to protect the VGR from wild animals. Additionally, the cultivation of lemons aims to generate revenue through the sale of the fruit, contributing to the further development of the project site.

Glimpses of the Project

Plantation by NRL Higher Official

Taking Care of Planted Saplings

Current Status of Planted Lemon Saplings

Plantation of Som Trees

Som trees are traditionally used for rearing muga silkworms in upper Assam to produce reeling cocoons. However, due to the aging of most som trees in the Bogidhola Muga VGR, they are no longer suitable for muga silkworm rearing. To address this issue and ensure the sustainability of muga culture, a project was initiated to plant 1,200 som trees in the VGR.

Rearing and Reeling of Muga Silk Worms

The golden silk Muga stands as a symbol of pride for Assam, deeply intertwined with its culture and tradition. Assam has long been renowned for producing high-quality silk, with Muga silk being a hallmark of the region's heritage. Assam's silk industry, encompassing Mulberry, Eri, and Muga silkworms, has flourished for centuries, with the famous Muga silk gaining increasing demand in international markets.

In light of this, NRL has initiated a collaborative effort with the District Sericulture Department, Golaghat, Marangi Development Block, Letekujan Gram Panchayat, and Marangi College to promote the rearing and reeling of Assam silk at Bogidhola Muga VGR and Sensowa Muga VGR. The project commenced in November 2021.

Following the successful completion of the first cycle of Muga rearing, five cycles have been completed to date.

Rearing of Muga Silk Worms

Obtained Muga Cocoons

Photographs of Reeling

Muga Silk Purchased by Higher Dignitaries

1.2. Plantation of fruit bearing tree saplings at Kamargaon area.

Numaligarh Refinery Limited (NRL) is actively engaging in environmental conservation through a significant fruit tree plantation initiative conducted in partnership with Prajanma, a non-governmental organization committed to sustainable development. This ambitious endeavor seeks to plant over 1,300 fruit-bearing tree saplings across various locations within the Kamargaon area of Golaghat district. The benefits of the plantation drive extend beyond environmental restoration. The fruit-bearing trees planted will provide a sustainable source of nutritious food for local communities, improving their food security and generating additional income opportunities. Moreover, these trees will offer shade, shelter, and improved air quality, contributing to the overall well-being of the community. Currently, some of the planted tree saplings have entered the fruit-bearing stage.

Some glimpses of the Project

E. Rural Development

Rural development encompasses a wide range of initiatives aimed at enhancing the quality of life and economic prospects for residents of rural areas. These efforts typically target the specific challenges encountered by rural communities, such as poverty, limited access to essential services, insufficient infrastructure, and a dearth of economic opportunities. NRL has initiated the following projects, which are executed in collaboration with the State PWD and Empaneled Contractors.Details are as below:

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status As on Date
Development of highland and water body near Mithaaam Chapori Custom Hiring Centre. Total Land :10.5 Bigha.	Mithaam Chapori Jathipotia Halowa gaon Custom Hiring centre	3,92,500.00	3,50,000.00	42,500.00	In Progress
Construction of Road from Doria to Karunating Road from CH:0.00M to CH:1000.00M, L = 1.00KM.	APWD	89,90,000.00	47,16,786.00	42,73,214.00	In Progress
Improvement of Bokial Purabangla road. L = 5.50KM	APWD	4,00,00,000.00	1,60,00,000.00	2,40,00,000.00	In Progress
Construction of interlocking concrete block pavement road from bypass (NH-39) Indira Das to Amlokhitol connecting road.	M/S Pankaj Chetia	73,79,630.00	41,75,562.33	32,04,067.67	In Progress
Repair and maintenance of Old NH-39 Road from Telgaram Tiniali to Refinery main gate.	Assam Public Work Department, Golaghat	83,88,000.00	83,88,000.00	-	Successfully accomplished
Construction of interlocking concrete block pavement road from Mineswar Saikia House to Prafulla Hazarika House.	Empanelled Contractor (M/S Sanjay Kr Gupta)	44,52,065.00	13,35,584.66	31,16,480.34	In Progress
Construction of interlocking concrete block pavement road ouguri chapori road	M/s Puna Bora	31,54,797.00	1589807.13	15,64,989.87	In Progress
Repairing of NH-39 bypass from Ch. 3.18 km to Ch. 5.6 km	State Public Work Department,Golaghat Division	99,90,000.00	99,80,729.00	9,271.00	In Progress
Repairing of NH-39 bypass from Ch. 5.60 km to Ch. 7.98 km	State Public Work Department, Golaghat Division	99,10,000.00	97,21,578.00	1,88,422.00	In Progress

Details of the project	Applicant	Approved Amount	Released Amount FY 2023-24	Amount Balance	Status As on Date
Construction of Information centre at Ouguri Rajabari Ahom gaon.	Ouguri Rajabari Ahom chuk Unnayan Samittee	10,67,962.00	9,01,233.00	1,66,729.00	In Progress
Construction of interlocking concrete block pavement road from bypass (NH-39) Indira Das to Amlokhitol connecting road.	M/S Pankaj Chetia	73,79,630.00	52,67,740.03	21,11,889.97	In Progress
Construction of interlocking concrete block pavement road from bypass (NH-39)to Jiten Bora house.	M/S Tarun Bora	36,86,619.00	23,59,186.96	13,27,432.04	In Progress
Construction of RCC drain at Telgaram area (Bishnupur adarsha Gaon)	S.R. Construction & Supplier, Nazira (Debojit Das)	59,14,034.00	37,91,090.00	21,22,944.00	In Progress
Construction of inter locking concrete block pavement road from Jathipotiagaon to Mithaam capori gaon.Length- 1257.00 M	Nayanmoni Saikia Dutta, Labanghat	80,25,057.22	51,46,704.34	28,78,352.88	In Progress
Construction of interlocking concrete block pavement road ouguri chapori road	M/s Puna Bora	31,54,797.00	1589807.13	15,64,989.87	In Progress
Repairing of NH-39 bypass from Ch. 3.18 km to Ch. 5.6 km	State Public Work Department, Golaghat Division	99,90,000.00	99,80,729.00	9,271.00	In Progress
Repairing of NH-39 bypass from Ch. 5.60 km to Ch. 7.98 km	State Public Work Department, Golaghat Division	99,10,000.00	97,21,578.00	1,88,422.00	In Progress
Construction of interlocking concrete block pavement road from Mineswar Saikia House to Prafulla Hazarika House	M/S Sanjay Kr Gupta	44,52,065.00	13,35,584.66	31,16,480.34	In Progress

Development of Highland and water body at Mithaam Chapori CHC

SOME GLIMPSES OF THE PROJECT

F. Sports, Health and Culture

1.1 Construction of Information centre at Ouguri Rajabari Ahom gaon:

The Job has been completed in the month of September, 2023 and it was inaugurated by NRL officials. Financial Involvement of the Project:

Implementing Agency	**Ouguri Rajabari Ahom chuk Unnayan Samittee**
Approved Amount	**Rs. 10,67,962.00**
Released Amount FY 2022-23	**Rs. 9,01,223.00**
Released Amount FY 2023-24	**Rs.50,000.00**

Photographs of the information Centre

1.2. Renovation of Civil and Electrical work at Ayuskar Citrakala Vidyalaya, Bokakhat

NRL has undertaken initiative to renovate the civil and electrical infrastructure at Ayuskar Chitrakala Vidyalaya in Bokakhat, recognizing the inadequacy of the existing classrooms for effective teaching and learning activities. The approved budget and disbursement amount for this project are detailed below:

Implementing Agency	**Ayushkar Chitrakala Vidyalaya,Bokakhat**
Approved Amount	**Rs. 3,50,000.00**
Released Amount FY 2022-23	**Rs. 1,50,000.00**
Released Amount FY 2023-24	**Rs.1,00,000.00**

1.3. Research proposal on Human Elephant Conflict in Morongi Block:

Marangi Mauza in Golaghat district has become a hotspot for human-elephant conflict, with the intensity of these incidents escalating on a daily basis and the number of human casualties rising. The invasion of elephants has resulted in the destruction of thousands of hectares of agricultural land, as well as homes, public property, and agricultural resources.
To address this pressing issue, the Social Development Forum (NGO) has initiated a research project aimed at finding a permanent solution to the conflict. NRL has provided financial support for a door-to-door baseline survey in villages within Marangi Mauza. Currently, eight villages have been surveyed, including Kachari Gaon, Telia Gaon, Bogidhola, Aborghat, BuragohaiKhat, Sumoni, Borchapori, and Bormohori Pathar Gaon.

Implementing Agency	Social Development Forum, Ponkial gaon
Approved Amount	Rs. 3,74,920.00
Released Amount FY 2023-24	Rs.1,24,974.00

GLIMPSES OF THE PROJECT

1.4. Conducting two days literacy workshop at Anajori Bibah Bhawan, Golaghat by Golaghat zila Sahitya Sabha:

Assam Sahitya Sabha, a non-profit literary organization, was established in December 1917 with the aim of promoting Assamese culture and literature. With approximately one thousand branches both within and outside the state, the Sabha is committed to fostering literary activities, nurturing emerging writers, and hosting a variety of literary events.

NRL has extended financial assistance to the Golaghat Zila Sahitya Sabha to organize workshops in various fields, including short story writing, spelling and compound letter workshops, and poetry recitations.

Financial involvement of the project

Implementing Agency	**Golaghat zila Sahitya Sabha**
Approved Amount	**Rs. 2,60,375.00**
Released Amount FY 2023-24	**Rs.2,60,375.00**

SOME GLIMPSES OF THE WORKSHOP

Annexure -D : Environment Expenditure Report

(Oct’23- Mar’24)

NUMALIGARH REFINERY LIMITED
DETAILS OF ENVIRONMENTAl EXPENDITURE

		Total cost in Rs		
Sl No	**Name of the Facilities**	**Apr-Sep23**	**Oct-Mar24**	**FY 2023-24**
1	Effluent Treatment plant	32,357,265.14	36,664,381.09	69,021,646.23
2	Sulphur Recovery Unit	56,603,279.22	63,902,276.66	120,505,555.88
3	Pollution & Environmental Expenses	2,140,442.91	168,886.52	2,309,329.43
4	Environmental Cell	8,038,962.25	7,277,455.99	15,316,418.24
5	R & M Expenses	15,675,262.24	19,210,225.86	34,885,488.10
	Grand total	**114,815,211.76**	**127,223,226.12**	**242,038,437.88**

Annexure -E : Form-4 - Annual Return Statement for Hazardous Wastes (22-23)

ANNEXURE-E

नुमालीगढ़ रिफाइनरी लिमिटेड
भारत सरकार का उद्यम
নুমলীগড় ৰিফাইনেৰী লিমিটেড
ভাৰত চৰকাৰৰ এক প্ৰতিষ্ঠান

NUMALIGARH
REFINERY
LIMITED
A GOVERNMENT OF INDIA ENTERPRISE
NRL
CIN -U11202AS1993GOI003893

Ref: NRL/ENV/PCBA/23-24/04

Date: 14 July 2023

To,
The Member Secretary,
Pollution Control Board, Assam,
Bamunimaidam,
Guwahati-781021

Sub: Submission of Annual Return on Hazardous Waste (Management and Handling) as per the provision of Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 in Form-4 for the year 2022-2023

Dear Sir,

We are submitting herewith the Annual Return on Hazardous Waste (Management and Handling) as per the provision of Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 in Form-4 for the year 2022-2023.

Hope the details provided shall meet the requirements.

Thanking you,

Yours faithfully,

(Alok Nayan Nath)
CM (TS-Environment)
Numaligarh Refinery Limited

CC: RO, PCBA , Golaghat

पोस्ट: एन. आर. प्रोजेक्ट, जिला: गोलाघाट, असम, पिन- 785699
P.O.: N.R. Project, District : Golaghat, Assam, PIN-785699

Registered Office:
122 ए, जी एस रोड, क्रिश्चानबस्ती, गुवाहाटी - 781005 (असम), दूरभाष: 0361-2203140/2203147, फैक्स: 0361-2203146, वेबसाइट: www.nrl.co.in
122A, G.S. Road, Christianbasti, Guwahati - 781005 (Assam), Phone: 0361-2203140/2203147, Fax: 0361-2203146, Website: www.nrl.co.in

FORM - 4

[See rules 6(5), 13(8), 16(6) and 20 (2)]

FORM FOR FILING ANNUAL RETURNS

[To be submitted to State Pollution Control Board by 30th day of June of every year for the preceding period **April'2022 to March'2023**

1.Name and address of facility : **Numaligarh Refinery Limited**,
P.O. NRP -785699
Golaghat, Assam.

2. Authorization No. and Date of issue: **NO: WB/OTWA/HW-353/20-21/191/01**
Date: 20th April, 2021(valid for five years)

3. Name of the authorized person and full address with telephone, fax number and e-mail: **Mr. Bimlesh Kumar Gupta, CGM(TS)**
Technical Services Department.
2nd Floor, Administrative Building,
Numaligarh Refinery Limited
PO: NRP 785699, Golaghat, Assam
E mail: bimlesh.gupta@nrl.co.in

4. Production during the year (product wise), wherever applicable: **N/A**

Part A. To be filled by hazardous waste generators

1. Total quantity of waste **generated** category wise: **Year: 2022-23**

Sl.no.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity Generated for the Year 2022-23
1.	Schedule-I, Category-4.1: Oil Sludge or emulsion (Tank Bottom Sludge)	876 MT
2.	Schedule-I, Category- 4.2: Spent Catalyst	Nil
3.	Schedule-I, Category- 4.3: Slop oil (Slop oil of OM&S)	24592 MT
4.	Schedule-I, Category-5.1: Used or Spent Oil (Spent Lube Oil)	12.998 MT
5.	Schedule-I, Category- 33.1: Empty barrels/containers contaminated with hazardous chemicals/wastes	3834 NOS
6.	Schedule -I, Category- 35.1: Exhaust air or gas cleaning residue (CPC dust)	652.14 MT
7.	Schedule-I, Category-35.3: Chemical Sludge from wastewater treatment	32.64 MT
8.	Schedule-I, Category-35.4: Oil and grease skimming (Slop Oil of ETP)	10300 MT

9. Schedule-I, Category- 34.1: Chemical containing Residue arising out of Decontamination:

The residual waste-water generation due to decontamination of chemical drums is directly routed through OWS to ETP. The quantity of the residual waste- water is taken into account along with the total waste-water generation from the refinery which is routed to ETP for treatment.

10. Schedule-I, Category- 34.2: Sludge from treatment of wastewater arising out of cleaning/disposal of barrels/ containers:

The sludge generated from the treatment of waste-water arising out of cleaning/disposal of barrels/containers is taken into account along with the total Chemical and Oily sludge generated from ETP (Refer part A-1, Sl.No.7) since the residual waste water arising out of the decontamination process is directly routed through OWS network to ETP for treatment.

2. Quantity **dispatched**: Year: **2022-23**

Sl.no.	Category of Hazardous Waste as per Schedule I/ Category of other waste as per Schedule-III	Quantity Dispatched for the Year 2022-23	Destination (a. Recyclers, (b. Coprocessing in cement plant (c. Actual User/Utilizer (d. Common TSDF)
1.	Schedule-I, Category- 4.2: Spent Catalyst	445.14632 MT (**)	a. <u>Dispatched to Recyclers</u> Precious Catalyst: • M/S Ravindra Heraeus Pvt. Ltd Non-Precious Catalyst: • M/S Refracast Metallurgical Pvt. Ltd • M/S Arham Industries
2.	Schedule-I, Category- 4.3: Slop oil from process units	5993 MT	a. <u>Dispatched to Recyclers</u> • L.B.S Industries • Fine Refiners Pvt. Ltd • Bankey Bihari Chemicals • Falak Industrials Fuels Pvt. Ltd • Bristol Petroleum Pvt. Ltd • Priya Petro Products • Merlyn Hydrocarbon Pvt. Ltd
3.	Schedule-I, Category-33.1: Empty barrels/containers contaminated with hazardous chemicals/wastes	5400 NOS	• M/S SS Enterprise • M/S Rajib Enterprise

5.	Schedule-I, Category-35.4: Oil and grease skimming (Slop Oil of ETP)	1800 MT	a. <u>Dispatched to Recyclers</u> • L.B.S Industries • Fine Refiners Pvt. Ltd • Bankey Bihari Chemicals • Falak Industrials Fuels Pvt. Ltd • Bristol Petroleum Pvt. Ltd • Priya Petro Products

(**) Based on sales figures after auction for Spent Catalyst which was generated during RTA-2019 and disposal completed on 28.12.2022. Stock declared as per earlier annual return statements was based on manual estimation.

3. Quantity **utilized in-house**, if any): **Year: 2022-23**

Sl.no.	Category of Hazardous Waste Utilized as per Schedule I / Category of other waste as per Schedule-III	Quantity Utilized for the Year 2022-23	Process in which utilized
1.	Schedule-I , Category- 4.3: Slop oil from process units	36593 MT	Reprocessed in CDU/VDU

4. Quantity in **storage** at end of the year (**31.03.2023**):

Sl.no.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity Stored at the beginning of the year 22-23 (Opening Stock)	Quantity Stored at the end of the year 22-23 (Closing Stock)
1.	Schedule-I, Category-4.1: Oil Sludge or emulsion (Tank Bottom Sludge)	1624 MT (**)	2000 MT (***)
2.	Schedule-I, Category- 4.2: Spent Catalyst	447.66632 MT (****)	2.52 MT
3.	Schedule-I, Category- 4.3: Slop oil (Slop oil of OM&S)	79766 MT	61771 MT
4.	Schedule-I, Category-5.1: Used or Spent Oil (Spent Lube Oil)	10.143 MT	23.141 MT
5.	Schedule-I, Category- 33.1: Empty barrels/containers contaminated with hazardous chemicals/wastes	4962 NOS	3396 NOS
6.	Schedule -I, Category- 35.1: Exhaust air or gas cleaning residue (CCU dust)	0 MT	652.14 MT(#)
7.	Schedule-I, Category-35.3: Chemical Sludge from wastewater treatment (Chemical and Oily Sludge from ETP)	NIL	Nil

8.	Schedule-I, Category-35.4: Oil and grease skimming (Slop Oil of ETP)	0 MT	8500 MT

** Opening stock for Tank Bottom Sludge has been revised based on reconciled figures obtained during Sludge survey.
*** Delivery order has been placed for 500 MT of Tank Bottom Oily Sludge to M/s Falak Industrials Fuels Pvt. Ltd on 27.02.2023. The lifting process has not yet started.
**** Opening stock for Spent Catalyst which was generated during RTA-2019 has been revised based on actual sales figures obtained after auction. Stock declared as per earlier annual return statements was based on manual estimation.
(#) Based on actual reconciliation figures as per physical verification on 31.03.2023 for Coke Calcination Unit dust generation.

Part B. To be filled by Treatment, storage and disposal facility operators

(Occupiers disposing Hazardous waste in Captive TSDF such as Secured Landfill Facility (SLF), through Bioremediation and secured landfilling and through captive Incineration)

1. Total quantity received during **2022-23** : **As per Part -A**

2. Quantity in stock at beginning of year **(on 01.04.2022)** :

Sl.no.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity Stored at the beginning of the year 22-23 (Opening Stock)
1.	Schedule-I, Category-4.1: Oil Sludge or emulsion (Tank Bottom Sludge)	1624 MT
2.	Schedule-I, Category-35.3: Chemical Sludge from wastewater treatment (Chemical and Oily Sludge from ETP)	NIL

3. Quantity treated – : **Nil**

4. Quantity disposed in **Landfills** as such and after treatment **(During 2022-23):**

Sl.No.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity Disposed for the Year 2022-23 in Captive Secured landfill
1.	Schedule-I, Category-35.3: Chemical Sludge from wastewater treatment (Chemical and Oily Sludge from ETP)	32.64 MT

5. Quantity incinerated (if applicable) - : **N / A**

6. Quantity processed other than specified above - : **Disposal through Bioremediation**

Sl.no.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity Disposed for the Year 2022-23 through Bioremediation
1.	Schedule-I, Category-4.1: Oil Sludge or emulsion (Tank Bottom Sludge)	500 MT

7. Quantity in **storage** at the end of the year **(on 31.03.2023):**

Sl.no.	Category of Hazardous Waste as per Schedule I / Category of other waste as per Schedule-III	Quantity in storage at the end of the year 2022-23
1.	Schedule-I, Category-4.1: Oil Sludge or emulsion (Tank Bottom Sludge)	2000 MT (#)
2.	Schedule-I, Category-35.3: Chemical Sludge from wastewater treatment (Chemical and Oily Sludge from ETP)	Nil

(#) Delivery order has been placed for 500 MT of Tank Bottom Oily Sludge to M/s Falak Industrials Fuels Pvt. Ltd on 27.02.2023. The lifting process has not yet started.

Part C. To be filled by recyclers or co-processors or other users : N/A

1. Quantity of waste received during the year –

(i) domestic sources

(ii) imported (if applicable)

2. Quantity in stock at the beginning of the year -
3. Quantity recycled or co-processed or used –
4. Quantity of products dispatched (wherever applicable) –
5. Quantity of waste generated -
6. Quantity of waste disposed -
7. Quantity re-exported (wherever applicable)-
8. Quantity in storage at the end of the year –

Date : 14.07.2023
Place : NRL, Golaghat, Assam

Signature of the Occupier or Operator of the disposal facility

आलोक नयन नाथ/ALOK NAYAN NATH
मुख्य प्रबंधक (तकनीकी सेवा)/Chief Manager (Technical service)
नुमालीगढ़ रिफाइनरी लिमिटेड / Numaligarh Refinery Limited
गोलाघाट, असम - 785 699 / Golaghat, Assam - 785 699

Annexure -F : Form-5 – Environmental Statement (22-23)

ANNEXURE- F

नुमालीगढ़ रिफाइनरी लिमिटेड
भारत सरकार का उद्यम
ভাৰত চৰকাৰৰ এক প্ৰতিষ্ঠান

NUMALIGARH REFINERY LIMITED
A GOVERNMENT OF INDIA ENTERPRISE
CIN -U11202AS1993GOI003893

NRL/ENV/PCBA/23-24/06

Dated: 29th September, 2023

To,

The Member Secretary,
Pollution Control Board, Assam
Bamunimaidam,
Guwahati-781021

Sub : Submission of Environmental statement in Form- V for the year 2022-23

Dear Sir,

We are submitting herewith the duly filled in "Environmental Statement" in Form-V for the year 2022-23 for your kind perusal.

Hope, the same shall meet the requirement.

Thanking you.

Yours' faithfully,

(Alok Nayan Nath)
DGM (TS-ENV)

Cc: RO, PCBA, Golaghat

[FORM – V]

(See rule 14)

Environmental Statement of NUMALIGARH REFINERY LIMITED for the FY– 2022-2023

PART – A

(i)	**Name and address of the owner/occupier: of the industry operation or process.**	**Numaligarh Refinery Limited P.O. Numaligarh Refinery Project Golaghat -785699, Assam**
	Co-ordination Office:	**Tolstoy House, 6th Floor 15-17 Tolstoy Marg New Delhi-110001**
	Registered Office :	**122A , G.S.Road Christianbasti Guwahati-781005**
(ii)	**Industry category Primary ----(STC code) Secondary-----(SIC Code)**	**: Primary**
(iii)	**Production capacity (Crude T'put)**	**: 3.0 MMTPA**
(iv)	**Year of establishment**	**: 22nd April ,1993**
(v)	**Date of the last environmental statement submitted**	**: 26th Sept,2022**

PART – B

Water and River Material Consumption

(1) Water consumption m3/d:

Process	**:**	**2956**
Cooling	**:**	**4972**
Domestic	**:**	**3540**

Name of Raw material: Crude Oil

Process water consumption in m3 per MT of raw material *:**

2021-2022	**2022-2023**
0.440	**0.349**

******As all the products are obtained from the same raw material i.e Crude Oil, Process Water Consumption shown above has been indicated as M3 per MT of crude processed.***

ii) Raw Material Consumption: Raw material: Crude Oil

	2021-2022	**2022-2023**
T'put during the year (in MT)	**2624409**	**3091364 (Design Capacity: 3.0 MMTPA)**

PART - C

Pollution discharged to environment/unit of output (Parameter as specified in the consent issued)

a) Treated Effluent Water: 2022-2023

Pollutants	CPCB Standard (mg/l	Concen. of pollutants in discharges(av.) (mg/l)	Quantity of pollutants discharged/loss (kg/yr, exc. pH)	Qnty of pollutants in kg/1000 MT of Crude		Percentage of variation from STD. with reasons
				Actual	Standard	
pH	6-8.5	6.97	-	-		All parameters are within prescribed limit/stds.
OIL & GREASE	5.0	2.51	684.28	0.22	2.00	
BOD3	15.0	9.56	2603.27	0.84	6.00	
COD	125.0	66.73	18167.98	5.88	50.00	
TSS	20.0	15.42	4197.81	1.36	8.00	
Phenol	0.35	0.12	126.32	0.04	0.14	
Sulphides	0.5	<0.1	106.70	0.01	0.20	
CN	0.2	<0.02	27.23	0.002	0.08	
Ammonia as N	15.0	10.67	2904.12	0.94	6.0	
Cr (Hexavalent)	0.1	0.00000	0.00	0.0000	0.04	
Cr (Total)	2.0	0.00267	0.73	0.0002	0.8	
Pb	0.1	0.0000	0.00	0.0000	0.04	
Zn	5.0	0.01808	4.92	0.0016	2.0	
Ni	1.0	0.00475	1.29	0.0004	0.4	
Cu	1.0	0.0045	1.23	0.0004	0.4	
Benzene	0.1	0.033	8.98	0.0029	0.04	
Benzo (a)-Pyrene	0.2	0.04	10.89	0.0035	0.08	
Hg	0.01	0.004	1.09	0.0004	0.004	
V	0.2	0.061	16.61	0.0054	0.8	
TKN	40.0	21.69	5904.43	1.19	16.0	
P	3.0	1.40	380.94	0.1232	1.2	

(b) AIR

Average Sulphur Dioxide emission from the refinery during – 2022-23:

SO2 Emission, Kg/hr	During April, 2022 to Mar,2023
As per NOC of PCB, Assam max. allowable limit is 256 kg/hr as SO2	98.7 kg/hr

2022-23						
AMBIENT AIR QUALITY MONITORING						
STATION	**PARAMETER**	**STD** **NAAQS-2009**	**Unit**	OBSERVATIONS		
				MAX	**MIN**	**AVG.**
REFINERY (WATCH-TOWER NO. 6)	**SO2**	**80 (24 hr avg.)**	µg/m3	**28.6**	**8.20**	**12.2**
	NO2	**80 (24 hr avg.)**	µg/m3	**18.5**	**10.30**	**14.7**
	O3	**100(8 hr avg.)**	µg/m3	**38.0**	**15.40**	**25.8**
	CO	**2(8 hr.avg.)**	mg/m3	**1.0**	**0.60**	**0.8**
	NH3	**400(24 hr.avg.)**	µg/m3	**33.7**	**14.40**	**24.2**
	PM 10	**100(24 hr.avg.)**	µg/m3	**65.2**	**44.40**	**55.1**
	PM 2.5	**60(24 hr.avg.)**	µg/m3	**33.9**	**16.90**	**25.1**
	Benzene	**5.0(Annual)**	µg/m3	**3.4**	**1.10**	**2.3**
	BaP	**1.0(Annual)**	ng/m3	**<0.5**	**<0.5**	**<0.5**
	Pb	**1.0(24 hr.avg.)**	µg/m3	**0.4**	**0.16**	**0.3**
	As	**6.0(Annual)**	ng/m3	**1.00**	**<1**	**<1**
	Ni	**20(Annual)**	ng/m3	**4.0**	**1.20**	**2.5**
ECO-PARK IN NRL TOWNSHIP	**SO2**	**80 (24 hr avg.)**	µg/m3	**14.6**	**8.20**	**11.1**
	NO2	**80 (24 hr avg.)**	µg/m3	**19.9**	**10.80**	**14.8**
	O3	**100(8 hr avg.)**	µg/m3	**41.4**	**14.00**	**25.0**
	CO	**2(8 hr.avg.)**	mg/m3	**1.1**	**0.55**	**0.8**
	NH3	**400(24 hr.avg.)**	µg/m3	**33.6**	**13.50**	**23.2**
	PM 10	**100(24 hr.avg.)**	µg/m3	**69.5**	**40.40**	**52.5**
	PM 2.5	**60(24 hr.avg.)**	µg/m3	**33.4**	**15.60**	**23.4**
	Benzene	**5.0(Annual)**	µg/m3	**3.4**	**1.00**	**2.1**

	BaP	**1.0(Annual)**	ng/m3	**<0.5**	**<0.5**	**<0.5**
	Pb	**1.0(24 hr.avg.)**	µg/m3	**0.4**	**0.14**	**0.3**
	As	**6.0(.0Annual)**	ng/m3	**1.0**	**1.00**	**1.0**
	Ni	**20(Annual)**	ng/m3	**4.1**	**1.10**	**2.6**
RAW WATER INTAKE	**SO2**	**80 (24 hr avg.)**	µg/m3	**13.0**	**7.40**	**10.2**
	NO2	**80 (24 hr avg.)**	µg/m3	**18.1**	**9.70**	**13.5**
	O3	**100(8 hr avg.)**	µg/m3	**33.4**	**13.10**	**23.2**
	CO	**2(8 hr.avg.)**	mg/m3	**0.9**	**0.52**	**0.8**
	NH3	**400(24 hr.avg.)**	µg/m3	**32.2**	**14.70**	**21.9**
	PM 10	**100(24 hr.avg.)**	µg/m3	**61.6**	**38.00**	**48.8**
	PM 2.5	**60(24 hr.avg.)**	µg/m3	**33.4**	**13.50**	**21.7**
	Benzene	**5.0(Annual)**	µg/m3	**3.1**	**1.00**	**2.0**
	BaP	**1.0(Annual)**	ng/m3	**<0.5**	**<0.5**	**<0.5**
	Pb	**1.0(24 hr.avg.)**	µg/m3	**0.4**	**0.14**	**0.3**
	As	**6.0(Annual)**	ng/m3	**1.00**	**<1**	**<1**
	Ni	**20(Annual)**	ng/m3	**3.4**	**1.10**	**2.2**
NH-39 BYPASS	**SO2**	**80 (24 hr avg.)**	µg/m3	**17.2**	**9.90**	**13.1**
	NO2	**80 (24 hr avg.)**	µg/m3	**22.0**	**12.60**	**17.3**
	O3	**100(8 hr avg.)**	µg/m3	**42.1**	**16.60**	**30.0**
	CO	**2(8 hr.avg.)**	mg/m3	**1.2**	**0.68**	**0.9**
	NH3	**400(24 hr.avg.)**	µg/m3	**39.4**	**16.50**	**28.5**

	PM 10	**100(24 hr.avg.)**	µg/m3	**73.7**	**50.10**	**62.6**
	PM 2.5	**60(24 hr.avg.)**	µg/m3	**39.1**	**18.70**	**46.2**
	Benzene	**5.0(Annual)**	µg/m3	**4.2**	**1.40**	**2.5**
	BaP	**1.0(Annual)**	ng/m3	**<0.5**	**<0.5**	**<0.5**
	Pb	**1.0(24 hr.avg.)**	µg/m3	**0.5**	**0.17**	**0.3**
	As	**6.0(Annual)**	ng/m3	**1.00**	**<1.0**	**<1.0**
	Ni	**20(Annual)**	ng/m3	**4.6**	**1.40**	**3.1**
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	**SO2**	**80 (24 hr avg.)**	µg/m3	**11.9**	**6.60**	**9.5**
	NO2	**80 (24 hr avg.)**	µg/m3	**16.2**	**8.60**	**12.8**
	O3	**100(8 hr avg.)**	µg/m3	**32.3**	**12.60**	**21.9**
	CO	**2(8 hr.avg.)**	mg/m3	**0.9**	**0.53**	**0.7**
	NH3	**400(24 hr.avg.)**	µg/m3	**29.0**	**12.10**	**20.6**
	PM 10	**100(24 hr.avg.)**	µg/m3	**54.4**	**36.20**	**46.1**
	PM 2.5	**60(24 hr.avg.)**	µg/m3	**28.2**	**12.20**	**20.6**
	Benzene	**5.0(Annual)**	µg/m3	**2.9**	**0.90**	**2.0**
	BaP	**1.0(Annual)**	ng/m3	**<0.5**	**<0.5**	**<0.5**
	Pb	**1.0(24 hr.avg.)**	µg/m3	**0.4**	**0.13**	**0.2**
	As	**6.0(Annual)**	ng/m3	**1.00**	**<1**	**<1**
	Ni	**20(Annual)**	ng/m3	**3.3**	**1.20**	**2.3**

All the parameters are found to be within limit

PART – D

Hazardous Wastes

(As specified under Hazardous Waste Management and Handling Rules, 1989 as amended up to date)

Hazardous Wastes(Generated/disposed)	Total Quantity (In MT)	
	During the previous Financial Year (2021-22)	During the current Financial year (2022-2023)
a) From Process		
i) Spent Catalyst (Schedule-1, Category-4.2)	Generation: NIL Stock as on 31.03.22: 447.6632MT (*)	Generation: Nil Disposed: 445.1436 MT (sold to recycler) Stock as on 31.03.23: 2.52MT
ii) Spent Adsorbents	Generation: Nil	Generation: Nil
iii) Tank Bottom (oily Sludge/waste) (Schedule -1, Category -4.1)	Generation: 620 MT Closing stock as on 31.03.22: 1624 MT(**)	Generation: 876 MT Disposed: 500 MT (via bioremediation) Stock as on 31.03.23: 2000 MT, kept in sealed drum for disposal (***)
iv) Slop Oil from Process Units (Schedule-1, Category-4.3)	Generated: 55528 MT Disposed: 9994 MT (sold to recycler) Processed in CDU/VDU:31090 MT Stock as on 31.03.22: 79766 MT	Generated: 24592 MT Disposed: 5993 MT (sold to recycler) Processed in CDU/VDU: 36593 MT Stock as on 31.03.23: 61771 MT
v) Spent lube oil (Schedule-1, Category-5.1)	Generation: 1.026 MT Stock as on 31.03.22: 10.143 MT	Generation: 12.998 MT Stock as on 31.03.23: 23.141 MT
vi) Schedule-I, Category-33.1: Empty barrels/containers contaminated with hazardous chemicals/wastes	Generation: Nil Stock as on 31.03.22: 4962 Nos	Generation: 3834 Nos Sold :5400 Nos Stock as on 31.03.23: 3396 Nos
b) From Pollution Control Facilities		
i) Chemical & Oily Sludge (Schedule -1, Category -35.3)	Generated:28 MT (disposed off in the SLF)	Generated:32.64 MT (disposed off in the SLF)

ii) Slop Oil from ETP operations (Schedule I, Category 35.4)	Stock as on 31.03.22 : Nil	Generation : 10300 MT Disposed : 1800 MT (sold to recylcers) Stock as on 31.03.2023 : 8500 MT
iii) Exhaust air or gas cleaning residue (CCU dust) (Schedule I, Category 35.1)	Generation: Nil Stock as on 31.03.22: Nil	Generation: 652.14 MT (#) Stock as on 31.03.23: 652.14 MT (#)

* Based on sales figures after auction for Spent Catalyst which was generated during RTA-2019 and disposal completed on 28.12.2022. Stock declared as per earlier statements was based on manual estimation.

** Closing stock for Tank Bottom Sludge for 2021-22 has been revised based on reconciled figures obtained during Sludge Survey.
*** Delivery order has been placed for 500 MT of Tank Bottom Oily Sludge to M/s Falak lndustrials Fuels Pvt. Ltd on 27.02.2023. The lifting process has not yet started.

(#) Based on actual reconciliation figures as per physical verification on 31.03.2023 for Coke Calcination Unit (CCU) dust generation.

Part – E

Solid Wastes

Solid Wastes generated /disposed	Total Quantity (in m3)	
	During the previous financial Year (2021-22)	During the current financial year (2022-23)
(a) From Process Generation of Incinerable substances -	3500 m3	4365 m3
(b) From pollution control facilities Generation at ETP Bio sludge -	385 MT	299.86 MT
(C) (1) Quantity recycled or reutilized within the unit	Nil	Nil
(2) Sold	Nil	Nil
(3) Disposal -		

Incinerable substances -	**Entire quantity disposed through incineration**	**Entire quantity disposed through incineration**
Bio sludge -	**Entire Quantity disposed off into SLF**	**Entire Quantity disposed off into SLF**

Part – F

Please specify the characteristics (in terms of concentration and quantum) of hazardous as well as solid waste and indicate disposal practice adopted for both these categories of wastes.

A typical laboratory analysis report of the Chemical & Oily Sludge is given hereunder:

NRL

NUMALIGARH REFINERY LIMITED
(Quality Control Department)

Analysis of Chemical and Oily sludge sample

Date	SAMPLE SOURCE	PARAMETERS	RESULTS %,wt
21-12-2022 10:00 hrs	ETP (Chemical & Oily sludge)	Moisture Content	78.0
		Oil Content	3.9
		Organic & Volatile Matter	14.23
		Iron	0.15
		Sodium	0.084
		Sulphide	0.026
		Phenol	0.004
		SiO2	0.005
		Chloride	3.10
		Calcium	0.092
		Magnesium	0.040
		Manganese	0.003
		Nickel	0.0012
		Sulphate	0.36
		Zinc	0.006
		Lead	0.0003
		Copper	0.0005
		Cobalt	0.0003

Analysed By: Mr. Prabhash Kumar Thakur

Barhai

Certified by: Dr. Bedobrat Barhai
Officer (Quality Control)
Numaligarh Refinery Limited
Golaghat , Assam
Pin:785699

बेदब्रत बढ़ई/BEDOBRAT BARHAI
अधिकारी (गुणवत्ता नियंत्रण)/Officer(Quality Control)
नुमालीगढ़ रिफाइनरी लिमिटेड / Numaligarh Refinery Limited
गोलाघाट, असम - 785 699 / Golaghat, Assam - 785 699

Disposal practice adopted for both categories of wastes:

A proper solid waste management procedure is in place at Numaligarh Refinery to deal with storage / disposal of the solid wastes (hazardous /non-hazardous) generated due to operation of refinery. As a part of the operation of the refinery, some amount of solid wastes are generated - to manage and to deal with the same, an environment friendly & proper solid waste management system has been prepared and as per the laid down procedure hazardous /non-hazardous solid waste are handled. Considering the activities related to waste management, NRL Management has delineated a solid waste management plan with the following objectives:

1. To protect human health and natural environment from the hazards posed by waste disposal.
2. To conserve energy and natural resources through waste recycling and recovery.
3. To reduce /eliminate, as far as possible, the generation of solid wastes including hazardous wastes.
4. To ensure proper management of solid wastes which protect the human health and the environment.

In-built measures had been adopted to minimize, control pollution and generation of waste in all the units with proper collection and disposal system. Adequate segregation, collection and treatment facilities for wastewater for centralized treatment has been provided to meet the stringent standards laid down in the latest MoEF Notification. An environmentally compatible management system for disposal of the ETP hazardous wastes i.e. Chemical & Oily sludge through Secure Land Fill has been developed inside the refinery premises. Types of Hazardous solid waste like – Chemical & Oily sludge which is generated at different sections of Effluent Treatment Plant (ETP) are collected in a sludge thickener through sludge collection system. Floating oil with water from the thickener, is recycled back to the Inlet Receiving Sump (IRS) of ETP for further processing and oil recovery. The thickened sludge from the bottom of the thickener is taken to the centrifuge feed sump for feeding to the specifically designed Chemical & Oily centrifuge for recovering the absorbed oil from it. By using the highly efficient centrifuge, almost total oil is recovered from the sludge and is recycled back to the slop oil system for reprocessing. The oil free cake from the centrifuge was disposed off in the Secured Land Fill (SLF). A Secured Land Fill with a capacity of 6000m3 has been constructed inside the Refinery Premises. Tank bottom sludge generally sold to CPCB/PCBA recognized Vendor, if not possible to sell, the same is disposed off through Bio-remediation in a more scientific and efficient manner in the Refinery premises itself. To cater the requirement, two number Bioremediation facilities are available for bioremediation of Crude Tank cleaning sludge.

Spent catalysts are generally generated after a gap of 3/4 years when the catalyst is required to be replaced in the various units of Refinery. After generation, the spent catalyst is kept in sealed drums at demarcated place for onward selling to CPCB/SPCB approved vendors with due intimation to PCBA and following the stipulated guidelines/procedures. Spent catalyst are sold to CPCB/SPCB recognized Vendors by following proper guidelines with intimation to SPCB.

Non –hazardous solid waste generated in the Refinery are mainly - incinerable waste, non-incinerable but reusable waste and bio -degradable waste etc. After collecting the wastes from the various sources viz. - process area, various units, admin office and other locations, wastes are segregated and kept in demarcated locations in the Solid waste disposal yard. Non-hazardous solid Waste like- paper, hard boards, packing materials/papers and cartons are incinerated through incineration process and non-hazardous bio- degradable wastes are disposed off by burying at isolated low laying areas within the refinery premises itself.

Part –G

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production:

NRL has determined the sources of pollution in various activities focusing on pollution load. Company's management is very careful and proactive regarding the environmental impacts of the new initiatives and products. NRL is conducting the Environmental Impact Assessment study of every project to understand the implications of setting up any new project or unit. Significant contribution made by NRL on the specific contribution on innovative clean technology, sustainability, broader user or target groups on the following fields:

a) Environment friendly technology adopted for highly polluting industries.
b) Innovativeness/creativity of clean technology.
c) Any significant contribution towards the manufacture of environmentally friendly products.
d) Abatement including reduction reuse, recycling or any beneficial use of waste generated.
e) Substantial and steady reduction in the effluents and emission in the year.

f) Success in defining environmental pollution needs meeting pollution prevention goals and overall improvements to the quality of air, water and land.

g) Reduction of risk to the community living in the vicinity of units handling hazardous chemicals.

h) Sustainability of the developed environment friendly technology from financial, social and ecological aspects.

As the higher fuel consumption directly contributes to the higher emission of the greenhouse gases affecting natural ecological processes, so energy conservation efforts have received continuous focus at NRL since conceptualization of the refinery by applying optimum consumption of fuel in furnaces thereby reducing the rate of emission of Green House Gas. It has adopted state of the art energy efficient technology, high efficiency furnaces with glass air pre-heaters, plate type exchangers, installation of captive co-generation power plant using heat recovery system, maximization of waste heat recovery, installation and operation of power recovery turbine in the hydrocracker and other units etc.

NRL has adopted very advanced and comprehensive steps towards controlling pollution. From the very onset, the selection process of technologies and equipment was done with special care for environmental protection.

Additionally, all the furnaces are provided with ultra-low NOx burners. Low noise rotary equipment were considered during the time of equipment selection.

Minimum Generation of waste:

In-built measures had been adopted to minimize and control of pollution and generation of waste in all the units with proper collection and disposal system.

Adequate segregation and centralized treatment facilities:

Adequate segregation, collection and treatment facilities for wastewater for centralized treatment has been provided to meet the stringent standards laid down in MoEF notification, 2008.

Details regarding the some of the pollution abatement measures of NRL are as follows:

1. Effluent Treatment Plant with latest technology

A centralized modern Effluent Treatment Plant having tertiary treatment facilities has been installed. Also, the ETP includes a three-stage oil recovery system from the wastewater and high efficiency centrifuge for recovering oil from the oily sludge. To avoid hazardous solid waste generation, more environmentally friendly hydrogen peroxide treatment process has been introduced. Discharge of Treated Effluent from ETP via dedicated pipeline has been discontinued since October 2000 and discharge of effluents from Sewage Treatment Plant has been discontinued since April 2007. The treated effluent from Township is diverted to our ETP inside the Refinery by implementing suitable modifications in the disposal line in ETP, where the treated water from township STP is received at aeration tank. The outlet at Numaligarh Jetty in river Dhansiri has blinded and the discharge from township STP also has been routed to ETP through the same line. About 60- 70% treated effluent is being reused/recycled in miscellaneous refinery activities and as Fire water makeup and rest quantity is system/operational losses in ETP due to various constraints. As a part of ETP modernization VOC recovery system has been implemented.

2. Green Belt Development

An ambitious plan of green belt development has been adopted around the refinery to serve as a barrier for air pollutants and noise. A 100m wide green belt around the refinery and 25 m wide around the marketing terminal covering 56 Ha of land has been developed and thereby rendering a perfectly natural barrier to the industrial noise, minor air pollutants from reaching the immediate surroundings, both human population, rich flora & fauna and also help in mitigating the effects of fugitive emission in all around Refinery. There are green covers of tea gardens (tea bushes and shed trees) in northern and southern boundary of refinery with approx. 260 hectares, contiguous to refinery Green Belt. Township situated at a distance of about 5 KM from the refinery is spread in 250 acres area. Although the township is full of natural green vegetation, large nos. of trees has been planted on both sides of roads and other parts in the township. Initially plantation of around 1,25,000 nos of saplings of various species were carried in the Green Belt around Refinery and 20,000 nos in the Green Belt around NRMT. Massive plantation are being carried out every year in the Green Belt to increase the density of trees. Around 55900 saplings have been planted in the Green Belt area during 2000-2018. Plantation activities inside the Refinery as well as outside the refinery have been carried out in a phased manner considering weather conditions. The meticulously planned and developed green

belt all around the refinery has now grown into a rich foliage, rendering a perfectly natural barrier to the industrial noise and minor air pollutants from reaching the immediate surroundings, both human population and the rich flora and fauna. NRL is aggressively pursuing tree plantation in the refinery area with plantation of around 7000 saplings during 2018-2021. Plantation drives in nearby areas of the refinery are taken from time to time under various scheme & programmes.

NRL has taken up two major flagship initiatives for plantation under Afforestation drive in degraded areas. An MoU was signed on 14.09.2020 between NRL and Golaghat Social Forestry Division, Government of Assam, for plantation of 1 lakh tree saplings (equivalent to 2200 Ton of CO2 absorption per annum), towards compensatory afforestation of 40 Hectares of degraded land in Nak-Kati Chapori under Khumtai Revenue Circle of Golaghat.
In a significant development for plantation of approx. 68000 tree saplings (equivalent to 149 Ton of CO2 absorption per annum), an MoU was signed on 23rd August 2021 between NRL and Nagaon Forest Division, Govt. of Assam for compensatory afforestation of 35 Hectare land in Kondoli PRF under Nagaon Forest Division with a total budget of ₹1.97 Crore.

Keeping environment as a prime concern, NRL has envisaged an ambitious experimental project for the first time in the country. This unique project called “Butterfly Eco System” located in the Refinery Township is an effort to give a natural habitat for butterflies to come, stay and breed in their natural way. Also a unique herbal garden of rare medicinal plants called “Smritibon” has been developed in the township.

In addition, plantation of various saplings have also been carried out on a wide scale all along the road sides in the Township & in the butterfly valley. More than 84% green cover maintained in Township.

3. Unique Ground Flare System

To avoid any adverse impact of the flare on wild animals in the Kaziranga National Park, non-illuminating ground flare has been incorporated which is first of its kind in the country.

4. Sulfur Recovery Plant

Assam crude is sweet crude (only 0.26 % Sulfur content), in spite of processing low sulfur Assam crude, a Sulfur Recovery Unit (SRU) has been installed to remove sulphur from sour water and sour gas generated during the refining process. Subsequently its capacity has

been enhanced from 14.6 Tonnes Per Day to 19.3 Tonnes Per Day in the year 2010 commensurate with the Diesel Quality Upgradation Project.

Implementation of a new train of Sulphur Recovery Unit (SRU) has been taken up for parallel execution to meet future environmental requirement and along with the implementation of Tail Gas Treating Unit (TGTU) with an objective to improve the sulphur recovery efficiency from the existing 96% to 99.9%. This will further reduce SO2 emission from the incinerator of SRU.

5. High Stack Height & Strict Emissions Monitoring

To reduce the ground level concentration of pollutants, height of stacks at different plants in the refinery is kept at 60 meters. Further, the height of stack at Coke Calcination Unit is kept at 77 meters. Facilities for continuous monitoring of SOx, NOx, PM, CO have been provided for all the furnace stacks and low NOx burners have been used in all the furnaces. Real time online emission data have been transmitting to CPCB sever continuously with remote alert facility. Connectivity of real time data to SPCB server has also been completed this year.

As a result of best practices, SO2 emission from the refinery is 98.7 kg/hr for FY-22-23 as against the allowable limit of 256 kg/hr.

6. Use of low sulfur fuel for the Refinery furnace

Only the sweet fuel gas, after removing sulfur in the Amine Treatment Unit, is used in the refinery furnaces.

7. Solid Waste Management

Chemical and Oily sludge generated at different sections of Effluent Treatment plant are centrifuged in the highly efficient Centrifuge to further remove the oil content. After centrifuge, the oil free cake is kept in sealed drums which are then disposed off in the Secured Land Fill. The Secured Land Fill has been divided into various cells separated by soil mounts for easy handling and operation. The waste is disposed off at these cells and compacted. The compacted waste is then covered by 15 cm soil layer after every day's operation which minimizes the chance of fire hazard, water percolation and odour problem.

NRL has taken up a lot of advance & innovative initiatives in the management of Hazardous Waste Treatment and Disposal Facilities. Cleaning of Tank bottom oily sludge has been done by adopting modern tank cleaning methods using Tricanter centrifuge system for maximum recovery of hydrocarbon and reduced sludge generation.

8. Spent Catalyst & Tank Boom Sludge

Spent catalysts are generated after a gap of 3/4 years when the catalyst is replaced in the various units of Refinery. After generation, the spent catalyst is kept in demarcated place in sealed drums and then the same is sold to CPCB approved vendors with due intimation to PCBA and following the stipulated guidelines. Tank bottom sludge are generally generated after a gap of 10/15 years when the Tanks, particularly Crude Tanks are cleaned. Whatever sludge is generated due to cleaning of the tanks, the accumulated sludge is either sold to CPCB/SPCB recognized recycler or bio-remediated inside Refinery premises itself. Bioremediation of 500 MT tank bottom sludge is under progress. Auction of additional 500 MT of sludge completed and delivery order for the same as been placed to recycler. Approx. 445 MT spent catalyst generated during Refinery Turn Around (RTA-2019) was sold to CPCB approved recyclers by Dec'22.

9. Implementation of Hydrogen Peroxide Treatment

In pursuance of latest development, H2O2 treatment process has been introduced for the chemical treatment of wastewater in the ETP by replacing the conventional FeCl3 process. Introduction of this technique has reduced the solid waste generation drastically.

10. Installation of oil traps in the Storm Water drains

Several numbers of oil traps have been installed and hay filters, oil absorbent booms are placed in the refinery storm water system as a preventive measure to eliminate any possibility of oil being carried over to the outside environment. Storm water recycle project is being implemented for reuse.

11. Estimation of Carbon Foot Print and Green House Gas Emission

NRL is focusing on energy efficiency, building carbon sink to minimize Green House Gas (GHG) emission. NRL continues to monitor its GHG inventory and get it validated through accredited agency. Company engaged TUV India Private Limited to conduct the independent assurance of Refinery's GHG emission, which includes "limited level of assurance" of NRL direct

and other indirect (Scope 1 and 3, there are no Scope 2 emissions presently) GHG emission. This assurance engagement has been conducted against the methodology & standards of API compendium 2021, ISO 14064, GHG protocol ISAE 3000 (revised), and ISAE 3410 (GHGs) for verification process under the operational control approach. GHG emission stands at 0.740 and 0.840 Million ton CO2 equivalent during FY 2021-22 & 2022-23 respectively.

12. CDM Projects

NRL installed a 12.0 MW Steam Turbine Generator (STG) to utilize and recover waste (thermal/pressure) energy of HP steam. This project has been registered as a CDM Project and NRL has earned Carbon Emission Reductions (CERs) from UNFCCC.

13. Fuel switch over

NRL has entered into a JV with Oil India Ltd (OIL) and Assam Gas Company Ltd (AGCL) to form Duliajan Numaligarh Pipeline (DNPL) who laid 192 KM pipeline from Duliajan to Numaligarh to supply Natural Gas (NG) which is currently used at Captive Power Plant (CPP) and Hydrogen Unit of NRL in lieu of Naphtha. This has resulted in reduction of carbon emission.

PART – H

Additional measures/investment proposal for environmental protection including abatement of pollution, prevention of pollution:

1. Secured Land Fill

As per CPCB recommendations with latest technic / scientific design, a Secured Land Fill of capacity of around 6000 m3 is in operation in the Refinery premises to cater the needs for disposal of Chemical & Oil Sludge.

2. Bioremediation facility

Two nos. of Bioremediation facilities are available in the refinery for bioremediation of tank bottom oily sludge.

3. Decanter System

A three phase decanter system has been commissioned for efficient slop management of the Refinery. About 50-70 KL of slop can be processed per day and the resultant processed slop can be directly transferred to CDU unit for re-processing along with crude.

4. Installation of double mechanical seals in IFRT (Internal Floating Roof Tanks) and EFRT (External Floating Roof Tanks) In line with MoEF notification, 2008, relating to Oil Refinery Industry, setting of double mechanical seals in all the IFRT and EFRT tanks have been completed.

5. Transmission of online real time data

Transmission of online real time data with remote alert facility for SO2, NOx, CO, PM and Ambient Air quality to CPCB and SPCB Server has been implemented. As per directions of CPCB, online transmission of Treated effluent data for four parameters of i.e. pH, TSS, BOD, COD and flow have been implemented.

6. Installation of additional CAAQMS

As per recommendation of MoEF and CPCB – installation of another Continuous Ambient Air Quality Monitoring Station (CAAQMS) at downwind direction has been completed and commissioned. Another CAAQMS is being planned to be installed as a part of NREP activities.

7. Dust mitigation activities

3 nos. of Mist Cannons are being utilized at project/construction sites as per requirement for control of dust pollution. Water sprinkling using tankers along major haul roads is also being carried out.

8. Flare Gas Recovery System

Numaligarh Refinery was originally designed with a twin flare system i.e., the ground flare and the elevated flare to avoid any adverse impact of the illumination of flare on animals and migratory birds in the surrounding wildlife sanctuaries and protected forest including Kaziranga National Park. In normal operation, the ground flare is in line and only pilot burner is lit up in the elevated flare. The elevated flare caters to the load during plant

emergencies when flare load is very high or during maintenance of the ground flare system.

As a measure for the further protection of environment & conservation of energy, Flare Gas Recovery System has been implemented to recover and reuse the excess gas going to the flare.

Flare Gas Recovery System (FGRS) supplied by M/s Garo SPA, Italy was successfully commissioned in the year 2018-19. Implementation of the Flare Gas Recovery System has not only reduced specific energy consumption of the refinery but has also reduced Greenhouse gas emission.

9. Despatch of Ethanol Blended Motor Spirit

NRL has commenced despatch of Ethanol blended Motor Spirit (EBMS) from its Marketing Terminal in Numaligarh for supply to Retail Outlets located in North-East India. The first tank truck loaded with EBMS was despatched on 03-03-2022 from Numaligarh Refinery Marketing Terminal to be sold through BPCL Retail Outlet. This augurs well with the Govt of India's target to achieve 20% blending of Ethanol with MS (Petrol) by 2025.

India imports 85% of its crude oil requirement. Ethanol, produced domestically, blending in Motor Spirit (Petrol) assumes significance at a time when the Govt. of India is focussed on reducing import dependence, thereby saving on foreign exchange while promoting green energy. Also, ethanol is a less polluting fuel, and offers equivalent efficiency at a lower cost as compared to MS (Petrol).

NRL has recently commissioned 2 above ground tanks of capacity 860 KL each, through its subsidiary ABRPL, along with modification of existing truck loading gantry facilities to enable online blending of Ethanol in required proportion before it is dispatched to its customers. NRL's joint venture company, M/s Assam Bio Refinery Pvt. Ltd. which is executing the first 2G bio refinery with bamboo mass as feedstock and bioethanol as one of the products is all set to be commissioned in the latter part of this year, which will substantially cater to the ethanol requirement in the North East region and beyond.

10. Maximum product evacuation through pipeline

About 80% of the product evacuation takes place via NSPL (Numaligarh Siliguri Pipeline) thereby contributing as an initiative towards reducing vehicular traffic for product despatch.

PART – I

Any other particulars for improving the quality of the environment:

As a part of continuous efforts towards reduction of emissions, Numaligarh Refinery produces ultra –low sulphur High Speed Diesel and motor spirit having less than 0.001% (10ppm) sulphur conforming to the Euro-VI Specifications. This contributes in reducing pollution from diesel and petrol vehicle due to the reduction in emission of Sulphur di-oxide in the atmosphere.

Numaligarh Refinery Limited (NRL) has upgraded its refinery for production of BS-VI HSD to meet product quality requirement as per Auto Fuel Policy of the Government of India by implementation of the Diesel Hydro Treater Project (DHDT), which was commissioned during January, 2018. NRL has also increased the capacity of its MS plant by 50% in 2019 and entire quantity of MS produced meet BS VI standards.

As an advance step towards environment protection, NRL has installed four mounded Bullets which are more environment friendly and safe for the storage of LPG replacing the existing LPG spheres.

Energy conservation measures:

NRL prioritizes maintaining energy conservation and enhancing its energy efficiency. Refinery closely monitors the key energy performance indicators viz Specific Energy Consumption and Energy Intensity Index (EII) out of several operational parameters. Unit performance is gauged on a continual basis and efforts are on to introduce best in class technology and global energy efficiency best practices. The SEC at 61.6 MBN and EII 82.7% against target of 61.9 MBN and 84 % respectively are well within the firm target set by MoPNG.

Numaligarh Refinery has a portfolio of 1.05 MW of Solar photovoltaic capacity, which is 0.4% of the total captive power generation. The total generation from the project is 983 MWh in 2022-23 which translates to reduction of global warming potential at 10 lac lbs CO_2.

NRL continues to pursue the opportunity for further electricity production through solar resources in extended area.

The EnCON measures resulted in fruition of 4470 SRFT, equivalent to 0.15 lac ton CO_2 during 22-23.

The details relating to energy conservation measures is as below:

Sl. No.	ENCON measures - 2022-23	SRFT saving
1	Condensate Recovery System commissioned in Hydrocracker Unit	150
2	Heat Integration of CDUVDU exchanger EE-51 A/B with DCU 03-EE-01A saving 0.5mmkcal/h	500
3	Efficient utilization of enrich O2 stream of both N2 plants to improve performance in SRU	720
4	HCU Feed Pre-heater steam reduced substantially	900
5	Steam trap performance rate at >98% in working condition	2200
	Total	**4470**

Sl. No.	Energy efficiency Improvement measures taken up during RTA'23
1	Breech-lock exchanger cleaning in HCU; Hydro-jetting of all preheat train exchangers of CDUVDU, DCU, MSP, DHT, Wax unit; internal and external tube body cleaning of fin-fan coolers/EEs
2	Regeneration of CRU catalyst; partial catalyst loading in HCU & SRU
3	Cleaning of APH of Reformer HGU EE-204 A/B; EE-215; Tube & tube sheet replacement of WHB EE-206
4	STG main surface condenser cleaning to improve vacuum
5	Installation of high precision ultrasonic mass flowmeter for Fuel NG in GTG-1 & GTG-2
6	Closed Gas sampling points in all process units
7	DHDT Internal Fuel gas hook-up directly to its furnace for operational ease
8	Stop steam loss due to frequent steam trap passing with Installation of control valve at condensate pot outlet of reheater-2&3 in SRU-I.

S.l.	Encon schemes in 2021-22	SRFT
1	Boiler blowdown recovery system commissioning in Hydrocracker Unit	65
2	Reduction in external fuel NG in Hydrogen generation unit and increasing internal off-gas in reformer by optimising steam carbon ratio at 2.45 instead of earlier 2.5 since later Oct'21	450
3	CDU Preheat temperature in heater increased at 288^0 C consistently after opportunity shutdown in Dec'21	1920
4	Plate type Diesel Product cooler installed in Hydrocracker Unit	2500
5	Waste Heat Recovery Boiler in Sulphur Recovery Unit for steam generation(@1.5Tph) after installation of NOx reduction furnace	900
6	Steam trap performance rate at 98% in working condition	950
7	Reduction in flue gas loss from Utility Boiler	274
8	Improving performance of condenser of steam turbine	110
9	Optimize Boiler Feed Water System of CCU WHRB Boiler	96
10	Bag filter and duct leakage in WHRB of CCU attended	135
	Total	7400

Energy conservation measures planned beyond FY-22-23:

1. Online Digital Twin Model development for CDU/VDU and integration with column model
2. Online predictive analysis tools with AI & ML to detect loss from steam traps, ultrasonic PSV, IP21 wireless sensors;
3. Condensate recovery scheme in balance units;
4. Replacement with energy efficient motor and pump in process units;

Other schemes adding to continual benefit:

1. Steam traps dynamic analysis and monitoring.
2. Regular monitoring of Hydrocarbon passing of all valves connected with flare system by Acoustic Leak Detector and Fugitive emissions from tanks, line flanges etc, throughout the year under LDAR program.
3. Continuous operation of APC in CDU, DCU, HCU and H2U.
4. Conventional light replacement with Energy efficient light
5. Steady operation of 12 MW STG for Captive Power generation by utilizing and recovering waste energy (thermal and pressure) of HP steam, Maximization of NG use for continual improvement in the energy consumption, Increased Reliability with installation of Prognostic Online monitoring system for Off-Gas and Make-up Gas Compressor of HCU. There has been increase in productivity, safety and reduction of unplanned outages & maintenance cost, Replacement of higher heat duty exchanger EE-01 in HCU, etc.

ENCON schemes implemented during 2015-16:

1. CDU/VDU column internal modification for yield/energy optimization.
2. Installation of plate type heat exchanger (air pre-heater) in HGU flue gas duct.
3. Replacement of catalyst in RB-02 of Isomerization Unit.
4. Replacement of old trays with High Capacity Tray in HCU fractionators' kero zone.
5. Emissivity coating for controlled thermal radiative and convective heat transfer from the Furnace surface and tubes of Process units.
6. Up-rating of GTG-1 for augmentation of capacity (4-5MW).
7. Replacement of metallic blades with E-FRP blades in all the air fin fan coolers of the Process Units
8. Installation of Ultrasonic Activator in CDU/VDU in upstream of crude booster pump
9. Use of FO additive program post successful trial run with resulted fuel savings.
10. Modification in DCU by diversion of Slop as Quench instead of SRGO as quench. This has enabled reduction in slop generation.
11. HP steam header pressure reduction from 41kg/cm2 to 39.0 kg/cm2 resulting in savings of fuel.
12. Energy management system implementation in Electrical metering system. Online energy consumption is now available in desktop in micro level for any critical equipment.
13. Diversion of the Stabilizer off gas ex -CDU to DCU off -gas compressor to recover the LPG component from fuel gas.

ENCON schemes implemented during 2016-17:

1. Maximizing reformate production with reduced energy by internal modification and increase in Isom plant load by conversion of available redundant equipment as DIH bottom pump. This has resulted in saving of around 1.5TPH LP steam and realization of 38KWs of power.
2. Hook up of Hot VGO line with cold VGO line to maximize hot feed in HCU.
3. Incorporating heater bank coil for NG heater 34-HE-121 -01/02 up to 43 degC thereby stopping MP steam in NG heater.
4. Uprating of Gas Turbine by 4-5 MW has helped in single GT operation even with increase load of new units.
5. CDU VDU column internal replacement with structured packing has resulted in improved vacuum, less COT by 5 degC with same distillation yield profile. This has reduced energy consumption significantly
6. Chemical cleaning/foam cleaning of exchangers/columns/CR loops done which resulted in increase in preheat temp
7. Burner alignment checking done for all major furnaces for efficiency improvement
8. Significant saving potential in electrical energy has been identified through system drive audit carried out for all motors and pumps through PCRA (Petroleum Conservation Research Association)

ENCON schemes implemented during 2017-18:

1. Stoppage of Turbine driven Fuel oil pump and switched to motor. Saving of 3.5TPH MP steam in lieu of 45KW motor.Net saving is 1200 MTOE.
2. Reduction of reboiler steam in MSP-DIH with operational change. Net steam saving leading to saving of 300MTOE.
3. 10 KW rooftop Solar PV panel installed at the NRMT admin Bldg and Control room.
4. Achieved zero steam leak by attending leaky steam traps and i/l valve.
5. Stoppage of steam tracing in SDU feed line and the tank heating steam coils of Solvent de-oiling unit. Stoppage.
6. Trial installation of E-glass fiber insulation in DCU transfers line. Shell outside temp dropped by 15- 20degC.
7. Air Compressor 3rd stopped (400KW) with close monitoring, Isolating the plant air at battery limit.
8. Reuse of Storm water as CT make up at 300m3/h
9. PATII mandatory Energy audit by PCRA and Energy efficiency Improvement study by EIL done during the year. Recommendations taken up for implementation at various phase.

10. Overhauling of STG turbine and improvement in condenser vacuum done during the year lead to a saving of 1500 MTOE
11. GTG exhaust to HRSG SH inlet heat loss plugging done .This lead to saving of 3000 MTOE.

ENCON schemes implemented during 2018-19:

1. CDU Pre-heat improvement by 15 degC with introduction of new HGO CR loop.Net saving is 2500 MTOE (Metric Tonne Oil Equivalent).
2. FGRS commissioned in Flare area to recover refinery flared gas. Net saving is 1800 MTOE.
3. 1 MW rooftop Solar panel installed within the Refinery premise .Net saving is 220 MTOE.
4. Electric heat tracing in WHFU. Net saving is 500 MTOE.
5. Auto water decantation valve installed in all Crude and slop tanks to reduce oil carryover in ETP.
6. Sun-domes installed in Warehouse and Electrical Lab to reduce artificial lighting.
7. Trial online Antifouling chemical injection programme in preheat train of CDU/VDU has been found to be successful leading to energy conservation.
8. Application of new e-glass fibre insulation in DCU transfers line has resulted in reduction of heat loss.
9. Implementation of APC (Advanced Process Control) in MSP and Wax Unit and continued operation in CDU, DCU, H2U and HCU has helped in reduction in energy consumption.

ENCON schemes implemented during 2019-20:

1. Burners (216 Nos.) in the reformer of Hydrogen Unit were replaced by FPMR-5 burners to increase reformer outlet temperature and reduce methane slippage. Steam generation has increased by two fold and equivalent annualized saving is 4000 SRFT (Standard Refinery Fuel Tonne).
2. A new plate and glass enamelled carbon steel tube Air-Preheater (APH) installed in CDU/VDU replacing the old cast / glass APH. Equivalent annualized saving is 1060 SRFT.
3. Booster pumps (2 Nos.) in CDU/VDU have been replaced from API 6th edition to API 10th edition. Equivalent annualized saving is 350 SRFT.
4. Capacity of MS Plant has been augmented by 50% with modifications in NHT Pre Heat Train, new convection coil in CRU inter heater and waste heat utilization for generation of superheated steam in CRU. Equivalent annualized saving is 1300 SRFT.

ENCON schemes implemented during 2020-21:

1. Feed effluent exchangers (Shell & Tube type) have been replaced by Plate Type Heat Exchangers in Sulphur Recovery Block. Equivalent annualized saving is 1600 SRFT.
2. Installation of electrical tracing in Solvent De-oiling Unit and offsite of Wax Plant replacing the steam tracing. Equivalent annualized saving is 615 SRFT.
3. Optimization of excess air in furnaces of Crude Distillation Unit, Vacuum Distillation Unit and Hydrocracker Unit. Equivalent annualized saving is 500 SRFT.
4. Condensate recovery scheme in Delayed Cocker Unit and Captive Power Plant. Equivalent annualized saving is 450 SRFT.
5. Replacement of electrical motors and pumps with energy efficient motors and pumps. 590 6. Improvement in stream trap performance rate to 99% in working condition. Equivalent annualized saving is 150 SRFT.

Technology Absorption, Adaptation and Innovation measures:

1. Numaligarh Refinery Expansion Project (NREP)

NRL is in the process of augmenting its refining capacity from 3.0 MMTPA to 9.0 MMTPA, by setting up a new refinery train of 6.0 MMTPA in the existing premises.

The project is being executed using a mix implementation model engaging a combination of PMC, EPC, EPCM and other supporting consultants. The Hydrogen Generation Unit will be set up in "JOB WORK" mode. Delivery of Process Package, including engineering for all the units are completed and overall progress made as on 31st March 2023 is 33.7%. Noteworthy technologies adopted are PFCC unit for high yield of Propylene and Ebullated Bed Resid Hydrocracker (RPTU).

Capacity expansion of NRL from 3.0 MMTPA to 9.0 MMTPA will ensure additional availability of petroleum products primarily LPG, MS and HSD in the NE and Eastern region of India and meet the growing energy demand in the region. Additionally, NRL will also export HSD to Bangladesh through the Indo Bangla Friendship Pipeline (IBFPL) commissioned during March 2023.

2. Bio Refinery Project

NRL is setting up a 49 TMTPA Bio Refinery project as a joint venture company promoted by NRL with 50% equity and balance 50% by Fortum 3.B.V Netherland and Chempolis Oy, Finland for producing ethanol from cellulosic feedstock 'Bamboo'. The process for production of bio-ethanol from bamboo biomass is based on the Formicobio Technology from M/s Chempolis. Overall progress of the project is 80% as on 31st March, 2023.

Bio-Ethanol production from the Bio- Refinery shall be used in blending with Motor spirit by North-East refineries. Bio Refinery project will help in meeting the 20% Ethanol Blended Petrol (EBP20) programme of GOI's National Biofuel Policy by 2023-24 which will in turn help to strengthen country's energy security, enable local enterprises and farmers to participate in the energy economy and reduce vehicular emissions.

3. Wax Pastillation Unit

NRL has commissioned a new Wax Pastillation Unit (WPU) during March 2023 with a production capacity of 144TPD. M/s IPCO, Germany is the technology provider and process licensor of the WPU. The technology involves an efficient and cost- effective process, in which molten liquid wax is converted into pastille form (5 to 6mm size). Pallet Wax from Wax Pastillation Unit will cater to additional demand from customers and will enhance flexibility in marketing of Paraffin Wax. This plant will also improve capacity utilization of Wax block as existing ASPU is sensitive to maintenance.

4. Aq. Ammonia Project

NRL is setting up an Aqueous Ammonia plant to meet 10 TPD Aq. Ammonia requirement in Bio-refinery to maintain pH for proper performance of enzymes. It is noteworthy that NRL is going to produce Aq. NH3(25%) from a waste NH3 rich stream of sour water stripper utilizing technology that is developed jointly by NRL & EIL.

Aq. Ammonia 25% (NH3) production will reduce NOX generation from refinery. Moreover, this project will convert waste to value added by product.

5. Green Hydrogen

NRL has been playing a pivotal role amongst the Indian PSU to meet the Green Hydrogen Consumption Obligation (GHCO) as per Govt. of India mandate. Green Hydrogen offers a renewable energy-based alternative for meeting Hydrogen requirements in fertilizer production and petroleum refining. This has the potential to reduce the country's dependency on fossil fuels, energy security and a step towards achieving the Net Zero goal. NRL is setting up a 2.4 KTPA (16 MW) Alkaline Electrolyzer (AEL) for production of 300 Kg per hour of Green Hydrogen. The project is awarded to M/s Greenko ZeroC for implementation with electrolyzer to be supplied by M/s John Cockril, Belgium. NRL will meet 5% of GHCO by 2024-25 after commissioning of the project.

6. Initiative for solar power

In its pursuit of tapping new and renewable energy sources, a slew of initiatives have been taken up to utilize solar energy in the refinery and in the township premises. 1000KWp Solar PV panel installed in all non-critical building rooftops inside the refinery in 2017-18. Also installed 20KW solar rooftop PV panels in adjacent to NRL marketing terminal. NRL has replaced conventional streetlights with solar powered lights in several places in its township. NRL extending its solar power initiative for the benefit of the nearby community, solar panel has been installed in nos. of nearby schools. In its foray to renewable energy, NRL has taken initiative to install 50 KW Solar power plant on the roof top of Corporate Office Building in Guwahati.

7. Initiative for mitigation of climate change and environmental sustainability

In a significant development, NRL has signed an MoU on 23rd January 2023 with Principle Chief Conservator of Forests & Head of Forest Force (PCCF-HOFF), Assam for construction and maintenance of 3 bamboo nurseries of 5 hectors each for macro proliferation and to nurture tissue cultured Bamboo saplings which will be made available to Farmers in Assam and neighbouring states, to develop carbon sink for mitigation of climate change and for environmental sustainability with an estimated cost involvement of about ₹9 Crore. One hectare of bamboo plantation can absorb 17 Ton CO_2 from the air per annum. The three bamboo nurseries will generate approximately 60 Lakh ready to plant saplings that can be planted on 15,000 hectares of land area, thus will create a carbon sink that will fix 2.6 Lakh Ton CO2 from the air per annum.

Research and Development (R&D) Activities

NRL took a few initiatives to strengthen research and development capability of the organization through partnership with academia and research organizations. R&D activities presently pursued by NRL are as follows:

1. R&D Collaboration with CSIR: NEIST

NRL entered into a framework collaboration with CSIR: NEIST for Identification of critical research areas pertinent to microbial remediation, soil chemistry, functionalization of low grade/ weight hydrocarbons and subsequent upgradation, training of scientists, technologists and officials in specialized areas. As part of this collaboration, a project “Removal of Phenol from sour & strip water, it’s re-use and value addition”has been taken up at an estimated cost of ₹1.27 Crore for a total project duration of 2 years with the aim to reduce water foot print

and to produce value added chemicals. Under this project, lab scale demonstration for phenol removal is successfully completed and design and fabrication of pilot plant is ready for demonstration at NRL site.

2. NRL Centre of Excellence for Sustainable Material at IIT Guwahati:

As a positive development, NRL has joined hands with Indian Institute of Guwahati (IITG) to develop Bio-degradable plastics from oil and bio refinery streams. An R&D project with a financial involvement of Rs. 4 Crore has been identified as the first project to be taken up.
Earlier, an Memorandum of Understanding (MoU) was signed between NRL and IITG on 13th September 2019 for establishing 'NRL Centre of Excellence on Sustainable Materials (NCESM)' in Guwahati.

Presently the centre is carrying out research activities on "Development of Biodegradable Plastics from Oil and Bio-Refinery Streams". Development of indigenous technology for production of biodegradable plastic will help in replacing non-biodegradable polythylene based packaging and contribute towards reduction of pollution from solid waste. Bio-degradable plastic will be a value added stream for the Bio Refinery. The aim of the project is to convert "Furfural", one of the by-products of the ABRPL, to biodegradable polymer "Polycaprolactone (PCL)".
Recently, a translational facility is set up at NRL CoE for housing a pilot plant on Bio-degradable polymer with a range of equipment related to downstream processing of bio-degradable plastics such as Blown Film Machine, Injection Moulding, Thermoforming, Cast Film Extruder etc. The pilot plant has the facility to manufacture a wide variety of items, including carry bags, toys, cutlery, decorative items etc. bothfrom normal and biodegradable polymers.

3. Research Project at St. Edmund's College, Shillong

NRL has engaged St. Edmund's College, Shillong for research study on Utilization of cyanobacteria in the bioremediation of crude oil, hydrocarbon storage tank bottom sludge, and ETP hydrocarbon sludge and its environmental biotechnology implications at an estimated cost of ₹83 Lakh.
The aim of this project is Utilization of cyanobacteria in the bioremediation of crude oil, hydrocarbon storage tank bottom sludge, and ETP hydrocarbon sludge. Under this project, significant development on culture of cyanobacteria samples collected from NRL have been achieved and bio-accumulation study with the cultured bacteria on hydrocarbon sludge is being investigated.

4. R&D Collaboration with CSIR IIP Dehradun

A project titled "Studies for Efficient Utilisation of UCO stream generated from upcoming Ebullated Bed (EB) Resid Hydrocracker under Numaligarh Refinery Expansion Project" has been taken up to carry out studies to convert un-converted oil (UCO) into value added products or speciality products like Bitumen.

5. Projects taken up in collaboration with BPCL Corporate R&D Centre (CRDC), Noida

NRL is currently collaborating with BPCL CRDC, Noida in two R&D projects:

• Production of Furfural Alcohol (FA) and Tetra Hydro Furan (THF) from Furfural: Furfural will be one of the by-products from bio-refinery. CRDC is currently developing technology for production of Furfural Alcohol and Tetra Hydro Furan from Furfural.

• Measuring efficacy of Enzymes of various suppliers for conversion of bamboo pulp into glucose by hydrolysis process.

6. Scientific and Technical Collaboration with Engineers India Limited

As per Govt. of India guidelines on collaborative research and development (R&D) among PSUs, NRL and EIL have entered into a Memorandum of Understanding ("MOU") dated 31.03.2022 to exchange scientific knowledge, encourage joint research in the field of hydrocarbon, petrochemicals, energy technology, and commercialize such jointly developed technologies. Both the parties have already identified a list of projects for joint development of its technology with separate Memorandum of Agreement having defined objectives, scope of work, roles of parties, deliverables, cost and royalty sharing etc.

NRL and EIL entered into a Memorandum of Agreement (MoA) for joint development and commercialization of technology for production of Aqueous Ammonia from ammonia-rich sour gases of refinery. NRL will set up a plant for Aqueous Ammonia production using EIL's design know-how and NRL's expertise on operating Suphur Recovery Unit (SRU). Above Ground Sulphur Seal will be designed to handle 70 Kg per hour of liquid Sulfur flow to install at SRU of NRL using EIL's expertise on designing above Ground Sulphur Seal. Development and commercialization of Overground Sulphur Seal technology will help refineries to improve liquid – gas phase separation of liquid Sulphur in Sulphur Recovery Units. This will also lead to a reduction in SOX emission.

7. Research Collaboration with Kaziranga University and Institute of Frontier Science and Application:

NRL has signed a Memorandum of Agreement (MoA) with Kaziranga University (KU) and the Institute of Frontier Science and Application (IFSA) for collaboration to carry out a research project titled 'Assessment of Wind Energy Potential in North- East India'. The collaboration is a first of its kind for systematic exploration of wind energy potential in North East India. As per the MoA, Kaziranga University, in technical collaboration with Institute of Frontier Science and Application (IFSA) and funding from NRL, will implement the project which aims to develop bankable wind energy assessment data over North-East India in riverine environment using mobile Lidar observations for aperiod of three years.

Assessment of Wind-Energy Potential using LIDAR technology through multi-level and multi-site high- frequency observation and Analysis in Riverine Environment at Turbine Level will provide bankablewind-energy database for Assam relevant for viable wind energy installation. The results of the project can be used to catalyze commercial wind energy generation in Assam. The project thus has huge potential for significant socio-economic benefits for Assam. With the present project as a proof-of-concept, it can also be easily scaled up to cover wider areas of the North-East.

8. Indigenous Isomerisation Catalyst:

The indigenous isomerization catalyst once developed would be manufactured from third party manufacturers in India. Successful implementation of this R&D scheme will lead to increase indigenous capabilities for manufacturing such items which are presently procured from foreign manufacturers. Besides reducing dependency on foreign vendors, this initiative will give fillip to the Make-In-India mission of the Government.

Projects of NRL:

On-going Projects

1. Numaligarh Refinery Expansion Project (NREP)

Numaligarh Refinery Expansion Project (NREP) is for the capacity expansion of the existing Refinery from the present 3 MMTPA to 9 MMTPA. The NREP consists of 02 major components, the Refinery Expansion with new train of process units (6 MMTPA) and Paradeep-Numaligarh Pipeline along with Crude Oil Import Terminal (COIT) at Paradeep (1630 km, 9 MMTPA).

The Cabinet Committee on Economic Affairs (CCEA) of the Government of India has accorded investment approval for the project on 16.01.2019. Environmental Clearance (EC) for setting up

the new train of refinery of 6 million capacity was accorded by the MoEFCC on 27.07.2020.EC-CRZ clearance for COIT was received on 19th May 2021. Financial closure for the expansion project has been achieved on 30-12-2021.

The NREP project is being executed using a mix implementation model comprising EPC, EPCM, PMC and BOO contracts. Process units like CDUVDU, DHDT, MS Block, SRU etc. are planned to be set up through EPC contracts. Few critical and complex units like RPTU and PFCC are planned to be set up in EPCM mode. The Hydrogen Generation Unit (HGU) will be set up in BOO mode. NRL will consider the green hydrogen option while sizing its hydrogen unit.

Overall progress of NREP as on 31st March,2023 is 34.18%. Progress for refinery scope of job is 31.1% while progress for pipeline scope of jobs is 39.2%.

2. Indo-Bangladesh Friendship pipeline (IBFPL)

The India Bangladesh Friendship Product Pipeline (IBFPL) was completed during the financial year 2022-23. The 132 Km long pipeline extending from NRL's Siliguri Marketing Terminal in India to Parbatipur in Bangladesh shall facilitate export of 1 MMT HSD annually. The project was inaugurated on 18th March,2023.

Future Projects:

Petrochemical Project for NRL:

NRL is setting up a Petrochemical Complex to produce 360 KTPA of homopolymer grade polypropylene by leveraging on the capability to produce high value petrochemical feedstock from NRL's 6 MMTPA new refinery (NREP) presently under implementation. The project will consist of polypropylene production unit & dispatch facilities, along with associated utility systems. The investment approval for the project was obtained in March 2022. The project is anticipated to be completed in FY 2025-26. The polypropylene plant will utilize propylene as feedstock, which will be made available from high severity Petro-FCC of NREP. Once implemented, the integration of petrochemical with refinery will provide significant value addition from the complex. Considering impressive growth of polypropylene in the domestic market, the 360 KTPA Polypropylene unit will help NRL to venture into petrochemical market. This will also increase NRL's Petrochemical Intensity Index (PII). NRL has engaged **M/s Lummus Novolen gmbh**, Germany, as process licensor for the proposed 360 KTPA Polypropylene unit. Basic Engineering Design Package for the unit is already completed.

Joint Ventures and Associate Companies of NRL

NRL has three joint venture companies and one associate company:

1. Indradhanush Gas Grid Limited (IGGL)

IGGL is a joint venture company among Numaligarh Refinery Limited (NRL), M/s Oil India Limited (OIL), M/s Oil and Natural Gas Corporation Limited (ONGC), M/s Indian Oil Corporation Limited (IOCL) and M/s GAIL(India) Limited (GAIL) and was incorporated on 10th August 2018 to implement the North East Gas Grid project envisaged in the Hydrocarbon Vision 2030 for North East of Govt. of India. NRL is a partner with 20% stake in Indradhanush Gas Grid Limited (IGGL) which is executing Natural Gas Pipeline of 4.75 mmscmd capacity. The project will establish gas grid connectivity in the eight North-Eastern States, viz. Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim with the National Gas Grid through the Barauni-Guwahati Gas Pipeline Overall physical progress of the project as on 31st March, 2023 was 70.01%.

2. Duliajan Numaligarh Pipeline Limited (DNPL)

DNP Limited is a Joint Venture Company between Assam Gas Company Limited (AGCL), Oil India Limited (OIL) and Numaligarh Refinery Limited (NRL) and was incorporated on 15th June 2007 with an authorized share capital of ₹170.00 Crore. The present shareholding of the Company as on 31st March 2022 stands at AGCL (51%), NRL (26%) and OIL (23%). The registered office of the Company is at Guwahati, Assam with its operational headquarters at AGCL, Duliajan. The company started transportation of natural gas from Oil India Limited's installation in Duliajan to Numaligarh Refinery from March, 2011 onwards.

The main object of DNP Limited is transportation of natural gas through pipeline having a design capacity of 1.2 MMSCUM of natural gas per day from Madhuban at Duliajan to NRL Refinery. During the year 2022-23, the Company transported 3,08,767 TSCM of natural gas as against 3,10,595 TSCM of natural gas in 2021- 22.

3. Assam Bio Refinery Private Limited (ABRPL)

Country's first 2G bamboo based bio refinery being executed through a JV with Finnish collaborators ***"Assam Bio Refinery Private Limited"*** has recorded adequate progress on ground.

Assam Bio Refinery Private Limited was incorporated on 4th June, 2018 as a joint venture company promoted by NRL with 50% equity and balance 50% by Fortum 3.B.V Netherland and

Chempolis Oy, Finland for producing ethanol from cellulosic feedstock 'Bamboo' which is available in abundance in North-Eastern (NE) states of India. The Project envisages using 300 Kilo-Tones Per Annum (KTPA) of dry bamboo (500 KTPA of green bamboo) as raw material and shall produce Cellulosic Ethanol, Acetic Acid, Furfuryl/Furfuryl Alcohol, along with combustible residue in the form of Bio coal and Stillages. The technology being used is based on selective fractionation of biomass and coproduction of multiple products. It shall produce approx. 49,000 Tones Per Annum (TPA) of bio-ethanol, 11,000 TPA of acetic acid and 18,000 TPA of furfural alcohol. Bamboo residue shall be used as fuel to produce steam and electricity. The Project Construction activity at the site was started in late 2018 and is continuing with major civil and structural works going on. Engineers India Limited (EIL) has been appointed as the Engineering, Procurement and Construction Management (EPCM) consultant on August 24, 2018. Civil & Structural works at the site is continuing in full swing and manufacturing works at vendors' locations are also progressing well. Overall physical progress of the project as on 31st March,2023 was 82.1%.

4. Brahmaputra Cracker and Polymer Limited (BCPL):

BCPL is an associate company incorporated on 8th January,2007 as a Central Public Sector Enterprise under the Department of Chemicals & Petrochemicals, Government of India with an authorized share capital of ₹2,000 Crore to implement the Assam Gas Cracker Project in the district of Dibrugarh, Assam. GAIL (India) Limited is the main promoter having 70% of equity participation while Numaligarh Refinery Limited (NRL), Oil India Ltd (OIL) and Government of Assam are holding 10% share each. The plant was commissioned on 2nd January,2016 and dedicated to the nation by the Hon'ble Prime Minister, on 5th February,2016. The principal end products of the Company are High Density Polyethylene (HDPE) and Linear Low Density Polyethylene (LLDPE). The other products include Hydrogenated Pyrolysis Gasoline and Pyrolysis Fuel Oil.

Awards and Recognitions:

NRL was honoured with Grow Care India Environment Management Platinum Award 2022 on 10th February'23.

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Annexure -I : Noise Monitoring Report (Mar’24)

Nitya Work for Quality
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Test Report

Issued To **M/s Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Test Report Date 26/03/2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sample Particulars

Nature of the Sample : **Ambient Noise**
Date of Sampling : 22/03/2024
Parameter Tested : Noise Level, Leq dB (A)*
Instrument Used : Sound Level Meter

Analysis Report

Sr. No.	URL No.	Area	Location	Observed Value dB(A)		Standard dB(A)
				Day	Night	
1	TC636624000002200F to TC636624000002219F	CDU/VDU	Field Cabin (Inside)	63.3	61.1	92 for 6 hrs
2			Crude Booster Pump Area (C)	88.6	86.2	
3			Crude Booster (B)	88.1	87.3	
4		DCU	Field Cabin	62.4	61.1	
5			LPG Compressor	88.9	87.6	
6		HCU	Field Cabin (Inside)	70.1	66.2	
7			Near RGC Area	86.6	85.4	
8		H_2U	Field Cabin (Inside)	55.2	52.1	
9			PSA Area	92.8	91.0	
10		SRB	Field Cabin (Inside)	62.1	60.3	
11			Control Rooms	60.3	57.7	
12		PH#1	Field Cabin (Inside)	65.5	63.1	90 for 8 hrs
13		PH#3	Field Cabin (Inside)	64.8	62.8	
14		CPP	Control Rooms	64.2	61.1	
15			Field Cabin (Inside)	65.5	63.4	
16			Instrumentation Room	67.7	65.5	
17			Air Compressor (Utility)	96.6	94.4	
18		CPP (2)	Cabin (2)	65.8	63.2	
19			Sound Prone Zone	88.2	87.7	

Remark:
*dB (A) Leq denotes the time weighted average of the level of sound in decibels on a scale which is relatable to human hearing.

TC-6366

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Test Report Date 26/03/2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Analysis Report

Sr. No.	URL No.	Area	Location	Observed Value dB(A)		Standard dB(A)
				Day	Night	
20	TC636624000002220F to TC636624000002239F	CPP 3	Cooling Tower (North Side)	88.1	86.2	92 for 6 hrs
21			Cooling Tower (South Side)	86.7	85.5	
22		DM Plant	Field Cabin (Inside)	67.5	66.1	
23		FWPH	Control Rooms (Inside)	63.2	62.2	
24		ETP	Disposal Pump (House)	64.8	62.7	
25			Control Rooms (Inside)	65.9	64.2	
26		CCU	Control Rooms (Inside)	64.1	63.3	
27			Near BFW	90.2	88.1	
28			Near Air Blower	87.7	86.2	90 for 8 hrs
29		MSP	Field Cabin	65.5	64.2	
30			Near Compressor House	88.8	86.1	
31			Near Furnace Area	87.5	87.2	
32		N2 Plant /Compressor	Control Rooms (Inside)	63.3	63.1	
33			Near Compressor House	96.1	95.8	
34		N2 Plant	LP Compressor (27-KA0002A)	89.2	88.1	
35			LP Compressor (27-KA0002B)	88.5	87.3	
36		Wax (ASPU)	Compressor (304- A)	82.2	80.0	
37			Compressor (304- B)	82.4	81.3	
38			Office Cabin (ASPU)	65.2	63.1	
39		Wax (SDU)	Field Cabin	63.6	63.2	

Remark:
*dB (A) Leq denotes the time weighted average of the level of sound in decibel on scale 'A' which is relatable to human hearing.

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Test Report Date 26/03/2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Analysis Report

Sr. No.	URL No.	Area	Location	Observed Value dB(A)		Standard dB(A)
				Day	Night	
40	TC636624000002240F to TC636624000002260F	LPG B Plant	Carousel	95.5	94.1	92 for 6 hrs
41			Unloading	93.3	92.1	
42			Sealing	96.2	94.4	
43			Loading	95.1	93.2	
44		DHDT	F. Cabin	65.5	62.1	
45		WAX	F. Cabin(Plant Area-Hydro finishing)	63.2	61.2	90 for 8 hrs
46		Pump House 2	Pump House 2	66.1	64.4	
47		Decanter	Decanter	96.6	94.2	
48		FGRU	FGRU	88.8	87.1	
49		HCU Blast Proof Cabin	HCU Blast Proof Cabin	65.0	63.2	
50		Wax Pastillation Unit	Wax Pastillation Unit	83.4	81.3	
51		Lab	Outside Lab Building	68.2	67.3	Day Time-75
52			Near Laboratory	66.1	65.5	
53		IT Deptt.	Server Room	52.2	51.1	
54		ADM Building	Near AC Room	64.4	63.2	
55			Near ADM Building	69.9	67.7	
56		Watch Tower No.	Near W.T. No.1	63.3	61.2	
57		Central Control Room	In front of CCR	68.8	66.6	
58		Flare Area	Near Flare Area	62.1	60.3	Night Time-70
59		VKNRL Hospital	Hospital Premises	66.6	63.2	
60		DPS	DPS Premises	63.4	60.0	

Remark:
*dB (A) Leq denotes the time weighted average of the level of sound in decibel on scale(A) which is relatable to human hearing.

TC-6366

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Annexure -II : Stack Monitoring Reports (Oct’23-Mar’24)

QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.

DURING QUARTER III (OCT-DEC'23), 2023-24

Online Stack Analyser data

UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE in mg/Nm3			Limiting Concentration in mg/Nm3	Remarks
			MAX.	MIN.	AVG		
CDU/VDU	FF-01/02	SO2	392.95	42.93	252.88	**796**	Stack with dual firing (FG:FO=55:45)
		NOx	184.05	154.76	172.26	**395**	
		CO	7.76	0.70	4.69	**173**	
		PM	43.07	4.52	8.83	**51**	
DCU	FF-01	SO2	240.76	174.90	208.56	**1035**	Stack with dual firing (FG:FO=40:60)
		NOx	188.79	157.34	173.80	**410**	
		CO	1.28	0.49	1.03	**180**	
		PM	21.79	5.15	10.41	**64**	
HCU	FF-01/02	SO2	7.77	3.98	4.82	**50**	Stack with Gas firing
		NOx	23.19	8.41	17.45	**350**	
		CO	9.61	8.12	8.72	**150**	
		PM	9.07	3.00	5.87	**10**	
HCU	FF-03	SO2	66.00	3.34	24.88	**183**	Stack with dual firing (FG:FO=92:8)
		NOx	92.58	0.40	20.28	**358**	
		CO	81.69	8.49	40.67	**154**	
		PM	6.13	4.11	4.65	**17**	
H2U	FF-01	SO2	29.26	22.60	26.77	**50**	Stack with Gas firing
		NOx	31.34	0.16	15.59	**350**	
		CO	10.43	9.61	10.19	**150**	
		PM	9.66	5.81	7.18	**10**	
CPP(HRSG)		SO2	42.43	37.02	39.53	**50**	Stack with Gas firing (FG:Naphtha=100:0)
		NOx	78.85	6.19	28.57	**350**	
		CO	5.10	1.36	3.09	**150**	
		PM	7.84	0.004	2.76	**10**	
		SO2	45.72	12.80	30.62	**50**	

CPP (UB)	NOx	101.54	6.14	55.99	**350**	Stack with dual firing (FG:Naphtha=100:0)
	CO	13.51	0.15	6.41	**150**	
	PM	9.22	4.97	6.92	**10**	
MSP (CRU)	SO2	30.21	2.79	13.02	**50**	Stack with Gas firing
	NOx	122.98	16.22	53.06	**350**	
	CO	2.28	0.67	1.56	**150**	
	PM	7.09	4.75	6.30	**10**	
MSP (NHTU)	SO2	34.63	1.44	8.94	**50**	Stack with Gas firing
	NOx	144.47	0.73	50.08	**350**	
	CO	6.48	0.51	2.91	**150**	
	PM	7.09	4.75	6.30	**10**	
DHDT	SO2	46.57	4.26	23.48	**50**	Stack with Gas firing
	NOx	98.74	4.19	23.24	**250**	
	CO	20.80	0.09	2.53	**100**	
	PM	1.58	0.73	1.02	**5**	
Limiting concentration of emission calculated as per MOEF notification on standard vide GSR-186 (E) dated 18th March, 2008.						

QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.

DURING QUARTER IV (JAN-MAR'24), 2023-24

Online Stack Analyser data

UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE in mg/Nm3			Limiting Concentration in mg/Nm3	Remarks
			MAX.	MIN.	AVG		
CDU/VDU	FF-01/02	SO2	583.67	73.91	219.04	**716**	Stack with dual firing (FG:FO=60:40)
		NOx	183.51	120.51	162.63	**390**	
		CO	6.82	3.17	4.77	**170**	
		PM	37.77	6.98	16.87	**46**	
DCU	FF-01	SO2	222.77	8.94	145.44	**914**	Stack with dual firing (FG:FO=48:52)
		NOx	174.43	15.55	145.97	**402**	
		CO	3.67	0.02	0.18	**176**	
		PM	26.46	4.35	7.90	**57**	
HCU	FF-01/02	SO2	7.35	4.98	6.22	**50**	Stack with Gas firing
		NOx	9.90	6.41	7.15	**350**	
		CO	9.43	8.42	8.97	**150**	
		PM	6.50	4.67	5.87	**10**	
HCU	FF-03	SO2	158.25	3.52	36.14	**226**	Stack with dual firing (FG:FO=89:11)
		NOx	87.31	17.10	66.91	**361**	
		CO	43.61	8.40	9.66	**155**	
		PM	6.55	3.96	4.37	**20**	
H2U	FF-01	SO2	49.98	16.90	31.03	**50**	Stack with Gas firing
		NOx	101.39	31.84	55.93	**350**	
		CO	18.35	6.37	10.02	**150**	
		PM	8.68	5.91	6.49	**10**	
CPP(HRSG)		SO2	49.84	35.53	42.93	**50**	Stack with Gas firing (FG:Naphtha=100:0)
		NOx	78.30	4.70	32.47	**350**	
		CO	35.26	2.44	5.49	**150**	
		PM	8.49	2.738	5.64	**10**	
		SO2	46.45	10.37	26.84	**50**	

CPP (UB)	NOx	157.69	23.22	76.92	**350**	Stack with dual firing (FG:Naphtha=100:0)
	CO	54.75	0.13	13.08	**150**	
	PM	6.85	2.74	5.27	**10**	
MSP (CRU)	SO2	38.57	12.20	21.56	**50**	Stack with Gas firing
	NOx	73.35	47.39	62.04	**350**	
	CO	3.43	0.44	1.37	**150**	
	PM	6.98	4.31	5.87	**10**	
MSP (NHTU)	SO2	39.21	5.81	10.56	**50**	Stack with Gas firing
	NOx	79.46	53.76	70.40	**350**	
	CO	3.42	2.16	2.61	**150**	
	PM	6.98	4.31	5.87	**10**	
DHDT	SO2	39.40	1.84	18.45	**50**	Stack with Gas firing
	NOx	89.30	5.37	30.24	**250**	
	CO	10.13	0.05	2.01	**100**	
	PM	0.79	0.73	0.76	**5**	
Limiting concentration of emission calculated as per MOEF notification on standard vide GSR-186 (E) dated 18th March, 2008.						

Annexure -III : Ambient Air Monitoring Reports

(Oct’23-Mar’24)

NUMALIGARH REFINERY LIMITED

QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS DURING QUARTER III (OCT-DEC'23), 2023-24

Ambient Air Quality Data

STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS		
				MAX	MIN	AVG.
REFINERY (WATCH TOWER NO. 6)	SO2	80 (24 hr avg.)	µg/m3	18.00	4.26	9.56
	NO2	80 (24 hr avg.)	µg/m3	27.65	10.42	16.30
	O_3	180 (1 hr avg.)	µg/m3	5.23	0.0	2.06
	CO	4.000 (1 hr.avg.)	mg/m3	1.07	0.0	0.52
	NH_3	400 (24 hr.avg.)	µg/m3	38.53	9.97	22.23
	PM 10	100 (24 hr.avg.)	µg/m3	73.48	34.21	56.79
	PM 2.5	60 (24 hr.avg.)	µg/m3	58.36	21.22	41.24
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC	-	mg/m3	0.92	0.52	0.72
	BaP	01 (Annual)	ng/m3	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	06 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	14.78	5.63	8.48
	NO2	80 (24 hr avg.)	µg/m3	19.07	9.65	15.20
	O_3	180 (1 hr avg.)	µg/m3	5.14	0.00	2.22
	CO	4.000 (1 hr.avg.)	mg/m3	1.14	0.56	0.77
	NH_3	400 (24 hr.avg.)	µg/m3	39.04	10.36	26.40
	PM 10	100 (24 hr.avg.)	µg/m3	73.05	31.47	55.63
	PM 2.5	60 (24 hr.avg.)	µg/m3	56.23	15.21	39.28
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC		mg/m3	0.97	0.52	0.69
	BaP	1.0 (Annual)	ng/m3	0.00	0.00	0.00

	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	6.0 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
RAW WATER INTAKE	SO2	80 (24 hr avg.)	µg/m3	16.70	6.47	9.71
	NO2	80 (24 hr avg.)	µg/m3	24.30	12.56	17.54
	O_3	180 (1 hr avg.)	µg/m3	5.01	0.00	2.14
	CO	4.000 (1 hr.avg.)	mg/m3	1.11	0.54	0.77
	NH_3	400 (24 hr.avg.)	µg/m3	39.85	9.36	27.32
	PM 10	100 (24 hr.avg.)	µg/m3	72.63	35.47	58.68
	PM 2.5	60 (24 hr.avg.)	µg/m3	57.96	18.24	40.83
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC		mg/m3	0.96	0.51	0.72
	BaP	01 (Annual)	ng/m3	0.00	0.00	0.00
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	06 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	SO2	80 (24 hr avg.)	µg/m3	18.00	5.31	9.50
	NO2	80 (24 hr avg.)	µg/m3	27.65	9.26	14.67
	O_3	180 (1 hr avg.)	µg/m3	5.14	0.00	2.18
	CO	4.000 (1 hr.avg.)	mg/m3	1.07	0.00	0.53
	NH_3	400 (24 hr.avg.)	µg/m3	38.53	9.45	24.22
	PM 10	100 (24 hr.avg.)	µg/m3	66.36	32.47	51.93
	PM 2.5	60 (24 hr.avg.)	µg/m3	58.36	16.32	37.89
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC	-	mg/m3	0.83	0.51	0.67
	BaP	1.0	ng/m3	0.00	0.00	0.00
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00

	As	6.0	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00

BDL:Below Detection Level, All the parameters are found to be within limt

NUMALIGARH REFINERY LIMITED

QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS DURING QUARTER IV (JAN-MAR'24), 2023-24

Ambient Air Quality Data

STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS		
				MAX	MIN	AVG.
REFINERY (WATCH TOWER NO. 6)	SO2	80 (24 hr avg.)	µg/m3	14.53	6.75	10.47
	NO2	80 (24 hr avg.)	µg/m3	25.31	13.42	17.47
	O_3	180 (1 hr avg.)	µg/m3	7.00	4.3	5.87
	CO	4.000 (1 hr.avg.)	mg/m3	0.80	0.8	0.80
	NH_3	400 (24 hr.avg.)	µg/m3	27.00	21.08	23.75
	PM 10	100 (24 hr.avg.)	µg/m3	74.84	60.74	68.25
	PM 2.5	60 (24 hr.avg.)	µg/m3	59.37	28.61	47.26
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC	-	mg/m3	0.96	0.55	0.81
	BaP	01 (Annual)	ng/m3	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	06 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	13.57	7.40	10.29
	NO2	80 (24 hr avg.)	µg/m3	20.42	10.31	15.94
	O_3	180 (1 hr avg.)	µg/m3	8.00	3.15	5.86
	CO	4.000 (1 hr.avg.)	mg/m3	0.88	0.59	0.70
	NH_3	400 (24 hr.avg.)	µg/m3	27.58	20.18	22.73
	PM 10	100 (24 hr.avg.)	µg/m3	67.00	53.16	62.11
	PM 2.5	60 (24 hr.avg.)	µg/m3	58.31	31.68	46.38
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC		mg/m3	1.06	0.52	0.74
	BaP	1.0 (Annual)	ng/m3	0.00	0.00	0.00

	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	6.0 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
RAW WATER INTAKE	SO2	80 (24 hr avg.)	µg/m3	17.37	7.56	12.06
	NO2	80 (24 hr avg.)	µg/m3	22.07	14.36	17.85
	O_3	180 (1 hr avg.)	µg/m3	7.12	4.34	6.02
	CO	4.000 (1 hr.avg.)	mg/m3	0.84	0.59	0.72
	NH_3	400 (24 hr.avg.)	µg/m3	26.82	20.96	23.27
	PM 10	100 (24 hr.avg.)	µg/m3	75.38	61.05	67.03
	PM 2.5	60 (24 hr.avg.)	µg/m3	57.28	42.93	50.60
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC		mg/m3	0.82	0.51	0.68
	BaP	01 (Annual)	ng/m3	0.00	0.00	0.00
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00
	As	06 (Annual)	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	SO2	80 (24 hr avg.)	µg/m3	11.29	6.45	8.25
	NO2	80 (24 hr avg.)	µg/m3	17.83	9.62	13.62
	O_3	180 (1 hr avg.)	µg/m3	7.34	3.69	5.52
	CO	4.000 (1 hr.avg.)	mg/m3	0.93	0.66	0.76
	NH_3	400 (24 hr.avg.)	µg/m3	29.73	20.36	23.51
	PM 10	100 (24 hr.avg.)	µg/m3	65.55	43.26	55.12
	PM 2.5	60 (24 hr.avg.)	µg/m3	47.53	31.47	37.54
	Benzene	05 (Annual)	µg/m3	0.00	0.00	0.00
	HC	-	mg/m3	0.82	0.51	0.64
	BaP	1.0	ng/m3	0.00	0.00	0.00
	Pb	1.0 (24 hr.avg.)	µg/m3	0.00	0.00	0.00

	As	6.0	ng/m3	0.00	0.00	0.00
	Ni	20 (Annual)	ng/m3	0.00	0.00	0.00

BDL:Below Detection Level, All the parameters are found to be within limt

Annexure -IV : Treated Effluent Monitoring Reports

(Oct’23-Mar’24)

QUARTERLY PERFORMANCE REPORT W.R.T ENIVRONMENTAL ASPECT

DURING QR. III(OCT-DEC'23) 2023 -24

TABLE-1 LIQUID EFFLUENT POLLUTANT LEVEL -

MONITORED VALUES in mg/lit.except pH								
SL. NO	PARAMETERS	NO. OF OBS	MAX.	MIN.	AVG.	Limiting value for conc. (mg/l except for pH)	Quantum limit in Kg / 1000 MT of crude processed	
							Actual	Standard
1	pH	92	8.0	6.0	7.3	6-8.5	-	-
2	OIL & GREASE	92	4.1	0.1	1.86	5	0.97	2.0
3	SULPHIDE	92	<0.1	<0.1	<0.1	0.5	<0.1	0.2
4	PHENOL	92	0.24	0.01	0.07	0.35	0.03	0.14
5	S. SOLID	92	20.0	3.0	12.59	20.0	6.58	8.0
6	COD	92	125.0	10.80	62.8	125.0	32.81	50.0
7	BOD3	92	15.0	3.0	7.96	15.0	4.16	6.0
8	CN	92	<0.02	<0.02	<0.02	0.2	<0.02	0.08
9	Ammonia as N	3	10.6	9.2	9.87	15.0	5.16	6.0
10	Cr (Hexavalent)	3	0	0	0.00	0.1	0.0000	0.04
11	Cr (Total)	3	0.002	0.001	0.001	2.0	0.0007	0.8
12	Pb	3	0	0	0.0000	0.1	0.0000	0.04
13	Zn	3	0.012	0.006	0.009	5.0	0.0045	2.0
14	Ni	3	0.003	0.001	0.002	1.0	0.0010	0.4
15	Cu	3	0.004	0.001	0.002	1.0	0.0012	0.4
16	Benzene	3	<0.1	<0.1	<0.1	0.1	<0.1	0.04
17	Benzo (a)- Pyrene	3	<0.2	<0.2	<0.2	0.2	<0.2	0.08
18	Hg	3	<0.01	<0.01	<0.01	0.01	<0.01	0.004
19	V	3	<0.2	<0.2	<0.2	0.2	<0.2	0.8
20	TKN	3	17.92	11.4	15.4	40.0	8.04	16.0
21	P	3	1.36	1.2	1.26	3.0	0.66	1.2

Limiting concentration of effluent is as per MoEF notification on standard vide GSR-186 (E)dated 18th March, 2008.

*** BDL- Detectable Limit : 0.1 microgram/Litre**

*** Parameters from 9 to 21 are monitored once in a month as per CPCB norms**

QUARTERLY PERFORMANCE REPORT W.R.T ENIVRONMENTAL ASPECT

DURING QR. IV(JAN-MAR'24) 2023 -24

TABLE-1 LIQUID EFFLUENT POLLUTANT LEVEL -

MONITORED VALUES in mg/lit.except pH								
SL. NO	PARAMETERS	NO. OF OBS	MAX.	MIN.	AVG.	Limiting value for conc. (mg/l except for pH)	Quantum limit in Kg / 1000 MT of crude processed	
							Actual	Standard
1	pH	91	8.5	7.0	7.7	6-8.5	-	-
2	OIL & GREASE	91	3.6	0.9	1.84	5	0.82	2.0
3	SULPHIDE	91	<0.1	<0.1	<0.1	0.5	<0.1	0.2
4	PHENOL	91	0.35	0.01	0.08	0.35	0.04	0.14
5	S. SOLID	91	16.0	4.0	9.52	20.0	4.23	8.0
6	COD	91	67.0	7.20	20.1	125.0	8.95	50.0
7	BOD3	91	15.0	2.0	7.86	15.0	3.50	6.0
8	CN	91	<0.02	<0.02	<0.02	0.2	<0.02	0.08
9	Ammonia as N	3	12.2	11.2	11.53	15.0	5.13	6.0
10	Cr (Hexavalent)	3	0	0	0.00	0.1	0.0000	0.04
11	Cr (Total)	3	0.001	0.001	0.001	2.0	0.0004	0.8
12	Pb	3	0	0	0.0000	0.1	0.0000	0.04
13	Zn	3	0.015	0.004	0.011	5.0	0.0049	2.0
14	Ni	3	0.005	0.002	0.003	1.0	0.0015	0.4
15	Cu	3	0.002	0.001	0.002	1.0	0.0007	0.4
16	Benzene	3	<0.1	<0.1	<0.1	0.1	<0.1	0.04
17	Benzo (a)- Pyrene	3	<0.2	<0.2	<0.2	0.2	<0.2	0.08
18	Hg	3	<0.01	<0.01	<0.01	0.01	<0.01	0.004
19	V	3	<0.2	<0.2	<0.2	0.2	<0.2	0.8
20	TKN	3	14.56	10.1	12.9	40.0	5.74	16.0
21	P	3	1.04	0.74	0.90	3.0	0.40	1.2

Limiting concentration of effluent is as per MoEF notification on standard vide GSR-186 (E)dated 18th March, 2008.

*** BDL- Detectable Limit : 0.1 microgram/Litre**

*** Parameters from 9 to 21 are monitored once in a month as per CPCB norms**

Annexure -V : VOC and Fugitive Emission Reports

(Oct’23-Mar’24)

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
UNIT: MSP								
Area	**B/L Pump Area**							
1	Fuel Gas Inlet line U/S I/V U/S Flange	1	0	0	0	0	8760	0
2	Fuel Gas Inlet line U/S I/V Gland	2	0	0	0	0	8760	0
3	Fuel Gas Inlet line U/S I/V D/S Flange	3	0	0	0	0	8760	0
4	Fuel Gas Inlet line D/S I/V U/S Flange	4	0	0	0	0	8760	0
5	Fuel Gas Inlet line D/S I/V Gland	5	0	0	0	0	8760	0
6	Fuel Gas Inlet line D/S I/V D/S Flange	6	0	0	0	0	8760	0
7	Sour Gas Outlet line U/S I/V U/S Flange	7	0	0	0	0	8760	0
8	Sour Gas Outlet line U/S I/V Gland	8	0	0	0	0	8760	0
9	Sour Gas Outlet line U/S I/V D/S Flange	9	0	0	0	0	8760	0
10	Drain Line I/V Gland	10	0	0	0	0	8760	0
11	Drain Line Safety Flange	11	0	0	0	0	8760	0
12	Sour Gas Outlet line D/S I/V U/S Flange	12	0	0	0	0	8760	0
13	Sour Gas Outlet line D/S I/V Gland	13	0	0	0	0	8760	0
14	Sour Gas Outlet line D/S I/V D/S Flange	14	0	0	0	0	8760	0
15	LPG R/D Outlet line U/S I/V U/S Flange	15	0	0	0	0	8760	0
16	LPG R/D Outlet line U/S I/V Gland	16	0	0	0	0	8760	0
17	LPG R/D Outlet line U/S I/V D/S Flange	17	0	0	0	0	8760	0
18	Drain Line I/V Gland	18	0	0	0	0	8760	0
19	LPG R/D First I/V Gland	19	0	0	0	0	8760	0
20	LPG R/D Outlet line D/S I/V U/S Flange	20	0	0	0	0	8760	0
21	LPG R/D Outlet line D/S I/V Gland	21	0	0	0	0	8760	0
22	LPG R/D Outlet line D/S I/V D/S Flange	22	0	0	0	0	8760	0
23	Hydrogen Rich Gas To PSA Outlet line U/S I/V	23	0	0	0	0	8760	0
24	Hydrogen Rich Gas To PSA Outlet line U/S I/V	24	0	0	0	0	8760	0

NITYA LABORATORIES Authorised

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
25	Hydrogen Rich Gas To PSA Outlet line U/S I/V	25	0	0	0	0	8760	0
26	Drain Line I/V Gland	26	0	0	0	0	8760	0
27	Drain Line Safety Flange	27	0	0	0	0	8760	0
28	NRV U/S Flange	28	0	0	0	0	8760	0
29	NRV Top Flange	29	0	0	0	0	8760	0
30	NRV D/S Flange	30	0	0	0	0	8760	0
31	Hydrogen Rich Gas To PSA Outlet line D/S I/V	31	0	0	0	0	8760	0
32	Hydrogen Rich Gas To PSA Outlet line D/S I/V	32	0	0	0	0	8760	0
33	Hydrogen Rich Gas To PSA Outlet line D/S I/V	33	0	0	0	0	8760	0
34	Hydrogen From PSA Inlet line U/S I/V U/S Flange	34	0	0	0	0	8760	0
35	Hydrogen From PSA Inlet line U/S I/V Gland	35	0	0	0	0	8760	0
36	Hydrogen From PSA Inlet line U/S I/V D/S Flange	36	0	0	0	0	8760	0
37	NRV U/S Flange	37	0	0	0	0	8760	0
38	NRV Top Flange	38	0	0	0	0	8760	0
39	NRV D/S Flange	39	0	0	0	0	8760	0
40	Drain Line I/V Gland	40	0	0	0	0	8760	0
41	Drain Line Safety Flange	41	0	0	0	0	8760	0
42	Hydrogen From PSA Inlet line D/S I/V U/S Flange	42	0	0	0	0	8760	0
43	Hydrogen From PSA Inlet line D/S I/V Gland	43	0	0	0	0	8760	0
44	Hydrogen From PSA Inlet line D/S I/V D/S Flange	44	0	0	0	0	8760	0
45	To 14-VV-01 S/U H. NAPTHA To 1st I/V U/S Flange	45	0	0	0	0	8760	0
46	To 14-VV-01 S/U H. NAPTHA To 1st I/V Gland	46	0	0	0	0	8760	0
47	To 14-VV-01 S/U H. NAPTHA To 1st I/V D/S Flange	47	0	0	0	0	8760	0
48	NRV U/S Flange	48	0	0	0	0	8760	
49	NRV Top Flange	49	0	0	0	0	8760	0
50	NRV D/S Flange	50	0	0	0	0	8760	

NITYA LABORATORIES Authorised

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
51	Drain Line I/V Gland	51	0	0	0	0	8760	0
52	Drain Line Safety Flange	52	0	0	0	0	8760	0
53	To 14-VV-01 S/U H. NAPTHA To 2nd I/V U/S Flange	53	0	0	0	0	8760	0
54	To 14-VV-01 S/U H. NAPTHA To 2nd I/V Gland	54	0	0	0	0	8760	0
55	To 14-VV-01 S/U H. NAPTHA To 2nd I/V D/S Flange	55	0	0	0	0	8760	0
56	To 14-VV-01 S/U H. NAPTHA To Storage line 1	56	0	0	0	0	8760	0
57	To 14-VV-01 S/U H. NAPTHA To Storage line 1	57	0	0	0	0	8760	0
58	To 14-VV-01 S/U H. NAPTHA To Storage line 1	58	0	0	0	0	8760	0
59	NRV U/S Flange	59	0	0	0	0	8760	0
60	NRV Top Flange	60	0	0	0	0	8760	0
61	NRV D/S Flange	61	0	0	0	0	8760	0
62	Drain Line I/V Gland	62	0	0	0	0	8760	0
63	Drain Line Safety Flange	63	0	0	0	0	8760	0
64	To 14-VV-01 S/U H. NAPTHA To Storage line 2	64	0	0	0	0	8760	0
65	To 14-VV-01 S/U H. NAPTHA To Storage line 2	65	0	0	0	0	8760	0
66	To 14-VV-01 S/U H. NAPTHA To Storage line 2	66	0	0	0	0	8760	0
67	14-LV-1701 U/S line I/V U/S Flange	67	0	0	0	0	8760	0
68	14-LV-1701 U/S line I/V Gland	68	0	0	0	0	8760	0
69	14-LV-1701 U/S line I/V D/S Flange	69	0	0	0	0	8760	0
70	CDE line 1st I/V Gland	70	0	0	0	0	8760	0
71	CDE line 2nd I/V Gland	71	0	0	0	0	8760	0
72	Stainer Flange	72	0	0	0	0	8760	0
73	CDE line 3rd I/V Gland	73	0	0	0	0	8760	0
74	14-LV-1701 line C/V U/S Flange	74	0	0	0	0	8760	
75	14-LV-1701 line C/V Gland	75	0	0	0	0	8760	0
76	14-LV-1701 line C/V D/S Flange	76	0	0	0	0	8760	

NITYA LABORATORIES Authorised

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
77	14-LV-1701 line D/S line U/S Flange	77	0	0	0	0	8760	0
78	14-LV-1701 line D/S line Gland	78	0	0	0	0	8760	0
79	14-LV-1701 line D/S line D/S Flange	79	0	0	0	0	8760	0
80	Bypass line I/V U/S Flange	80	0	0	0	0	8760	0
81	Bypass line I/V Gland	81	0	0	0	0	8760	0
82	Bypass line I/V D/S Flange	82	0	0	0	0	8760	0
83	15-FV-1401 U/S line I/V U/S Flange	83	0	0	0	0	8760	0
84	15-FV-1401 U/S line I/V Gland	84	0	0	0	0	8760	0
85	15-FV-1401 U/S line I/V D/S Flange	85	0	0	0	0	8760	0
86	CDE line 1st I/V Gland	86	0	0	0	0	8760	0
87	CDE line 2nd I/V Gland	87	0	0	0	0	8760	0
88	Stainer Flange	88	0	0	0	0	8760	0
89	CBD Drain line Top Flange	89	0	0	0	0	8760	0
90	15-FV-1401 line C/V U/S Flange	90	0	0	0	0	8760	0
91	15-FV-1401 line C/V Gland	91	0	0	0	0	8760	0
92	15-FV-1401 line C/V D/S Flange	92	0	0	0	0	8760	0
93	15-FV-1401 line D/S line U/S Flange	93	0	0	0	0	8760	0
94	15-FV-1401 line D/S line Gland	94	0	0	0	0	8760	0
95	15-FV-1401 line D/S line D/S Flange	95	0	0	0	0	8760	0
96	Bypass line I/V U/S Flange	96	0	0	0	0	8760	0
97	Bypass line I/V Gland	97	0	0	0	0	8760	0
98	Bypass line I/V D/S Flange	98	0	0	0	0	8760	0
99	15-PV-1401 U/S line I/V U/S Flange	99	0	0	0	0	8760	0
100	15-PV-1401 U/S line I/V Gland	100	0	0	0	0	8760	0
101	15-PV-1401 U/S line I/V D/S Flange	101	0	0	0	0	8760	0
102	15-FV-1401 line C/V U/S Flange	102	0	0	0	0	8760	0

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VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
103	15-FV-1401 line C/V Gland	103	0	0	0	0	8760	0
104	15-FV-1401 line C/V D/S Flange	104	0	0	0	0	8760	0
105	15-FV-1401 line D/S line U/S Flange	105	0	0	0	0	8760	0
106	15-FV-1401 line D/S line Gland	106	0	0	0	0	8760	0
107	15-FV-1401 line D/S line D/S Flange	107	0	0	0	0	8760	0
108	To Flare line 1st I/V U/S Flange	108	0	0	0	0	8760	0
109	To Flare line 1st I/V Gland	109	0	0	0	0	8760	0
110	To Flare line 1st I/V D/S Flange	110	0	0	0	0	8760	0
111	NRV U/S Flange	111	0	0	0	0	8760	0
112	NRV Top Flange	112	0	0	0	0	8760	0
113	NRV D/S Flange	113	0	0	0	0	8760	0
114	Drain Line I/V Gland	114	0	0	0	0	8760	0
115	Drain Line Safety Flange	115	0	0	0	0	8760	0
116	To Flare line 2nd I/V U/S Flange	116	0	0	0	0	8760	0
117	To Flare line 2nd I/V Gland	117	0	0	0	0	8760	0
118	To Flare line 2nd I/V D/S Flange	118	0	0	0	0	8760	0
119	To FG Header line 1st I/V U/S Flange	119	0	0	0	0	8760	0
120	To FG Header line 1st I/V Gland	120	0	0	0	0	8760	0
121	To FG Header line 1st I/V D/S Flange	121	0	0	0	0	8760	0
122	NRV Top Flange	122	0	0	0	0	8760	0
123	NRV D/S Flange	123	0	0	0	0	8760	0
124	Drain Line I/V Gland	124	0	0	0	0	8760	0
125	Drain Line Safety Flange	125	0	0	0	0	8760	0
126	To FG Header line 2nd I/V U/S Flange	126	0	0	0	0	8760	0
127	To FG Header line 2nd I/V Gland	127	0	0	0	0	8760	0
128	To FG Header line 2nd I/V D/S Flange	128	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
129	15-PA-CF-001A	129	0	0	0	0	8760	0
130	Suction line I/V U/S Flange	130	0	0	0	0	8760	0
131	Suction line I/V Gland	131	0	0	0	0	8760	0
132	Suction line I/V D/S Flange	132	0	0	0	0	8760	0
133	Stainer Top Flange	133	0	0	0	0	8760	0
134	P.G. Meter line I/V Gland	134	0	0	0	0	8760	0
135	Suction Line Flange	135	0	0	0	0	8760	0
136	Pump Seal	136	0	0	0	0	8760	0
137	CBD line 1st I/V Gland	137	0	0	0	0	8760	0
138	Stainer Flange	138	0	0	0	0	8760	0
139	CBD line 2nd I/V Gland	139	0	0	0	0	8760	0
140	Drain Line I/V Gland	140	0	0	0	0	8760	0
141	OWS Point	141	0	0	0	0	8760	0
142	Discharge line U/S Flange	142	0	0	0	0	8760	0
143	Meter line Flange	143	0	0	0	0	8760	0
144	NRV U/S Flange	144	0	0	0	0	8760	0
145	NRV Top Flange	145	0	0	0	0	8760	0
146	NRV D/S Flange	146	0	0	0	0	8760	0
147	Discharge line I/V U/S Flange	147	0	0	0	0	8760	0
148	Discharge line I/V Gland	148	0	0	0	0	8760	0
149	Discharge line I/V D/S Flange	149	0	0	0	0	8760	0
150	15-PA-CF-001B	150	0	0	0	0	8760	0
151	Suction line I/V U/S Flange	151	0	0	0	0	8760	0
152	Suction Line I/V Gland	152	0	0	0	0	8760	0
153	Suction line I/V D/S Flange	153	0	0	0	0	8760	0
154	Stainer Top Flange	154	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
155	P.G. Meter line I/V Gland	155	0	0	0	0	8760	0
156	Suction Line Flange	156	0	0	0	0	8760	0
157	Pump Seal	157	0	0	0	0	8760	0
158	CBD line 1st I/V Gland	158	0	0	0	0	8760	0
159	Stainer Flange	159	0	0	0	0	8760	0
160	CBD line 2nd I/V Gland	160	0	0	0	0	8760	0
161	Drain Line I/V Gland	161	0	0	0	0	8760	0
162	OWS Point	162	0	0	0	0	8760	0
163	Discharge line U/S Flange	163	0	0	0	0	8760	0
164	Meter line Flange	164	0	0	0	0	8760	0
165	NRV U/S Flange	165	0	0	0	0	8760	0
166	NRV Top Flange	166	0	0	0	0	8760	0
167	NRV D/S Flange	167	0	0	0	0	8760	0
168	Discharge line I/V U/S Flange	168	0	0	0	0	8760	0
169	Discharge line I/V Gland	169	0	0	0	0	8760	0
170	Discharge line I/V D/S Flange	170	0	0	0	0	8760	0
171	15-PV-1301A U/S I/V U/S Flange	171	0	0	0	0	8760	0
172	15-PV-1301A U/S I/V Gland	172	0	0	0	0	8760	0
173	15-PV-1301A U/S I/V D/S Flange	173	0	0	0	0	8760	0
174	15-PV-1301A C/V U/S Flange	174	0	0	0	0	8760	0
175	15-PV-1301A C/V Gland	175	0	0	0	0	8760	0
176	15-PV-1301A C/V D/S Flange	176	0	0	0	0	8760	0
177	15-PV-1301A D/S I/V U/S Flange	177	0	0	0	0	8760	0
178	15-PV-1301A D/S I/V Gland	178	0	0	0	0	8760	0
179	15-PV-1301A D/S I/V D/S Flange	179	0	0	0	0	8760	0
180	Bypass line I/V U/S Flange	180	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
181	Bypass line I/V Gland	181	0	0	0	0	8760	0
182	Bypass line I/V D/S Flange	182	0	0	0	0	8760	0
183	15-PA-CF-002A	183	0	0	0	0	8760	0
184	Suction line I/V U/S Flange	184	0	0	0	0	8760	0
185	Suction line I/V Gland	185	0	0	0	0	8760	0
186	Suction line I/V D/S Flange	186	0	0	0	0	8760	0
187	Stainer Top Flange	187	0	0	0	0	8760	0
188	P.G. Meter I/V Gland	188	0	0	0	0	8760	0
189	Suction Line Flange	189	0	0	0	0	8760	0
190	Pump Seal	190	0	0	0	0	8760	0
191	CBD line 1st I/V Gland	191	0	0	0	0	8760	0
192	Stainer Flange	192	0	0	0	0	8760	0
193	CBD line 2nd I/V Gland	193	0	0	0	0	8760	0
194	Drain Line I/V Gland	194	0	0	0	0	8760	0
195	OWS Point	195	0	0	0	0	8760	0
196	Discharge Line Flange	196	0	0	0	0	8760	0
197	Meter line I/V Gland	197	0	0	0	0	8760	0
198	NRV U/S Flange	198	0	0	0	0	8760	0
199	NRV Top Flange	199	0	0	0	0	8760	0
200	Discharge line I/V U/S Flange	200	0	0	0	0	8760	0
201	Discharge line I/V Gland	201	0	0	0	0	8760	0
202	Discharge line I/V D/S Flange	202	0	0	0	0	8760	0
203	15-PA-CF-002B	203	0	0	0	0	8760	0
204	Suction line I/V U/S Flange	204	0	0	0	0	8760	0
205	Suction Line I/V Gland	205	0	0	0	0	8760	0
206	Suction line I/V D/S Flange	206	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
Area	Pump							
207	Stainer Top Flange	207	0	0	0	0	8760	0
208	Meter line I/V Gland	208	0	0	0	0	8760	0
209	Suction Line Flange	209	0	0	0	0	8760	0
210	Pump Seal	210	0	0	0	0	8760	0
211	CBD line 1st I/V Gland	211	0	0	0	0	8760	0
212	CBD line 2nd I/V Gland	212	0	0	0	0	8760	0
213	Stainer Flange	213	0	0	0	0	8760	0
214	Drain Line I/V Gland	214	0	0	0	0	8760	0
215	OWS Point	215	0	0	0	0	8760	0
216	Discharge Line Flange	216	0	0	0	0	8760	0
217	Meter line I/V Gland	217	0	0	0	0	8760	0
218	NRV Top Flange	218	0	0	0	0	8760	0
219	NRV D/S Flange	219	0	0	0	0	8760	0
220	Discharge line I/V U/S Flange	220	0	0	0	0	8760	0
221	Discharge line I/V Gland	221	0	0	0	0	8760	0
222	Discharge line I/V D/S Flange	222	0	0	0	0	8760	0
223	15-FV-1503 U/S line I/V Gland	223	0	0	0	0	8760	0
224	CBD line 1st I/V Gland	224	0	0	0	0	8760	0
225	CBD line 2nd I/V Gland	225	0	0	0	0	8760	0
226	Stainer Flange	226	0	0	0	0	8760	0
227	CBD line 3rd I/V Gland	227	0	0	0	0	8760	0
228	15-FV-1503 line C/V U/S Flange	228	0	0	0	0	8760	0
229	15-FV-1503 line C/V Gland	229	0	0	0	0	8760	0
230	15-FV-1503 line C/V D/S Flange	230	0	0	0	0	8760	0
231	15-FV-1503 D/S line I/V Gland	231	0	0	0	0	8760	0

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Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
232	Bypass line I/V Gland	232	0	0	0	0	8760	0
233	14-PACF-004A	233	0	0	0	0	8760	0
234	Suction line I/V U/S Flange	234	0	0	0	0	8760	0
235	Suction Line I/V Gland	235	0	0	0	0	8760	0
236	Suction line I/V D/S Flange	236	0	0	0	0	8760	0
237	Stainer Top Flange	237	0	0	0	0	8760	0
238	Suction Line Flange	238	0	0	0	0	8760	0
239	Pump Seal	239	0	0	0	0	8760	0
240	Discharge Line Flange	240	0	0	0	0	8760	0
241	Meter line I/V Gland	241	0	0	0	0	8760	0
242	NRV U/S Flange	242	0	0	0	0	8760	0
243	NRV Top Flange	243	0	0	0	0	8760	0
244	NRV D/S Flange	244	0	0	0	0	8760	0
245	Discharge line I/V U/S Flange	245	0	0	0	0	8760	0
246	Discharge line I/V Gland	246	0	0	0	0	8760	0
247	Discharge line I/V D/S Flange	247	0	0	0	0	8760	0
248	CBD line 1st I/V Gland	248	0	0	0	0	8760	0
249	CBD line 2nd I/V Gland	249	0	0	0	0	8760	0
250	Drain Line I/V Gland	250	0	0	0	0	8760	0
251	OWS Point	251	0	0	0	0	8760	0
252	Stainer Flange	252	0	0	0	0	8760	0
253	14-PACF-004B	253	0	0	0	0	8760	0
254	Suction line I/V U/S Flange	254	0	0	0	0	8760	0
255	Suction Line I/V Gland	255	0	0	0	0	8760	0
256	Suction line I/V D/S Flange	256	0	0	0	0	8760	0
257	Stainer Top Flange	257	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
258	Suction Line Flange	258	0	0	0	0	8760	0
259	Pump Seal	259	0	0	0	0	8760	0
260	Discharge Line Flange	260	0	0	0	0	8760	0
261	Meter line I/V Gland	261	0	0	0	0	8760	0
262	NRV U/S Flange	262	0	0	0	0	8760	0
263	NRV Top Flange	263	0	0	0	0	8760	0
264	NRV D/S Flange	264	0	0	0	0	8760	0
265	Discharge line I/V U/S Flange	265	0	0	0	0	8760	0
266	Discharge line I/V Gland	266	0	0	0	0	8760	0
267	Discharge line I/V D/S Flange	267	0	0	0	0	8760	0
268	CBD line 1st I/V Gland	268	0	0	0	0	8760	0
269	CBD line 2nd I/V Gland	269	0	0	0	0	8760	0
270	Stainer Flange	270	0	0	0	0	8760	0
271	CBD line 3rd I/V Gland	271	0	0	0	0	8760	0
272	Drain Line I/V Gland	272	0	0	0	0	8760	0
273	OWS Point	273	0	0	0	0	8760	0
274	14-PACF-006A	274	0	0	0	0	8760	0
275	Suction line I/V U/S Flange	275	0	0	0	0	8760	0
276	Suction Line I/V Gland	276	0	0	0	0	8760	0
277	Suction line I/V D/S Flange	277	0	0	0	0	8760	0
278	Stainer Top Flange	278	0	0	0	0	8760	0
279	Suction Line Flange	279	0	0	0	0	8760	0
280	Pump Seal	280	0	0	0	0	8760	0
281	Discharge Line Flange	281	0	0	0	0	8760	0
282	Meter line I/V Gland	282	0	0	0	0	8760	0
283	NRV U/S Flange	283	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
284	NRV Top Flange	284	0	0	0	0	8760	0
285	NRV D/S Flange	285	0	0	0	0	8760	0
286	Drain Line I/V Gland	286	0	0	0	0	8760	0
287	Drain Line Safety Flange	287	0	0	0	0	8760	0
288	Discharge line I/V U/S Flange	288	0	0	0	0	8760	0
289	Discharge line I/V Gland	289	0	0	0	0	8760	0
290	Discharge line I/V D/S Flange	290	0	0	0	0	8760	0
291	Pump To CBD line 1st I/V U/S Flange	291	0	0	0	0	8760	0
292	Pump To CBD line 1st I/V Gland	292	0	0	0	0	8760	0
293	Pump To CBD line 1st I/V D/S Flange	293	0	0	0	0	8760	0
294	Pump To CBD line 2nd I/V Gland	294	0	0	0	0	8760	0
295	Stainer Flange	295	0	0	0	0	8760	0
296	Pump To CBD line 3rd I/V Gland	296	0	0	0	0	8760	0
297	OWS Point	297	0	0	0	0	8760	0
298	14-PACF-006B	298	0	0	0	0	8760	0
299	Suction line I/V U/S Flange	299	0	0	0	0	8760	0
300	Suction Line I/V Gland	300	0	0	0	0	8760	0
301	Suction line I/V D/S Flange	301	0	0	0	0	8760	0
302	Stainer Top Flange	302	0	0	0	0	8760	0
303	Suction Line Flange	303	0	0	0	0	8760	0
304	Pump Seal	304	0	0	0	0	8760	0
305	Discharge Line Flange	305	0	0	0	0	8760	0
306	Meter line I/V Gland	306	0	0	0	0	8760	0
307	NRV U/S Flange	307	0	0	0	0	8760	0
308	NRV Top Flange	308	0	0	0	0	8760	0
309	NRV D/S Flange	309	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
310	Drain Line I/V Gland	310	0	0	0	0	8760	0
311	Drain Line Safety Flange	311	0	0	0	0	8760	0
312	Discharge line I/V U/S Flange	312	0	0	0	0	8760	0
313	Discharge line I/V Gland	313	0	0	0	0	8760	0
314	Discharge line I/V D/S Flange	314	0	0	0	0	8760	0
315	Pump To CBD line 1st I/V U/S Flange	315	0	0	0	0	8760	0
316	Pump To CBD line 1st I/V Gland	316	0	0	0	0	8760	0
317	Pump To CBD line 1st I/V D/S Flange	317	0	0	0	0	8760	0
318	Pump To CBD line 2nd I/V Gland	318	0	0	0	0	8760	0
319	Stainer Flange	319	0	0	0	0	8760	0
320	Pump To CBD line 3rd I/V Gland	320	0	0	0	0	8760	0
321	OWS Point	321	0	0	0	0	8760	0
322	14-FV-1103 U/S line I/V U/S Flange	322	0	0	0	0	8760	0
323	14-FV-1103 U/S line I/V Gland	323	0	0	0	0	8760	0
324	14-FV-1103 U/S line I/V D/S Flange	324	0	0	0	0	8760	0
325	Drain Line 1st I/V Gland	325	0	0	0	0	8760	0
326	Drain Line 2nd I/V Gland	326	0	0	0	0	8760	0
327	Stainer Flange	327	0	0	0	0	8760	0
328	Drain Line 3rd I/V Gland	328	0	0	0	0	8760	0
329	14-FV-1103 C/V U/S Flange	329	0	0	0	0	8760	0
330	14-FV-1103 C/V Gland	330	0	0	0	0	8760	0
331	14-FV-1103 C/V D/S Flange	331	0	0	0	0	8760	0
332	14-FV-1103 D/S line I/V U/S Flange	332	0	0	0	0	8760	0
333	14-FV-1103 D/S line I/V Gland	333	0	0	0	0	8760	
334	14-FV-1103 D/S line I/V D/S Flange	334	0	0	0	0	8760	0
335	Bypass line I/V U/S Flange	335	0	0	0	0	8760	

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
336	Bypass line I/V Gland	336	0	0	0	0	8760	0
337	Bypass line I/V D/S Flange	337	0	0	0	0	8760	0
338	14-UV-1101 CV U/S Flange	338	0	0	0	0	8760	0
339	14-UV-1101 CV Gland	339	0	0	0	0	8760	0
340	14-UV-1101 CV D/S Flange	340	0	0	0	0	8760	0
341	14-PA-CF-001A	341	0	0	0	0	8760	0
342	Suction line I/V U/S Flange	342	0	0	0	0	8760	0
343	Suction Line I/V Gland	343	0	0	0	0	8760	0
344	Suction line I/V D/S Flange	344	0	0	0	0	8760	0
345	Stainer Top Flange	345	0	0	0	0	8760	0
346	Drain Line I/V Gland	346	0	0	0	0	8760	0
347	Drain Line Stainer Flange	347	0	0	0	0	8760	0
348	Suction Line Flange	348	0	0	0	0	8760	0
349	Pump Seal	349	0	0	0	0	8760	0
350	Discharge Line Flange	350	0	0	0	0	8760	0
351	Meter line I/V Gland	351	0	0	0	0	8760	0
352	NRV U/S Flange	352	0	0	0	0	8760	0
353	NRV Top Flange	353	0	0	0	0	8760	0
354	NRV D/S Flange	354	0	0	0	0	8760	0
355	Drain Line I/V Gland	355	0	0	0	0	8760	0
356	Drain Line Stainer Flange	356	0	0	0	0	8760	0
357	Discharge line I/V U/S Flange	357	0	0	0	0	8760	0
358	Discharge line I/V Gland	358	0	0	0	0	8760	0
359	Discharge line I/V D/S Flange	359	0	0	0	0	8760	0
360	Pump To CBD line 1st I/V Gland	360	0	0	0	0	8760	0
361	Pump To CBD line 2nd I/V Gland	361	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
362	Stainer Flange	362	0	0	0	0	8760	0
363	Pump To CBD line 3rd I/V Gland	363	0	0	0	0	8760	0
364	OWS Point	364	0	0	0	0	8760	0
365	14-PA-CF-001B	365	0	0	0	0	8760	0
366	Suction line I/V U/S Flange	366	0	0	0	0	8760	0
367	Suction Line I/V Gland	367	0	0	0	0	8760	0
368	Suction line I/V D/S Flange	368	0	0	0	0	8760	0
369	Stainer Top Flange	369	0	0	0	0	8760	0
370	Drain Line I/V Gland	370	0	0	0	0	8760	0
371	Drain Line Stainer Flange	371	0	0	0	0	8760	0
372	Suction Line Flange	372	0	0	0	0	8760	0
373	Pump Seal	373	0	0	0	0	8760	0
374	Discharge Line Flange	374	0	0	0	0	8760	0
375	Meter line I/V Gland	375	0	0	0	0	8760	0
376	NRV U/S Flange	376	0	0	0	0	8760	0
377	NRV Top Flange	377	0	0	0	0	8760	0
378	NRV D/S Flange	378	0	0	0	0	8760	0
379	Drain Line I/V Gland	379	0	0	0	0	8760	0
380	Drain Line Stainer Flange	380	0	0	0	0	8760	0
381	Discharge line I/V U/S Flange	381	0	0	0	0	8760	0
382	Discharge line I/V Gland	382	0	0	0	0	8760	0
383	Discharge line I/V D/S Flange	383	0	0	0	0	8760	0
384	Pump To CBD line 1st I/V Gland	384	0	0	0	0	8760	0
385	Pump To CBD line 2nd I/V Gland	385	0	0	0	0	8760	
386	Stainer Flange	386	0	0	0	0	876	0
387	Pump To CBD line 3rd I/V Gland	387	0	0	0	0	87	

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Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
388	OWS Point	388	0	0	0	0	8760	0
389	NAPTHA to SLOP U/S line I/V U/S Flange	389	0	0	0	0	8760	0
390	NAPTHA to SLOP U/S line I/V Gland	390	0	0	0	0	8760	0
391	NAPTHA to SLOP U/S line I/V D/S Flange	391	0	0	0	0	8760	0
392	NRV U/S Flange	392	0	0	0	0	8760	0
393	NRV Top Flange	393	0	0	0	0	8760	0
394	NRV D/S Flange	394	0	0	0	0	8760	0
395	Drain Line I/V Gland	395	0	0	0	0	8760	0
396	Drain Line Safety Flange	396	0	0	0	0	8760	0
397	NAPTHA to SLOP D/S line I/V U/S Flange	397	0	0	0	0	8760	0
398	NAPTHA to SLOP D/S line I/V Gland	398	0	0	0	0	8760	0
399	NAPTHA to SLOP D/S line I/V D/S Flange	399	0	0	0	0	8760	0
400	Splitter Reflux To SLOP U/S line I/V U/S Flange	400	0	0	0	0	8760	0
401	Splitter Reflux To SLOP U/S line I/V Gland	401	0	0	0	0	8760	0
402	Splitter Reflux To SLOP U/S line I/V D/S Flange	402	0	0	0	0	8760	0
403	NRV U/S Flange	403	0	0	0	0	8760	0
404	NRV Top Flange	404	0	0	0	0	8760	0
405	NRV D/S Flange	405	0	0	0	0	8760	0
406	Drain Line I/V Gland	406	0	0	0	0	8760	0
407	Drain Line Safety Flange	407	0	0	0	0	8760	0
408	Splitter Reflux To SLOP D/S line I/V U/S Flange	408	0	0	0	0	8760	0
409	Splitter Reflux To SLOP D/S line I/V Gland	409	0	0	0	0	8760	0
410	Splitter Reflux To SLOP D/S line I/V D/S Flange	410	0	0	0	0	8760	0
411	2nd I/V U/S Flange	411	0	0	0	0	8760	0
412	2nd I/V Gland	412	0	0	0	0	8760	0
413	2nd I/V D/S Flange	413	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
414	Stritter Reflux To SLOP U/S line 1st I/V U/S Flange	414	0	0	0	0	8760	0
415	Stritter Reflux To SLOP U/S line 1st I/V Gland	415	0	0	0	0	8760	0
416	Stritter Reflux To SLOP U/S line 1st I/V D/S Flange	416	0	0	0	0	8760	0
417	Stritter Reflux To SLOP U/S line 2nd I/V U/S Flange	417	0	0	0	0	8760	0
418	Stritter Reflux To SLOP U/S line 2nd I/V Gland	418	0	0	0	0	8760	0
419	Stritter Reflux To SLOP U/S line 2nd I/V D/S Flange	419	0	0	0	0	8760	0
420	NRV U/S Flange	420	0	0	0	0	8760	0
421	NRV Top Flange	421	0	0	0	0	8760	0
422	NRV D/S Flange	422	0	0	0	0	8760	0
423	Drain Line I/V Gland	423	0	0	0	0	8760	0
424	Drain Line Safety Flange	424	0	0	0	0	8760	0
425	Stritter Reflux To SLOP D/S line I/V U/S Flange	425	0	0	0	0	8760	0
426	Stritter Reflux To SLOP D/S line I/V Gland	426	0	0	0	0	8760	0
427	Stritter Reflux To SLOP D/S line I/V D/S Flange	427	0	0	0	0	8760	0
428	Hydrogen Rich Gas From Unit 15 U/S I/V U/S Flange	428	0	0	0	0	8760	0
429	Hydrogen Rich Gas From Unit 15 U/S I/V Gland	429	0	0	0	0	8760	0
430	Hydrogen Rich Gas From Unit 15 U/S I/V D/S Flange	430	0	0	0	0	8760	0
431	NRV U/S Flange	431	0	0	0	0	8760	0
432	NRV Top Flange	432	0	0	0	0	8760	0
433	NRV D/S Flange	433	0	0	0	0	8760	0
434	Drain Line I/V Gland	434	0	0	0	0	8760	0
435	Drain Line Safety Flange	435	0	0	0	0	8760	0
436	Hydrogen Rich Gas From Unit 15 D/S I/V U/S Flange	436	0	0	0	0	8760	0
437	Hydrogen Rich Gas From Unit 15 D/S I/V Gland	437	0	0	0	0	8760	0
438	Hydrogen Rich Gas From Unit 15 D/S I/V D/S Flange	438	0	0	0	0	8760	0
439	Hydrogen From PSA To 16-VV-2 U/S I/V U/S Flange	439	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
440	Hydrogen From PSA To 16-VV-2 U/S I/V Gland	440	0	0	0	0	8760	0
441	Hydrogen From PSA To 16-VV-2 U/S I/V D/S Flange	441	0	0	0	0	8760	0
442	NRV U/S Flange	442	0	0	0	0	8760	0
443	NRV Top Flange	443	0	0	0	0	8760	0
444	NRV D/S Flange	444	0	0	0	0	8760	0
445	Drain Line I/V Gland	445	0	0	0	0	8760	0
446	Drain Line Safety Flange	446	0	0	0	0	8760	0
447	Hydrogen From PSA To 16-VV-2 D/S I/V U/S Flange	447	0	0	0	0	8760	0
448	Hydrogen From PSA To 16-VV-2 D/S I/V Gland	448	0	0	0	0	8760	0
449	Hydrogen From PSA To 16-VV-2 D/S I/V D/S Flange	449	0	0	0	0	8760	0
450	14-FV-1501-CV U/S I/V U/S Flange	450	0	0	0	0	8760	0
451	14-FV-1501-CV U/S I/V Gland	451	0	0	0	0	8760	0
452	14-FV-1501-CV U/S I/V D/S Flange	452	0	0	0	0	8760	0
453	CBD line 1st I/V Gland	453	0	0	0	0	8760	0
454	CBD line 2nd I/V Gland	454	0	0	0	0	8760	0
455	CBD line 3rd I/V Gland	455	0	0	0	0	8760	0
456	Stainer Flange	456	0	0	0	0	8760	0
457	14-FV-1501-CV U/S Flange	457	0	0	0	0	8760	0
458	14-FV-1501-CV Gland	458	0	0	0	0	8760	0
459	14-FV-1501-CV D/S Flange	459	0	0	0	0	8760	0
460	14-FV-1501-CV D/S I/V U/S Flange	460	0	0	0	0	8760	0
461	14-FV-1501-CV D/S I/V Gland	461	0	0	0	0	8760	0
462	14-FV-1501-CV D/S I/V D/S Flange	462	0	0	0	0	8760	0
463	Bypass line I/V U/S Flange	463	0	0	0	0	8760	0
464	Bypass line I/V Gland	464	0	0	0	0	8760	0
465	Bypass line I/V D/S Flange	465	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
466	From 14-PA-4 A/B to SLOP 1st I/V U/S Flange	466	0	0	0	0	8760	0
467	From 14-PA-4 A/B to SLOP 1st I/V Gland	467	0	0	0	0	8760	0
468	From 14-PA-4 A/B to SLOP 1st I/V D/S Flange	468	0	0	0	0	8760	0
469	From 14-PA-4 A/B to SLOP 2nd I/V Gland	469	0	0	0	0	8760	0
470	From 14-PA-4 A/B to SLOP 2nd I/V D/S Flange	470	0	0	0	0	8760	0
471	14-FV-1701 U/S I/V U/S Flange	471	0	0	0	0	8760	0
472	14-FV-1701 U/S I/V Gland	472	0	0	0	0	8760	0
473	14-FV-1701 U/S I/V D/S Flange	473	0	0	0	0	8760	0
474	CBD line 1st I/V Gland	474	0	0	0	0	8760	0
475	CBD line 2nd I/V Gland	475	0	0	0	0	8760	0
476	CBD line 3rd I/V Gland	476	0	0	0	0	8760	0
477	Stainer Flange	477	0	0	0	0	8760	0
478	14-FV-1701 C/V U/S Flange	478	0	0	0	0	8760	0
479	14-FV-1701 C/V Gland	479	0	0	0	0	8760	0
480	14-FV-1701 C/V D/S Flange	480	0	0	0	0	8760	0
481	14-FV-1701 D/S I/V U/S Flange	481	0	0	0	0	8760	0
482	14-FV-1701 D/S I/V Gland	482	0	0	0	0	8760	0
483	14-FV-1701 D/S I/V D/S Flange	483	0	0	0	0	8760	0
484	Bypass line I/V U/S Flange	484	0	0	0	0	8760	0
485	14-FV-1401 U/S I/V U/S Flange	485	0	0	0	0	8760	0
486	14-FV-1401 U/S I/V Gland	486	0	0	0	0	8760	0
487	14-FV-1401 U/S I/V D/S Flange	487	0	0	0	0	8760	0
488	CBD line 1st I/V Gland	488	0	0	0	0	8760	0
489	CBD line 2nd I/V Gland	489	0	0	0	0	8760	0
490	CBD line 3rd I/V Gland	490	0	0	0	0	8760	0
491	Stainer Flange	491	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
492	14-FV-1401 C/V U/S Flange	492	0	0	0	0	8760	0
493	14-FV-1401 C/V Gland	493	0	0	0	0	8760	0
494	14-FV-1401 C/V D/S Flange	494	0	0	0	0	8760	0
495	14-FV-1401 D/S I/V U/S Flange	495	0	0	0	0	8760	0
496	14-FV-1401 D/S I/V Gland	496	0	0	0	0	8760	0
497	14-FV-1401 D/S I/V D/S Flange	497	0	0	0	0	8760	0
498	Bypass line I/V U/S Flange	498	0	0	0	0	8760	0
499	Bypass line I/V Gland	499	0	0	0	0	8760	0
500	Bypass line I/V D/S Flange	500	0	0	0	0	8760	0
501	From 14-PA-CF-001 Start Up line I/V U/S Flange	501	0	0	0	0	8760	0
502	From 14-PA-CF-001 Start Up line I/V Gland	502	0	0	0	0	8760	0
503	From 14-PA-CF-001 Start Up line I/V D/S Flange	503	0	0	0	0	8760	0
504	Hydrogen From Unit 15 1st I/V Gland	504	0	0	0	0	8760	0
505	Stainer Flange	505	0	0	0	0	8760	0
506	Top Flange	506	0	0	0	0	8760	0
507	Drain Line I/V Gland	507	0	0	0	0	8760	0
508	Drain Line Safety Flange	508	0	0	0	0	8760	0
509	Hydrogen From Unit 15 2nd I/V Gland	509	0	0	0	0	8760	0
510	14-FV-1402 U/S line I/V Gland	510	0	0	0	0	8760	0
511	CBD line I/V Gland	511	0	0	0	0	8760	0
512	14-FV-1402 C/V U/S Flange	512	0	0	0	0	8760	0
513	14-FV-1402 C/V Gland	513	0	0	0	0	8760	0
514	CBD line I/V Gland	514	0	0	0	0	8760	0
515	14-FV-1402 D/S I/V Gland	515	0	0	0	0	8760	
516	Bypass line I/V Gland	516	0	0	0	0	876	0
517	Heavy Naptha From Unit-14 line 1st I/V U/S Flange	517	0	0	0	0	87	

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
518	Heavy Naptha From Unit-14 line 1st I/V Gland	518	0	0	0	0	8760	0
519	Heavy Naptha From Unit-14 line 1st I/V D/S Flange	519	0	0	0	0	8760	0
520	Heavy Naptha From Unit-14 line 2nd I/V Gland	520	0	0	0	0	8760	0
521	Heavy Naptha From Unit-14 line 2nd I/V D/S Flange	521	0	0	0	0	8760	0
522	Feed Naptha To Unit-15 line U/S I/V U/S Flange	522	0	0	0	0	8760	0
523	Feed Naptha To Unit-15 line U/S I/V Gland	523	0	0	0	0	8760	0
524	Feed Naptha To Unit-15 line U/S I/V D/S Flange	524	0	0	0	0	8760	0
525	NRV U/S Flange	525	0	0	0	0	8760	0
526	NRV Top Flange	526	0	0	0	0	8760	0
527	NRV D/S Flange	527	0	0	0	0	8760	0
528	Drain Line I/V Gland	528	0	0	0	0	8760	0
529	Drain Line Safety Flange	529	0	0	0	0	8760	0
530	Feed Naptha To Unit-15 line D/S I/V U/S Flange	530	0	0	0	0	8760	0
531	Feed Naptha To Unit-15 line D/S I/V Gland	531	0	0	0	0	8760	0
532	Feed Naptha To Unit-15 line D/S I/V D/S Flange	532	0	0	0	0	8760	0
533	S/U line (Reaction Section BP) line U/S I/V U/S Flange	533	0	0	0	0	8760	0
534	S/U line (Reaction Section BP) line U/S I/V Gland	534	0	0	0	0	8760	0
535	S/U line (Reaction Section BP) line U/S I/V D/S Flange	535	0	0	0	0	8760	0
536	S/U line (Reaction Section BP) line D/S I/V U/S Flange	536	0	0	0	0	8760	0
537	S/U line (Reaction Section BP) line D/S I/V Gland	537	0	0	0	0	8760	0
538	Hydrogen From PSA To 15-KA-001 Seal U/S line	538	0	0	0	0	8760	0
539	Hydrogen From PSA To 15-KA-001 Seal U/S line	539	0	0	0	0	8760	0
540	Hydrogen From PSA To 15-KA-001 Seal U/S line	540	0	0	0	0	8760	0
541	NRV U/S Flange	541	0	0	0	0	8760	0
542	NRV Top Flange	542	0	0	0	0	8760	0
543	NRV D/S Flange	543	0	0	0	0	8760	0

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VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
544	Drain Line I/V Gland	544	0	0	0	0	8760	0
545	Drain Line Safety Flange	545	0	0	0	0	8760	0
546	Hydrogen From PSA To 15-KA-001 Seal D/S line	546	0	0	0	0	8760	0
547	Hydrogen From PSA To 15-KA-001 Seal D/S line	547	0	0	0	0	8760	0
548	Hydrogen From PSA To 15-KA-001 Seal D/S line	548	0	0	0	0	8760	0
549	From 16-KA-001 A/B To 15-KA-001 (Seal) line	549	0	0	0	0	8760	0
550	From 16-KA-001 A/B To 15-KA-001 (Seal) line	550	0	0	0	0	8760	0
551	From 16-KA-001 A/B To 15-KA-001 (Seal) line	551	0	0	0	0	8760	0
552	NRV U/S Flange	552	0	0	0	0	8760	0
553	NRV Top Flange	553	0	0	0	0	8760	0
554	NRV D/S Flange	554	0	0	0	0	8760	0
555	Vrain Line I/V Gland	555	0	0	0	0	8760	0
556	Vrain Line Safety Flange	556	0	0	0	0	8760	0
557	From 16-KA-001 A/B To 15-KA-001 (Seal) line	557	0	0	0	0	8760	0
558	From 16-KA-001 A/B To 15-KA-001 (Seal) line	558	0	0	0	0	8760	0
559	From 16-KA-001 A/B To 15-KA-001 (Seal) line	559	0	0	0	0	8760	0
560	To-15-KA-001 Seal line U/S I/V U/S Flange	560	0	0	0	0	8760	0
561	To-15-KA-001 Seal line U/S I/V Gland	561	0	0	0	0	8760	0
562	To-15-KA-001 Seal line U/S I/V D/S Flange	562	0	0	0	0	8760	0
563	NRV U/S Flange	563	0	0	0	0	8760	0
564	NRV Top Flange	564	0	0	0	0	8760	0
565	NRV D/S Flange	565	0	0	0	0	8760	0
566	To-15-KA-001 Seal line D/S I/V U/S Flange	566	0	0	0	0	8760	0
567	To-15-KA-001 Seal line D/S I/V Gland	567	0	0	0	0	8760	
568	To-15-KA-001 Seal line D/S I/V D/S Flange	568	0	0	0	0	8760	0
569	16-PA-CF-0011A Suction line I/V U/S Flange	569	0	0	0	0	8760	

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Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
570	16-PA-CF-0011A Suction line I/V Gland	570	0	0	0	0	8760	0
571	16-PA-CF-0011A Suction line I/V D/S Flange	571	0	0	0	0	8760	0
572	Stainer Flange	572	0	0	0	0	8760	0
573	Drain Line 1st I/V Gland	573	0	0	0	0	8760	0
574	Stainer Flange	574	0	0	0	0	8760	0
575	Drain Line 2nd I/V Gland	575	0	0	0	0	8760	0
576	Suction Line Flange	576	0	0	0	0	8760	0
577	Pump Seal	577	0	0	0	0	8760	0
578	Discharge Line Flange	578	0	0	0	0	8760	0
579	Drain Line I/V Gland	579	0	0	0	0	8760	0
580	Drain Line Safety Flange	580	0	0	0	0	8760	0
581	Meter line I/V Gland	581	0	0	0	0	8760	0
582	NRV U/S Flange	582	0	0	0	0	8760	0
583	NRV Top Flange	583	0	0	0	0	8760	0
584	NRV D/S Flange	584	0	0	0	0	8760	0
585	Drain Line 1st I/V Gland	585	0	0	0	0	8760	0
586	Drain Line 2nd I/V Gland	586	0	0	0	0	8760	0
587	OWS Point	587	0	0	0	0	8760	0
588	Suction line Outlet line to 1st I/V U/S Flange	588	0	0	0	0	8760	0
589	Suction line Outlet line to 1st I/V Gland	589	0	0	0	0	8760	0
590	Suction line Outlet line to 1st I/V D/S Flange	590	0	0	0	0	8760	0
591	Drain Line I/V Gland	591	0	0	0	0	8760	0
592	Drain Line Safety Flange	592	0	0	0	0	8760	0
593	Suction line Outlet line to 2nd I/V U/S Flange	593	0	0	0	0	8760	0
594	Suction line Outlet line to 2nd I/V Gland	594	0	0	0	0	8760	0
595	Suction line Outlet line to 2nd I/V D/S Flange	595	0	0	0	0	8760	0

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Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
596	16-PA-CF-0011B Suction line I/V U/S Flange	596	0	0	0	0	8760	0
597	16-PA-CF-0011B Suction line I/V Gland	597	0	0	0	0	8760	0
598	16-PA-CF-0011B Suction line I/V D/S Flange	598	0	0	0	0	8760	0
599	Stainer Top Flange	599	0	0	0	0	8760	0
600	Drain Line 1st I/V Gland	600	0	0	0	0	8760	0
601	Stainer Flange	601	0	0	0	0	8760	0
602	Drain Line 2nd I/V Gland	602	0	0	0	0	8760	0
603	Suction Line Flange	603	0	0	0	0	8760	0
604	Pump Seal	604	0	0	0	0	8760	0
605	Discharge Line Flange	605	0	0	0	0	8760	0
606	Drain Line I/V Gland	606	0	0	0	0	8760	0
607	Drain Line Safety Flange	607	0	0	0	0	8760	0
608	P.G. Meter I/V Gland	608	0	0	0	0	8760	0
609	NRV U/S Flange	609	0	0	0	0	8760	0
610	NRV Top Flange	610	0	0	0	0	8760	0
611	NRV D/S Flange	611	0	0	0	0	8760	0
612	Drain Line 1st I/V Gland	612	0	0	0	0	8760	0
613	Drain Line 2nd I/V Gland	613	0	0	0	0	8760	0
614	OWS Point	614	0	0	0	0	8760	0
615	Discharge line I/V U/S Flange	615	0	0	0	0	8760	0
616	Discharge line I/V Gland	616	0	0	0	0	8760	0
617	Discharge line I/V D/S Flange	617	0	0	0	0	8760	0
618	Discharge line to Outlet line I/V Gland	618	0	0	0	0	8760	0
619	Discharge line to Outlet line Top Flange	619	0	0	0	0	8760	0
620	Drain Line I/V Gland	620	0	0	0	0	8760	0
621	Drain Line Safety Flange	621	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
622	16-PA-CF-013A	622	0	0	0	0	8760	0
623	Suction line I/V U/S Flange	623	0	0	0	0	8760	0
624	Suction Line I/V Gland	624	0	0	0	0	8760	0
625	Suction line I/V D/S Flange	625	0	0	0	0	8760	0
626	Stainer Top Flange	626	0	0	0	0	8760	0
627	Suction line to Outlet line 1st I/V U/S Flange	627	0	0	0	0	8760	0
628	Suction line to Outlet line 1st I/V Gland	628	0	0	0	0	8760	0
629	Suction line to Outlet line 1st I/V D/S Flange	629	0	0	0	0	8760	0
630	Suction line to Outlet line 2nd I/V U/S Flange	630	0	0	0	0	8760	0
631	Suction line to Outlet line 2nd I/V Gland	631	0	0	0	0	8760	0
632	Suction line to Outlet line 2nd I/V D/S Flange	632	0	0	0	0	8760	0
633	Suction line to Outlet line 3rd I/V U/S Flange	633	0	0	0	0	8760	0
634	Suction line to Outlet line 3rd I/V Gland	634	0	0	0	0	8760	0
635	Suction line to Outlet line 3rd I/V D/S Flange	635	0	0	0	0	8760	0
636	OWS Point	636	0	0	0	0	8760	0
637	Drain Line 1st I/V Gland	637	0	0	0	0	8760	0
638	Steamer Flange	638	0	0	0	0	8760	0
639	Drain Line 2nd I/V Gland	639	0	0	0	0	8760	0
640	Suction Line Flange	640	0	0	0	0	8760	0
641	Discharge Line Flange	641	0	0	0	0	8760	0
642	P.G. Meter I/V Gland	642	0	0	0	0	8760	0
643	NRV U/S Flange	643	0	0	0	0	8760	0
644	NRV Top Flange	644	0	0	0	0	8760	0
645	NRV D/S Flange	645	0	0	0	0	8760	0
646	Drain Line 1st I/V Gland	646	0	0	0	0	8760	0
647	Drain Line 2nd I/V Gland	647	0	0	0	0	8760	0

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
648	OWS Point	648	0	0	0	0	8760	0
649	Discharge line I/V U/S Flange	649	0	0	0	0	8760	0
650	Discharge line I/V Gland	650	0	0	0	0	8760	0
651	Discharge line I/V D/S Flange	651	0	0	0	0	8760	0
652	16-PA-CF-013B	652	0	0	0	0	8760	0
653	Suction line I/V U/S Flange	653	0	0	0	0	8760	0
654	Suction Line I/V Gland	654	0	0	0	0	8760	0
655	Suction line I/V D/S Flange	655	0	0	0	0	8760	0
656	Stainer Top Flange	656	0	0	0	0	8760	0
657	Drain Line 1st I/V Gland	657	0	0	0	0	8760	0
658	Steamer Flange	658	0	0	0	0	8760	0
659	Drain Line 2nd I/V Gland	659	0	0	0	0	8760	0
660	Suction Line Flange	660	0	0	0	0	8760	0
661	Discharge Line Flange	661	0	0	0	0	8760	0
662	P.G. Meter I/V Gland	662	0	0	0	0	8760	0
663	NRV U/S Flange	663	0	0	0	0	8760	0
664	NRV Top Flange	664	0	0	0	0	8760	0
665	NRV D/S Flange	665	0	0	0	0	8760	0
666	Drain Line 1st I/V Gland	666	0	0	0	0	8760	0
667	Drain Line 2nd I/V Gland	667	0	0	0	0	8760	0
668	OWS Point	668	0	0	0	0	8760	0
669	Discharge line I/V U/S Flange	669	0	0	0	0	8760	0
670	Discharge line I/V Gland	670	0	0	0	0	8760	0
671	Discharge line I/V D/S Flange	671	0	0	0	0	8760	
672	16-FV-2201 U/S line I/V U/S Flange	672	0	0	0	0	8760	0
673	16-FV-2201 U/S line I/V Gland	673	0	0	0	0	8760	

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
674	16-FV-2201 U/S line I/V D/S Flange	674	0	0	0	0	8760	0
675	Drain Line I/V Gland	675	0	0	0	0	8760	0
676	16-FV-2201 C/V U/S Flange	676	0	0	0	0	8760	0
677	16-FV-2201 C/V Gland	677	0	0	0	0	8760	0
678	16-FV-2201 C/V D/S Flange	678	0	0	0	0	8760	0
679	Drain Line I/V Gland	679	0	0	0	0	8760	0
680	16-FV-2201 D/S line I/V U/S Flange	680	0	0	0	0	8760	0
681	16-FV-2201 D/S line I/V Gland	681	0	0	0	0	8760	0
682	16-FV-2201 D/S line I/V D/S Flange	682	0	0	0	0	8760	0
683	Bypass line I/V U/S Flange	683	0	0	0	0	8760	0
684	Bypass line I/V Gland	684	0	0	0	0	8760	0
685	Bypass line I/V D/S Flange	685	0	0	0	0	8760	0
686	16-FV-2103 U/S line I/V U/S Flange	686	0	0	0	0	8760	0
687	16-FV-2103 U/S line I/V Gland	687	0	0	0	0	8760	0
688	16-FV-2103 U/S line I/V D/S Flange	688	0	0	0	0	8760	0
689	Drain Line I/V Gland	689	0	0	0	0	8760	0
690	16-FV-2103 line C/V U/S Flange	690	0	0	0	0	8760	0
691	16-FV-2103 line C/V Gland	691	0	0	0	0	8760	0
692	16-FV-2103 line C/V D/S Flange	692	0	0	0	0	8760	0
693	Drain Line I/V Gland	693	0	0	0	0	8760	0
694	15-FV-2103 D/S line I/V U/S Flange	694	0	0	0	0	8760	0
695	15-FV-2103 D/S line I/V Gland	695	0	0	0	0	8760	0
696	15-FV-2103 D/S line I/V D/S Flange	696	0	0	0	0	8760	0
697	Bypass line I/V U/S Flange	697	0	0	0	0	8760	0
698	Bypass line I/V Gland	698	0	0	0	0	8760	0
699	Bypass line I/V D/S Flange	699	0	0	0	0	8760	0

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
700	16-FV-2205 U/S line I/V U/S Flange	700	0	0	0	0	8760	0
701	16-FV-2205 U/S line I/V Gland	701	0	0	0	0	8760	0
702	16-FV-2205 U/S line I/V D/S Flange	702	0	0	0	0	8760	0
703	Drain Line I/V Gland	703	0	0	0	0	8760	0
704	16-FV-2205 C/V U/S Flange	704	0	0	0	0	8760	0
705	16-FV-2205 C/V Gland	705	0	0	0	0	8760	0
706	16-FV-2205 C/V D/S Flange	706	0	0	0	0	8760	0
707	Drain Line I/V Gland	707	0	0	0	0	8760	0
708	16-FV-2205 D/S line I/V U/S Flange	708	0	0	0	0	8760	0
709	16-FV-2205 D/S line I/V Gland	709	0	0	0	0	8760	0
710	16-FV-2205 D/S line I/V D/S Flange	710	0	0	0	0	8760	0
711	Bypass line I/V U/S Flange	711	0	0	0	0	8760	0
712	Bypass line I/V Gland	712	0	0	0	0	8760	0
713	Bypass line I/V D/S Flange	713	0	0	0	0	8760	0
714	16-PA-CF-010A	714	0	0	0	0	8760	0
715	Suction line I/V U/S Flange	715	0	0	0	0	8760	0
716	Suction Line I/V Gland	716	0	0	0	0	8760	0
717	Suction line I/V D/S Flange	717	0	0	0	0	8760	0
718	Stainer Top Flange	718	0	0	0	0	8760	0
719	Suction line to Outlet line 1st I/V U/S Flange	719	0	0	0	0	8760	0
720	Suction line to Outlet line 1st I/V Gland	720	0	0	0	0	8760	0
721	Suction line to Outlet line 1st I/V D/S Flange	721	0	0	0	0	8760	0
722	Suction line to Outlet line 2nd I/V U/S Flange	722	0	0	0	0	8760	0
723	Suction line to Outlet line 2nd I/V Gland	723	0	0	0	0	8760	0
724	Suction line to Outlet line 2nd I/V D/S Flange	724	0	0	0	0	8760	0
725	Suction line to Outlet line 3rd I/V U/S Flange	725	0	0	0	0	8760	0

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726	Suction line to Outlet line 3rd I/V Gland	726	0	0	0	0	8760	0
727	Suction line to Outlet line 3rd I/V D/S Flange	727	0	0	0	0	8760	0
728	OWS Point	728	0	0	0	0	8760	0
729	Drain Line 1st I/V Gland	729	0	0	0	0	8760	0
730	Steamer Flange	730	0	0	0	0	8760	0
731	Drain Line 2nd I/V Gland	731	0	0	0	0	8760	0
732	Suction Line Flange	732	0	0	0	0	8760	0
733	Pump Seal	733	0	0	0	0	8760	0
734	Discharge Line Flange	734	0	0	0	0	8760	0
735	P.G. Meter I/V Gland	735	0	0	0	0	8760	0
736	NRV U/S Flange	736	0	0	0	0	8760	0
737	NRV Top Flange	737	0	0	0	0	8760	0
738	NRV D/S Flange	738	0	0	0	0	8760	0
739	Drain Line 1st I/V Gland	739	0	0	0	0	8760	0
740	Drain Line 2nd I/V Gland	740	0	0	0	0	8760	0
741	OWS Point	741	0	0	0	0	8760	0
742	Discharge line I/V U/S Flange	742	0	0	0	0	8760	0
743	Discharge line I/V Gland	743	0	0	0	0	8760	0
744	Discharge line I/V D/S Flange	744	0	0	0	0	8760	0
745	16-PA-CF-010B	745	0	0	0	0	8760	0
746	Suction line I/V U/S Flange	746	0	0	0	0	8760	0
747	Suction Line I/V Gland	747	0	0	0	0	8760	0
748	Suction line I/V D/S Flange	748	0	0	0	0	8760	0
749	Stainer Top Flange	749	0	0	0	0	8760	0
750	Drain Line 1st I/V Gland	750	0	0	0	0	8760	0
751	Steamer Flange	751	0	0	0	0	8760	0

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
752	Drain Line 2nd I/V Gland	752	0	0	0	0	8760	0
753	Suction Line Flange	753	0	0	0	0	8760	0
754	Pump Seal	754	0	0	0	0	8760	0
755	Discharge Line Flange	755	0	0	0	0	8760	0
756	P.G. Meter I/V Gland	756	0	0	0	0	8760	0
757	NRV U/S Flange	757	0	0	0	0	8760	0
758	NRV Top Flange	758	0	0	0	0	8760	0
759	NRV D/S Flange	759	0	0	0	0	8760	0
760	Drain Line 1st I/V Gland	760	0	0	0	0	8760	0
761	Drain Line 2nd I/V Gland	761	0	0	0	0	8760	0
762	OWS Point	762	0	0	0	0	8760	0
763	Discharge line I/V U/S Flange	763	0	0	0	0	8760	0
764	Discharge line I/V Gland	764	0	0	0	0	8760	0
765	Discharge line I/V D/S Flange	765	0	0	0	0	8760	0
766	16-PA-CF-012A	766	0	0	0	0	8760	0
767	Suction line I/V U/S Flange	767	0	0	0	0	8760	0
768	Suction Line I/V Gland	768	0	0	0	0	8760	0
769	Suction line I/V D/S Flange	769	0	0	0	0	8760	0
770	Stainer Top Flange	770	0	0	0	0	8760	0
771	Drain Line 1st I/V Gland	771	0	0	0	0	8760	0
772	Steamer Flange	772	0	0	0	0	8760	0
773	Drain Line 2nd I/V Gland	773	0	0	0	0	8760	0
774	Suction Line Flange	774	0	0	0	0	8760	0
775	Discharge Line Flange	775	0	0	0	0	8760	0
776	Meter line I/V Gland	776	0	0	0	0	8760	0
777	Top Flange	777	0	0	0	0	8760	0

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VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
778	Drain Line 1st I/V Gland	778	0	0	0	0	8760	0
779	Drain Line 2nd I/V Gland	779	0	0	0	0	8760	0
780	OWS Point	780	0	0	0	0	8760	0
781	Discharge line I/V Gland	781	0	0	0	0	8760	0
782	16-PA-CF-012B	782	0	0	0	0	8760	0
783	Suction line I/V U/S Flange	783	0	0	0	0	8760	0
784	Suction Line I/V Gland	784	0	0	0	0	8760	0
785	Suction line I/V D/S Flange	785	0	0	0	0	8760	0
786	Stainer Top Flange	786	0	0	0	0	8760	0
787	Drain Line 1st I/V Gland	787	0	0	0	0	8760	0
788	Steamer Flange	788	0	0	0	0	8760	0
789	Drain Line 2nd I/V Gland	789	0	0	0	0	8760	0
790	Suction Line Flange	790	0	0	0	0	8760	0
791	Discharge Line Flange	791	0	0	0	0	8760	0
792	Meter line I/V Gland	792	0	0	0	0	8760	0
793	Top Flange	793	0	0	0	0	8760	0
794	Drain Line 1st I/V Gland	794	0	0	0	0	8760	0
795	Drain Line 2nd I/V Gland	795	0	0	0	0	8760	0
796	OWS Point	796	0	0	0	0	8760	0
797	Discharge line I/V Gland	797	0	0	0	0	8760	0
798	16-FV-2204 D/S line I/V Gland	798	0	0	0	0	8760	0
799	Drain Line 1st I/V Gland	799	0	0	0	0	8760	0
800	Stainer Flange	800	0	0	0	0	8760	0
801	Drain Line 2nd I/V Gland	801	0	0	0	0	8760	
802	16-FV-2204 line C/V U/S Flange	802	0	0	0	0	8760	0
803	16-FV-2204 line C/V Gland	803	0	0	0	0	8760	

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
804	16-FV-2204 line C/V D/S Flange	804	0	0	0	0	8760	0
805	Drain Line I/V Gland	805	0	0	0	0	8760	0
806	D/S line I/V Gland	806	0	0	0	0	8760	0
807	Bypass line I/V Gland	807	0	0	0	0	8760	0
808	16-FV-2206 U/S line I/V Gland	808	0	0	0	0	8760	0
809	Drain Line 1st I/V Gland	809	0	0	0	0	8760	0
810	Stainer Flange	810	0	0	0	0	8760	0
811	Drain Line 2nd I/V Gland	811	0	0	0	0	8760	0
812	16-FV-2206 C/V U/S Flange	812	0	0	0	0	8760	0
813	16-FV-2206 C/V Gland	813	0	0	0	0	8760	0
814	16-FV-2206 C/V D/S Flange	814	0	0	0	0	8760	0
815	Drain Line I/V Gland	815	0	0	0	0	8760	0
816	D/S line I/V Gland	816	0	0	0	0	8760	0
817	Bypass line Stainer Flange	817	0	0	0	0	8760	0
818	Bypass line I/V Gland	818	0	0	0	0	8760	0
819	16-PA-CF-006A	819	0	0	0	0	8760	0
820	Suction line I/V U/S Flange	820	0	0	0	0	8760	0
821	Suction Line I/V Gland	821	0	0	0	0	8760	0
822	Suction line I/V D/S Flange	822	0	0	0	0	8760	0
823	Stainer Top Flange	823	0	0	0	0	8760	0
824	Drain Line 1st I/V Gland	824	0	0	0	0	8760	0
825	Steamer Flange	825	0	0	0	0	8760	0
826	Drain Line 2nd I/V Gland	826	0	0	0	0	8760	0
827	Suction Line Flange	827	0	0	0	0	8760	0
828	Pump Seal	828	0	0	0	0	8760	0
829	Discharge Line Flange	829	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
830	Vrain Line I/V Gland	830	0	0	0	0	8760	0
831	Vrain Line Safety Flange	831	0	0	0	0	8760	0
832	Meter line I/V Gland	832	0	0	0	0	8760	0
833	NRV U/S Flange	833	0	0	0	0	8760	0
834	NRV Top Flange	834	0	0	0	0	8760	0
835	NRV D/S Flange	835	0	0	0	0	8760	0
836	Drain Line 1st I/V Gland	836	0	0	0	0	8760	0
837	Drain Line 2nd I/V Gland	837	0	0	0	0	8760	0
838	OWS Point	838	0	0	0	0	8760	0
839	Discharge line I/V U/S Flange	839	0	0	0	0	8760	0
840	Discharge line I/V Gland	840	0	0	0	0	8760	0
841	Discharge line I/V D/S Flange	841	0	0	0	0	8760	0
842	16-PA-CF-006B	842	0	0	0	0	8760	0
843	Suction line I/V U/S Flange	843	0	0	0	0	8760	0
844	Suction Line I/V Gland	844	0	0	0	0	8760	0
845	Suction line I/V D/S Flange	845	0	0	0	0	8760	0
846	Stainer Top Flange	846	0	0	0	0	8760	0
847	Drain Line 1st I/V Gland	847	0	0	0	0	8760	0
848	Steamer Flange	848	0	0	0	0	8760	0
849	Drain Line 2nd I/V Gland	849	0	0	0	0	8760	0
850	Suction Line Flange	850	0	0	0	0	8760	0
851	Pump Seal	851	0	0	0	0	8760	0
852	Discharge Line Flange	852	0	0	0	0	8760	0
853	Vrain line I/V Gland	853	0	0	0	0	8760	0
854	Vrain Line Safety Flange	854	0	0	0	0	8760	0
855	Meter line I/V Gland	855	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
856	NRV U/S Flange	856	0	0	0	0	8760	0
857	NRV Top Flange	857	0	0	0	0	8760	0
858	NRV D/S Flange	858	0	0	0	0	8760	0
859	Drain Line 1st I/V Gland	859	0	0	0	0	8760	0
860	Drain Line 2nd I/V Gland	860	0	0	0	0	8760	0
861	OWS Point	861	0	0	0	0	8760	0
862	Discharge line I/V U/S Flange	862	0	0	0	0	8760	0
863	Discharge line I/V Gland	863	0	0	0	0	8760	0
864	Discharge line I/V D/S Flange	864	0	0	0	0	8760	0
865	MIN FLOW to 16-VV-06 U/S line I/V U/S Flange	865	0	0	0	0	8760	0
866	MIN FLOW to 16-VV-06 U/S line I/V Gland	866	0	0	0	0	8760	0
867	MIN FLOW to 16-VV-06 U/S line I/V D/S Flange	867	0	0	0	0	8760	0
868	NRV U/S Flange	868	0	0	0	0	8760	0
869	NRV Top Flange	869	0	0	0	0	8760	0
870	NRV D/S Flange	870	0	0	0	0	8760	0
871	Drain Line I/V Gland	871	0	0	0	0	8760	0
872	Drain Line Safety Flange	872	0	0	0	0	8760	0
873	Heavy Reformate to Storage U/S line I/V Gland	873	0	0	0	0	8760	0
874	Top Flange	874	0	0	0	0	8760	0
875	Drain Line I/V Gland	875	0	0	0	0	8760	0
876	Drain Line Safety Flange	876	0	0	0	0	8760	0
877	D/S line Stainer Flange	877	0	0	0	0	8760	0
878	D/S line I/V Gland	878	0	0	0	0	8760	0
879	16-PV-2102 U/S line I/V Gland	879	0	0	0	0	8760	0
880	Drain Line I/V Gland	880	0	0	0	0	8760	0
881	16-PV-2102 line C/V U/S Flange	881	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
882	16-PV-2102 line C/V Gland	882	0	0	0	0	8760	0
883	16-PV-2102 line C/V D/S Flange	883	0	0	0	0	8760	0
884	Drain Line I/V Gland	884	0	0	0	0	8760	0
885	D/S line I/V Gland	885	0	0	0	0	8760	0
886	Bypass line Stainer Flange	886	0	0	0	0	8760	0
887	Bypass line I/V Gland	887	0	0	0	0	8760	0
888	16-PA-CF-003A	888	0	0	0	0	8760	0
889	Suction line I/V U/S Flange	889	0	0	0	0	8760	0
890	Suction line I/V Gland	890	0	0	0	0	8760	0
891	Suction line I/V D/S Flange	891	0	0	0	0	8760	0
892	Stainer Top Flange	892	0	0	0	0	8760	0
893	Suction line to Outlet line 1st I/V U/S Flange	893	0	0	0	0	8760	0
894	Suction line to Outlet line 1st I/V Gland	894	0	0	0	0	8760	0
895	Suction line to Outlet line 1st I/V D/S Flange	895	0	0	0	0	8760	0
896	Suction line to Outlet line 2nd I/V U/S Flange	896	0	0	0	0	8760	0
897	Suction line to Outlet line 2nd I/V Gland	897	0	0	0	0	8760	0
898	Suction line to Outlet line 2nd I/V D/S Flange	898	0	0	0	0	8760	0
899	Vrain line I/V Gland	899	0	0	0	0	8760	0
900	Vrain Line Safety Flange	900	0	0	0	0	8760	0
901	Suction line to Outlet line 3rd I/V U/S Flange	901	0	0	0	0	8760	0
902	Suction line to Outlet line 3rd I/V Gland	902	0	0	0	0	8760	0
903	Suction line to Outlet line 3rd I/V D/S Flange	903	0	0	0	0	8760	0
904	Drain Line 1st I/V Gland	904	0	0	0	0	8760	0
905	Drain Line 2nd I/V Gland	905	0	0	0	0	8760	0
906	Steamer Flange	906	0	0	0	0	8760	0
907	Suction Line Flange	907	0	0	0	0	8760	0

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Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
908	Discharge Line Flange	908	0	0	0	0	8760	0
909	P.G. Meter I/V Gland	909	0	0	0	0	8760	0
910	Meter line to Drain line I/V Gland	910	0	0	0	0	8760	0
911	Meter line to Drain line Safety Flange	911	0	0	0	0	8760	0
912	NRV U/S Flange	912	0	0	0	0	8760	0
913	NRV Top Flange	913	0	0	0	0	8760	0
914	NRV D/S Flange	914	0	0	0	0	8760	0
915	Drain Line 1st I/V Gland	915	0	0	0	0	8760	0
916	Drain Line 2nd I/V Gland	916	0	0	0	0	8760	0
917	OWS Point	917	0	0	0	0	8760	0
918	Discharge line I/V U/S Flange	918	0	0	0	0	8760	0
919	Discharge line I/V Gland	919	0	0	0	0	8760	0
920	Discharge line I/V D/S Flange	920	0	0	0	0	8760	0
921	16-PA-CF-003B	921	0	0	0	0	8760	0
922	Suction line I/V U/S Flange	922	0	0	0	0	8760	0
923	Suction Line I/V Gland	923	0	0	0	0	8760	0
924	Suction line I/V D/S Flange	924	0	0	0	0	8760	0
925	Stainer Top Flange	925	0	0	0	0	8760	0
926	Drain Line 1st I/V Gland	926	0	0	0	0	8760	0
927	Steamer Flange	927	0	0	0	0	8760	0
928	Drain Line 2nd I/V Gland	928	0	0	0	0	8760	0
929	Suction Line Flange	929	0	0	0	0	8760	0
930	Discharge Line Flange	930	0	0	0	0	8760	0
931	Meter line I/V Gland	931	0	0	0	0	8760	0
932	Meter line to Drain line I/V Gland	932	0	0	0	0	8760	0
933	Meter line to Drain line Safety Flange	933	0	0	0	0	8760	0

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Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
934	NRV U/S Flange	934	0	0	0	0	8760	0
935	NRV Top Flange	935	0	0	0	0	8760	0
936	NRV D/S Flange	936	0	0	0	0	8760	0
937	Drain Line 1st I/V Gland	937	0	0	0	0	8760	0
938	Drain Line 2nd I/V Gland	938	0	0	0	0	8760	0
939	OWS Point	939	0	0	0	0	8760	0
940	Discharge line I/V U/S Flange	940	0	0	0	0	8760	0
941	Discharge line I/V Gland	941	0	0	0	0	8760	0
942	Discharge line I/V D/S Flange	942	0	0	0	0	8760	0
943	16-FV-1803 U/S line I/V Gland	943	0	0	0	0	8760	0
944	Drain Line I/V Gland	944	0	0	0	0	8760	0
945	16-FV-1803 C/V U/S Flange	945	0	0	0	0	8760	0
946	16-FV-1803 C/V Gland	946	0	0	0	0	8760	0
947	16-FV-1803 C/V D/S Flange	947	0	0	0	0	8760	0
948	Drain Line I/V Gland	948	0	0	0	0	8760	0
949	D/S line I/V Gland	949	0	0	0	0	8760	0
950	Bypass line I/V Gland	950	0	0	0	0	8760	0
951	16-FV-1802 D/S line I/V U/S Flange	951	0	0	0	0	8760	0
952	16-FV-1802 D/S line I/V Gland	952	0	0	0	0	8760	0
953	16-FV-1802 D/S line I/V D/S Flange	953	0	0	0	0	8760	0
954	Drain Line I/V Gland	954	0	0	0	0	8760	0
955	16-FV-1802 C/V U/S Flange	955	0	0	0	0	8760	0
956	16-FV-1802 C/V Gland	956	0	0	0	0	8760	0
957	16-FV-1802 C/V D/S Flange	957	0	0	0	0	8760	0
958	Drain Line I/V Gland	958	0	0	0	0	8760	0
959	16-FV-1802 D/S line I/V U/S Flange	959	0	0	0	0	8760	0

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
960	16-FV-1802 D/S line I/V Gland	960	0	0	0	0	8760	0
961	16-FV-1802 D/S line I/V D/S Flange	961	0	0	0	0	8760	0
962	Bypass line I/V U/S Flange	962	0	0	0	0	8760	0
963	Bypass line I/V Gland	963	0	0	0	0	8760	0
964	Bypass line I/V D/S Flange	964	0	0	0	0	8760	0
965	16-PA-CF-005A	965	0	0	0	0	8760	0
966	Suction line I/V U/S Flange	966	0	0	0	0	8760	0
967	Suction line I/V Gland	967	0	0	0	0	8760	0
968	Suction line I/V D/S Flange	968	0	0	0	0	8760	0
969	Stainer Top Flange	969	0	0	0	0	8760	0
970	Drain Line I/V Gland	970	0	0	0	0	8760	0
971	Suction Line Flange	971	0	0	0	0	8760	0
972	Discharge Line Flange	972	0	0	0	0	8760	0
973	Meter line I/V Gland	973	0	0	0	0	8760	0
974	Top Flange	974	0	0	0	0	8760	0
975	Drain Line 1st I/V Gland	975	0	0	0	0	8760	0
976	Steamer Flange	976	0	0	0	0	8760	0
977	Drain Line 2nd I/V Gland	977	0	0	0	0	8760	0
978	OWS Point	978	0	0	0	0	8760	0
979	Discharge line I/V Gland	979	0	0	0	0	8760	0
980	16-PA-CF-005B	980	0	0	0	0	8760	0
981	Suction line I/V U/S Flange	981	0	0	0	0	8760	0
982	Suction line I/V Gland	982	0	0	0	0	8760	0
983	Suction line I/V D/S Flange	983	0	0	0	0	8760	0
984	Stainer Top Flange	984	0	0	0	0	8760	0
985	Drain Line I/V Gland	985	0	0	0	0	8760	0

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			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
986	Suction Line Flange	986	0	0	0	0	8760	0
987	Discharge Line Flange	987	0	0	0	0	8760	0
988	P.G. Meter I/V Gland	988	0	0	0	0	8760	0
989	Drain Line 1st I/V Gland	989	0	0	0	0	8760	0
990	Steamer Flange	990	0	0	0	0	8760	0
991	Drain Line 2nd I/V Gland	991	0	0	0	0	8760	0
992	OWS Point	992	0	0	0	0	8760	0
993	Top Flange	993	0	0	0	0	8760	0
994	Discharge line I/V Gland	994	0	0	0	0	8760	0
995	16-PV-2301 U/S line I/V U/S Flange	995	0	0	0	0	8760	0
996	16-PV-2301 U/S line I/V Gland	996	0	0	0	0	8760	0
997	16-PV-2301 U/S line I/V D/S Flange	997	0	0	0	0	8760	0
998	Drain Line 1st I/V Gland	998	0	0	0	0	8760	0
999	Stainer Flange	999	0	0	0	0	8760	0
1000	Drain Line 2nd I/V Gland	1000	0	0	0	0	8760	0
1001	Drain Line 3rd I/V Gland	1001	0	0	0	0	8760	0
1002	16-PV-2301 C/V U/S Flange	1002	0	0	0	0	8760	0
1003	16-PV-2301 C/V Gland	1003	0	0	0	0	8760	0
1004	16-PV-2301 C/V D/S Flange	1004	0	0	0	0	8760	0
1005	Drain Line I/V Gland	1005	0	0	0	0	8760	0
1006	16-PV-2301 D/S line I/V U/S Flange	1006	0	0	0	0	8760	0
1007	16-PV-2301 D/S line I/V Gland	1007	0	0	0	0	8760	0
1008	16-PV-2301 D/S line I/V D/S Flange	1008	0	0	0	0	8760	0
1009	Bypass line I/V U/S Flange	1009	0	0	0	0	8760	0
1010	Bypass line I/V Gland	1010	0	0	0	0	8760	0
1011	Bypass line I/V D/S Flange	1011	0	0	0	0	8760	0

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
1012	16-FV-1701 U/S line I/V U/S Flange	1012	0	0	0	0	8760	0
1013	16-FV-1701 U/S line I/V Gland	1013	0	0	0	0	8760	0
1014	16-FV-1701 U/S line I/V D/S Flange	1014	0	0	0	0	8760	0
1015	16-FV-1701 C/V U/S Flange	1015	0	0	0	0	8760	0
1016	16-FV-1701 C/V Gland	1016	0	0	0	0	8760	0
1017	16-FV-1701 C/V D/S Flange	1017	0	0	0	0	8760	0
1018	16-FV-1701 D/S line I/V U/S Flange	1018	0	0	0	0	8760	0
1019	16-FV-1701 D/S line I/V Gland	1019	0	0	0	0	8760	0
1020	16-FV-1701 D/S line I/V D/S Flange	1020	0	0	0	0	8760	0
1021	Bypass line I/V U/S Flange	1021	0	0	0	0	8760	0
1022	Bypass line I/V Gland	1022	0	0	0	0	8760	0
1023	Bypass line I/V D/S Flange	1023	0	0	0	0	8760	0
1024	16-FV-1102 U/S line I/V U/S Flange	1024	0	0	0	0	8760	0
1025	16-FV-1102 U/S line I/V Gland	1025	0	0	0	0	8760	0
1026	16-FV-1102 U/S line I/V D/S Flange	1026	0	0	0	0	8760	0
1027	Drain Line 1st I/V Gland	1027	0	0	0	0	8760	0
1028	Stainer Flange	1028	0	0	0	0	8760	0
1029	Drain Line 2nd I/V Gland	1029	0	0	0	0	8760	0
1030	16-FV-1102 C/V U/S Flange	1030	0	0	0	0	8760	0
1031	16-FV-1102 C/V Gland	1031	0	0	0	0	8760	0
1032	16-FV-1102 C/V D/S Flange	1032	0	0	0	0	8760	0
1033	Drain Line I/V Gland	1033	0	0	0	0	8760	0
1034	16-FV-1102 D/S line I/V U/S Flange	1034	0	0	0	0	8760	0
1035	16-FV-1102 D/S line I/V Gland	1035	0	0	0	0	8760	
1036	16-FV-1102 D/S line I/V D/S Flange	1036	0	0	0	0	8760	0
1037	Bypass line I/V U/S Flange	1037	0	0	0	0	8760	

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
1038	Bypass line I/V Gland	1038	0	0	0	0	8760	0
1039	Bypass line I/V D/S Flange	1039	0	0	0	0	8760	0
1040	16-FV-1703 U/S line I/V Gland	1040	0	0	0	0	8760	0
1041	Drain Line I/V Gland	1041	0	0	0	0	8760	0
1042	16-FV-1703 C/V U/S Flange	1042	0	0	0	0	8760	0
1043	16-FV-1703 C/V Glande	1043	0	0	0	0	8760	0
1044	16-FV-1703 C/V D/S Flange	1044	0	0	0	0	8760	0
1045	Drain Line 1st I/V Gland	1045	0	0	0	0	8760	0
1046	Stainer Flange	1046	0	0	0	0	8760	0
1047	Drain Line 2nd I/V Gland	1047	0	0	0	0	8760	0
1048	16-FV-1703 D/S line I/V Gland	1048	0	0	0	0	8760	0
1049	Bypass line I/V Gland	1049	0	0	0	0	8760	0
1050	16-PA-CF-001A	1050	0	0	0	0	8760	0
1051	Suction line I/V U/S Flange	1051	0	0	0	0	8760	0
1052	Suction line I/V Gland	1052	0	0	0	0	8760	0
1053	Suction line I/V D/S Flange	1053	0	0	0	0	8760	0
1054	Stainer Top Flange	1054	0	0	0	0	8760	0
1055	Drain Line 1st I/V Gland	1055	0	0	0	0	8760	0
1056	Drain Line 2nd I/V Gland	1056	0	0	0	0	8760	0
1057	OWS Point	1057	0	0	0	0	8760	0
1058	Suction Line Flange	1058	0	0	0	0	8760	0
1059	Pump Seal	1059	0	0	0	0	8760	0
1060	Discharge Line Flange	1060	0	0	0	0	8760	0
1061	P.G. Meter line I/V Gland	1061	0	0	0	0	8760	0
1062	NRV U/S Flange	1062	0	0	0	0	8760	0
1063	NRV Top Flange	1063	0	0	0	0	8760	0

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VOC Emission Monitoring Survey Report

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
1064	NRV D/S Flange	1064	0	0	0	0	8760	0
1065	Steamer Flange	1065	0	0	0	0	8760	0
1066	Drain Line 1st I/V Gland	1066	0	0	0	0	8760	0
1067	Steamer Flange	1067	0	0	0	0	8760	0
1068	Drain Line 2nd I/V Gland	1068	0	0	0	0	8760	0
1069	Discharge line I/V U/S Flange	1069	0	0	0	0	8760	0
1070	Discharge line I/V Gland	1070	0	0	0	0	8760	0
1071	Discharge line I/V D/S Flange	1071	0	0	0	0	8760	0
1072	16-PA-CF-001B	1072	0	0	0	0	8760	0
1073	Suction line I/V U/S Flange	1073	0	0	0	0	8760	0
1074	Suction line I/V Gland	1074	0	0	0	0	8760	0
1075	Suction line I/V D/S Flange	1075	0	0	0	0	8760	0
1076	Stainer Top Flange	1076	0	0	0	0	8760	0
1077	Drain Line 1st I/V Gland	1077	0	0	0	0	8760	0
1078	Drain Line 2nd I/V Gland	1078	0	0	0	0	8760	0
1079	OWS Point	1079	0	0	0	0	8760	0
1080	Suction Line Flange	1080	0	0	0	0	8760	0
1081	Pump Seal	1081	0	0	0	0	8760	0
1082	Discharge Line Flange	1082	0	0	0	0	8760	0
1083	P.G. Meter line I/V Gland	1083	0	0	0	0	8760	0
1084	NRV U/S Flange	1084	0	0	0	0	8760	0
1085	NRV Top Flange	1085	0	0	0	0	8760	0
1086	NRV D/S Flange	1086	0	0	0	0	8760	0
1087	Drain Line 1st I/V Gland	1087	0	0	0	0	8760	0
1088	Steamer Flange	1088	0	0	0	0	8760	0
1089	Drain Line 2nd I/V Gland	1089	0	0	0	0	8760	0

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
1090	Discharge line I/V U/S Flange	1090	0	0	0	0	8760	0
1091	Discharge line I/V Gland	1091	0	0	0	0	8760	0
1092	Discharge line I/V D/S Flange	1092	0	0	0	0	8760	0
1093	From FEED DRYER line D/S I/V U/S Gland	1093	0	0	0	0	8760	0
1094	Top Flange	1094	0	0	0	0	8760	0
1095	Stainer Flange	1095	0	0	0	0	8760	0
1096	D/S line I/V Gland	1096	0	0	0	0	8760	0
1097	Drain Line I/V Gland	1097	0	0	0	0	8760	0
1098	Drain Line Safety Flange	1098	0	0	0	0	8760	0
1099	From 16-C-01 Bottom line 1st I/V U/S Flange	1099	0	0	0	0	8760	0
1100	From 16-C-01 Bottom line 1st I/V Gland	1100	0	0	0	0	8760	0
1101	From 16-C-01 Bottom line 1st I/V D/S Flange	1101	0	0	0	0	8760	0
1102	NRV U/S Flange	1102	0	0	0	0	8760	0
1103	NRV Top Flange	1103	0	0	0	0	8760	0
1104	From 16-C-01 Bottom line 2nd I/V U/S Flange	1104	0	0	0	0	8760	0
1105	From 16-C-01 Bottom line 2nd I/V Gland	1105	0	0	0	0	8760	0
1106	From 16-C-01 Bottom line 2nd I/V D/S Flange	1106	0	0	0	0	8760	0
1107	NRV U/S Flange	1107	0	0	0	0	8760	0
1108	NRV Top Flange	1108	0	0	0	0	8760	0
1109	16-FV-1804 U/S line I/V U/S Flange	1109	0	0	0	0	8760	0
1110	16-FV-1804 U/S line I/V Gland	1110	0	0	0	0	8760	0
1111	16-FV-1804 U/S line I/V D/S Flange	1111	0	0	0	0	8760	0
1112	Drain Line 1st I/V Gland	1112	0	0	0	0	8760	0
1113	Stainer Flange	1113	0	0	0	0	8760	0
1114	Drain Line 2nd I/V Gland	1114	0	0	0	0	8760	0
1115	16-FV-1804 C/V U/S Flange	1115	0	0	0	0	8760	0

VOC Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: March 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
1116	16-FV-1804 C/V Gland	1116	0	0	0	0	8760	0
1117	16-FV-1804 C/V D/S Flange	1117	0	0	0	0	8760	0
1118	Drain Line I/V Gland	1118	0	0	0	0	8760	0
1119	16-FV-1804 D/S line I/V U/S Flange	1119	0	0	0	0	8760	0
1120	16-FV-1804 D/S line I/V Gland	1120	0	0	0	0	8760	0
1121	16-FV-1804 D/S line I/V D/S Flange	1121	0	0	0	0	8760	0
1122	Bypass line I/V U/S Flange	1122	0	0	0	0	8760	0
1123	Bypass line I/V Gland	1123	0	0	0	0	8760	0
1124	Bypass line I/V D/S Flange	1124	0	0	0	0	8760	0
1125	ISOMER From DRYER DEGASSER U/S line I/V U/S Flange	1125	0	0	0	0	8760	0
1126	ISOMER From DRYER DEGASSER U/S line I/V Gland	1126	0	0	0	0	8760	0
1127	ISOMER From DRYER DEGASSER U/S line I/V D/S Flange	1127	0	0	0	0	8760	0

NITYA LABORATORIES Authorised

Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
UNIT: CDU/VDU						
Area	**B/L**					
1	Intergas Inlet Line U/S I/V U/S Flange	0	0	0	0.000	0.000
2	Intergas Inlet Line U/S I/V U/S Gland	0	0	0	0.000	0.000
3	Intergas Inlet Line U/S I/V D/S Flange	0	0	0	0.000	0.000
4	Intergas Inlet Line D/S I/V U/S Flange	0	0	0	0.000	0.000
5	Intergas Inlet Line D/S I/V U/S Gland	0	0	0	0.000	0.000
6	Intergas Inlet Line D/S I/V D/S Flange	0	0	0	0.000	0.000
7	UNSTAB Naptha Outlet Line U/S I/V U/S	0	0	0	0.000	0.000
8	UNSTAB Naptha Outlet Line U/S I/V U/S	0	0	0	0.000	0.000
9	UNSTAB Naptha Outlet Line U/S I/V D/S	0	0	0	0.000	0.000
10	UNSTAB Naptha Outlet Line D/S I/V U/S	0	0	0	0.000	0.000
11	UNSTAB Naptha Outlet Line D/S I/V U/S	0	0	0	0.000	0.000
12	UNSTAB Naptha Outlet Line D/S I/V D/S	0	0	0	0.000	0.000
13	STAB Naptha to Storage Outlet Line I/V	0	0	0	0.000	0.000
14	STAB Naptha to Storage Outlet Line I/V	0	0	0	0.000	0.000
15	STAB Naptha to Storage Outlet Line I/V	0	0	0	0.000	0.000
16	Meter line 1st I/V Gland	0	0	0	0.000	0.000
17	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
18	Drain line 1st I/V Gland	0	0	0	0.000	0.000
19	Drain line 2nd I/V Gland	0	0	0	0.000	0.000
20	Vrain Line I/V Gland	0	0	0	0.000	0.000
21	Vrain Line Safty Flange	0	0	0	0.000	0.000
22	LPG Bullet Outlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
23	LPG Bullet Outlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
24	LPG Bullet Outlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000
25	LPG Bullet Outlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
26	LPG Bullet Outlet D/S Line I/V U/S Gland	0	0	0	0.000	0.000
27	LPG Bullet Outlet D/S Line I/V D/S Flange	0	0	0	0.000	0.000
28	LPG to Inlet Vrain Line I/V Gland	0	0	0	0.000	0.000
29	LPG to Inlet Vrain Line I/V Saftey Flange	0	0	0	0.000	0.000
30	LPG to Intlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
31	LPG to Intlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
32	LPG to Intlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000

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Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
33	LPG to Intlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
34	LPG to Intlet D/S Line I/V U/S Gland	0	0	0	0.000	0.000
35	LPG to Intlet D/S Line I/V D/S Flange	0	0	0	0.000	0.000
36	LPG Ex SPHERE Inlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
37	LPG Ex SPHERE Inlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
38	LPG Ex SPHERE Inlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000
39	LPG Ex SPHERE Inlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
40	LPG Ex SPHERE Inlet D/S Line I/V U/S Giand	0	0	0	0.000	0.000
41	LPG Ex SPHERE Inlet D/S Line I/V D/S Flange	0	0	0	0.000	0.000
42	Fuel Gas Inlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
43	Fuel Gas Inlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
44	Fuel Gas Inlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000
45	Fuel Gas Inlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
46	Fuel Gas Inlet 0/5 Line I/V U/S Gland	0	0	0	0.000	0.000
47	Fuel Gas Inlet D/S Line I/V D/S Flange	0	0	0	0.000	0.000
48	Vrain Line I/V Gland	0	0	0	0.000	0.000
49	Vrain Line Safety Flange	0	0	0	0.000	0.000
50	LPG to SPHERE Inlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
51	LPG to SPHERE Inlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
52	LPG to SPHERE Inlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000
53	LPG to SPHERE Inlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
54	LPG to SPHERE Inlet D/S Line I/V U/S Giand	0	0	0	0.000	0.000
55	LPG to SPHERE Inlet D/S Line I/V D/S Flange	0	0	0	0.000	0.000
56	Meter Line Flange	0	0	0	0.000	0.000
57	01-FV-1905 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
58	01-FV-1905 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
59	01-FV-1905 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
60	Drain Line I/V Gland	0	0	0	0.000	0.000
61	Drain Line I/V Safety Flange	0	0	0	0.000	0.000
62	01-FV-1905 C/V Line I/V U/S Flange	0	0	0	0.000	0.000
63	02-FV-1905 C/V line I/V U/S Gland	0	0	0	0.000	0.000
64	01-FV-1905 C/V Line I/V D/S Flange	0	0	0	0.000	0.000
65	01-FV-1905 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
66	01-FV-1905 D/S Line I/V U/S Gland	0	0	0	0.000	0.000

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Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
67	01-FV-1905 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
68	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
69	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
70	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
71	01-FV-1921 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
72	01-FV-1921 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
73	01-FV-1921 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
74	Drain Line I/V Gland	0	0	0	0.000	0.000
75	Drain Line Safety Flange	0	0	0	0.000	0.000
76	01-FV-1921 C/V U/S Flange	0	0	0	0.000	0.000
77	01-FV-1921 C/V U/S Gland	0	0	0	0.000	0.000
78	01-FV-1921 C/V D/S Flange	0	0	0	0.000	0.000
79	01-FV-1921 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
80	01-FV-1921 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
81	01-FV-1921 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
82	Drain Line I/V Gland	0	0	0	0.000	0.000
83	Drain Line Safety Flange	0	0	0	0.000	0.000
84	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
85	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
86	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
87	01-LV-1701 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
88	01-LV 1701 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
89	01-LV-1701 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
90	Drain Line I/V Gland	0	0	0	0.000	0.000
91	Drain Line Safety Flange	0	0	0	0.000	0.000
92	01-LV-1701 C/S Line I/V U/S Flange	0	0	0	0.000	0.000
93	01-LV-1701 C/S Line I/V U/S Gland	0	0	0	0.000	0.000
94	01-LV-1701 C/S Line I/V D/S Flange	0	0	0	0.000	0.000
95	01-LV-1701 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
96	01-LV-1701 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
97	01-LV-1701 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
98	Drain Line I/V Gland	0	0	0	0.000	0.000
99	Drain Line Safety Flange	0	0	0	0.000	0.000
100	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
101	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
102	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
103	01-FV-1901 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
104	01-FV-1901 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
105	01-FV-1901 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
106	Drain Line I/V Gland	0	0	0	0.000	0.000
107	Drain Line Safety Flange	0	0	0	0.000	0.000
108	01-FV-1901 C/V U/S Flange	0	0	0	0.000	0.000
109	01-FV-1901 C/V U/S Gland	0	0	0	0.000	0.000
110	01-FV-1901 C/V D/S Flange	0	0	0	0.000	0.000
111	01-FV-1901 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
112	01-FV-1901 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
113	01-FV-1901 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
114	Drain Line I/V Gland	0	0	0	0.000	0.000
115	Drain Line Safety Flange	0	0	0	0.000	0.000
116	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
117	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
118	Pump Seal	0	0	0	0.000	0.000
119	01-FV-1904 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
120	01-FV-1904 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
121	01-FV-1904 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
122	Drain Line I/V Gland	0	0	0	0.000	0.000
123	Drain Line Safety Flange	0	0	0	0.000	0.000
124	01-FV-1904 C/V U/S Flange	0	0	0	0.000	0.000
125	01-FV-1904 C/V U/S Gland	0	0	0	0.000	0.000
126	01-FV-1904 C/V D/S Flange	0	0	0	0.000	0.000
127	01-FV-1904 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
128	01-FV-1904 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
129	01-FV-1904 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
130	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
131	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
132	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
133	01-FV-1903 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
134	01-FV-1903 U/S Line I/V Gland	0	0	0	0.000	0.000

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
135	01-FV-1903 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
136	Drain Line I/V Gland	0	0	0	0.000	0.000
137	Drain Line Safety Flange	0	0	0	0.000	0.000
138	01-FV-1903 C/V U/S Flange	0	0	0	0.000	0.000
139	01-FV-1903 C/V U/S Gland	0	0	0	0.000	0.000
140	01-FV-1903 C/V D/S Flange	0	0	0	0.000	0.000
141	01-FV-1903 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
142	01-FV-1903 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
143	01-FV-1903 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
144	Drain Line I/V Gland	0	0	0	0.000	0.000
145	Drain Line Safety Flange	0	0	0	0.000	0.000
146	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
147	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
148	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
149	01-PA-106A Suction Line I/V Gland	0	0	0	0.000	0.000
150	Stainer Top Flange	0	0	0	0.000	0.000
151	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
152	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
153	Suction Line Flange	0	0	0	0.000	0.000
154	Pump Seal	0	0	0	0.000	0.000
155	Discharge Line Flange	0	0	0	0.000	0.000
156	Meter line 1st I/V Gland	0	0	0	0.000	0.000
157	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
158	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
159	Discharge Line Gland	0	0	0	0.000	0.000
160	01-PA-106B Suction Line I/V Gland	0	0	0	0.000	0.000
161	Stainer Top Flange	0	0	0	0.000	0.000
162	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
163	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
164	Suction Line Flange	0	0	0	0.000	0.000
165	Pump Seal	0	0	0	0.000	0.000
166	Discharge Line Flange	0	0	0	0.000	0.000
167	Meter line 1st I/V Gland	0	0	0	0.000	0.000
168	Meter line 2nd I/V Gland	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
169	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
170	Discharge Line Gland	0	0	0	0.000	0.000
171	01-PA-105 A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
172	01-PA-105A Suction Line I/V U/S Gland	0	0	0	0.000	0.000
173	01-PA-105A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
174	Stainer Top Flange	0	0	0	0.000	0.000
175	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
176	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
177	Suction Line Flange	0	0	0	0.000	0.000
178	Pump Seal	0	0	0	0.000	0.000
179	Discharge Line Flange	0	0	0	0.000	0.000
180	Meter line 1st I/V Gland	0	0	0	0.000	0.000
181	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
182	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
183	NRV U/S Flange	0	0	0	0.000	0.000
184	NRV Top Flange	0	0	0	0.000	0.000
185	NRV D/S Flange	0	0	0	0.000	0.000
186	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
187	Discharge Line I/V U/S Gland	0	0	0	0.000	0.000
188	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
189	01 PA-105B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
190	01-PA-105B Suction Line I/V U/S Gland	0	0	0	0.000	0.000
191	01-PA-105B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
192	Stainer Top Flange	0	0	0	0.000	0.000
193	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
194	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
195	Suction Line Flange	0	0	0	0.000	0.000
196	Pump Seal	0	0	0	0.000	0.000
197	Discharge Line Flange	0	0	0	0.000	0.000
198	Meter line 1st I/V Gland	0	0	0	0.000	0.000
199	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
200	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
201	NRV I/V U/S Flange	0	0	0	0.000	0.000
202	NRV Top Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
203	NRV I/V D/S Flange	0	0	0	0.000	0.000
204	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
205	Discharge Line I/V U/S Gland	0	0	0	0.000	0.000
206	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
Unit : CDU/VDU						
Area	**Pump**					
207	01-PA-103B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
208	01-PA-103B Suction Line I/V Gland	0	0	0	0.000	0.000
209	01-PA-103B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
210	Stainer Top Flange	0	0	0	0.000	0.000
211	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
212	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
213	Suction Line Flange	0	0	0	0.000	0.000
214	PumpSeal	0	0	0	0.000	0.000
215	Discharge Line Flange	0	0	0	0.000	0.000
216	Meter line 1st I/V Gland	0	0	0	0.000	0.000
217	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
218	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
219	NRV I/V U/S Flange	0	0	0	0.000	0.000
220	NRV Top Flange	0	0	0	0.000	0.000
221	NRV I/V D/S Flange	0	0	0	0.000	0.000
222	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
223	Discharge Line I/V Gland	0	0	0	0.000	0.000
224	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
225	Suction Line to Outside Line 1st I/V U/S	0	0	0	0.000	0.000
226	Suction Line to Outside Line 1st I/V Giand	0	0	0	0.000	0.000
227	Suction Line to Outside Line 1st I/V D/S	0	0	0	0.000	0.000
228	Suction Line to Outside Line 2nd I/V U/S	0	0	0	0.000	0.000
229	Suction Line to Outside Line 2nd I/V Gland	0	0	0	0.000	0.000
230	Suction Line to Outside Line 2nd I/V D/S	0	0	0	0.000	0.000
231	Suction Line to Outside Line 3rd I/V U/S	0	0	0	0.000	0.000
232	Suction Line to Outside Line 3rd I/V Gland	0	0	0	0.000	0.000
233	Suction Line to Outside Line 3rd I/V D/S	0	0	0	0.000	0.000
234	Stainer Flange	0	0	0	0.000	0.000

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
235	OWS Point	0	0	0	0.000	0.000
236	01-PA-103A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
237	01-PA-103A Suction Line I/V Gland	0	0	0	0.000	0.000
238	01-PA-103A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
239	Stainer Top Flange	0	0	0	0.000	0.000
240	Stainer Top Flange Drain Line Gland	0	0	0	0.000	0.000
241	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
242	Suction Line Flange	0	0	0	0.000	0.000
243	Pump Seal	0	0	0	0.000	0.000
244	Discharge Line Flange	0	0	0	0.000	0.000
245	Meter line 1st I/V Gland	0	0	0	0.000	0.000
246	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
247	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
248	NRV I/V U/S Flange	0	0	0	0.000	0.000
249	NRV Top Flange	0	0	0	0.000	0.000
250	NRV I/V D/S Flange	0	0	0	0.000	0.000
251	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
252	Discharge Line I/V Gland	0	0	0	0.000	0.000
253	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
254	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
255	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
256	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
257	Stainer Flange	0	0	0	0.000	0.000
258	OWS Point	0	0	0	0.000	0.000
259	01-FV-4003 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
260	01-FV-4003 U/S Line I/V Gland	0	0	0	0.000	0.000
261	01-FV-4003 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
262	Drain Line I/V Gland	0	0	0	0.000	0.000
263	Drain Line Safety Flange	0	0	0	0.000	0.000
264	01-FV-4003 C/V U/S Flange	0	0	0	0.000	0.000
265	01-FV-4003C/V Gland	0	0	0	0.000	0.000
266	01-FV-4003 C/V D/S Flange	0	0	0	0.000	0.000
267	Drain Line I/V Gland	0	0	0	0.000	0.000
268	Drain Line Safety Flange	0	0	0	0.000	0.000

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
269	01-FV-4003 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
270	01-FV-4003 D/S Line I/V Gland	0	0	0	0.000	0.000
271	01-FV-4003 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
272	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
273	Bypass Line I/V Gland	0	0	0	0.000	0.000
274	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
275	01-FV-3803 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
276	01-FV-3803 U/S Line I/V Gland	0	0	0	0.000	0.000
277	01-FV-3803 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
278	Drain Line I/V Gland	0	0	0	0.000	0.000
279	Drain Line Safety Flange	0	0	0	0.000	0.000
280	01-FV-3803 CI/V U/S Flange	0	0	0	0.000	0.000
281	01-FV-3803 C/V Gland	0	0	0	0.000	0.000
282	01-FV-3803 C/V D/S Flange	0	0	0	0.000	0.000
283	Drain Line I/V Gland	0	0	0	0.000	0.000
284	Drain Line Safety Flange	0	0	0	0.000	0.000
285	01-FV-3803 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
286	01-FV-3803 D/S Line I/V Gland	0	0	0	0.000	0.000
287	01-FV-3803 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
288	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
289	Bypass Line I/V Gland	0	0	0	0.000	0.000
290	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
291	01-FV-3901 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
292	01-FV-3901 U/S Line I/V Gland	0	0	0	0.000	0.000
293	01-FV-3901 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
294	Drain Line I/V Gland	0	0	0	0.000	0.000
295	Drain Line Safety Flange	0	0	0	0.000	0.000
296	01-FV-3901 C/V U/S Flange	0	0	0	0.000	0.000
297	01-FV-3901 C/V Gland	0	0	0	0.000	0.000
298	01-FV-3901 C/V D/S Flange	0	0	0	0.000	0.000
299	Drain Line I/V Gland	0	0	0	0.000	0.000
300	Drain Line Safety Flange	0	0	0	0.000	0.000
301	01-FV-3901 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
302	01-FV-3901 D/S Line I/V Gland	0	0	0	0.000	0.000

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Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
303	01-FV-3901 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
304	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
305	Bypass Line I/V Gland	0	0	0	0.000	0.000
306	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
307	3.P.01.3916.A1A To EE-108Line I/V U/S	0	0	0	0.000	0.000
308	3.P.01.3916.A1A To EE-108Line I/V Gland	0	0	0	0.000	0.000
309	3.P.01.3916.A1A To EE-108Line I/V D/S	0	0	0	0.000	0.000
310	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
311	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
312	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
313	01-PR-101B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
314	01-PR-101B Suction Line I/V Gland	0	0	0	0.000	0.000
315	01-PR-101B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
316	Stainer Top Flange	0	0	0	0.000	0.000
317	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
318	Stainer Top Flange Drain Line I/V Safety	0	0	0	0.000	0.000
319	Suction Line Flange	0	0	0	0.000	0.000
320	Pump Seal	0	0	0	0.000	0.000
321	Discharge Line Flange	0	0	0	0.000	0.000
322	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
323	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
324	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
325	NRV I/V U/S Flange	0	0	0	0.000	0.000
326	NRV Top Flange	0	0	0	0.000	0.000
327	NRV I/V D/S Flange	0	0	0	0.000	0.000
328	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
329	Discharge Line I/V Gland	0	0	0	0.000	0.000
330	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
331	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
332	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
333	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
334	Stainer Flange	0	0	0	0.000	0.000
335	OWS Point	0	0	0	0.000	0.000
336	01-PA-101A Suction Line I/V U/S Flange	0	0	0	0.000	0.000

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Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
337	01-PA-101A Suction Line I/V Gland	0	0	0	0.000	0.000
338	01-PA-101A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
339	Stainer Top Flange	0	0	0	0.000	0.000
340	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
341	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
342	Suction Line Flange	0	0	0	0.000	0.000
343	Pump Seal	0	0	0	0.000	0.000
344	Discharge Line Flange	0	0	0	0.000	0.000
345	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
346	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
347	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
348	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
349	Discharge Line I/V Gland	0	0	0	0.000	0.000
350	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
351	Suction Line To Outside Line 1st I/V U/S	0	0	0	0.000	0.000
352	Suction Line To Outside Line 1st I/V Gland	0	0	0	0.000	0.000
353	Suction Line To Outside Line 1st I/V D/S	0	0	0	0.000	0.000
354	Suction Line To Outside Line 2nd I/V U/S	0	0	0	0.000	0.000
355	Suction Line To Outside Line 2nd I/V Gland	0	0	0	0.000	0.000
356	Suction Line To Outside Line 2nd I/V D/S	0	0	0	0.000	0.000
357	Suction Line To Outside Line 3rd I/V U/S	0	0	0	0.000	0.000
358	Suction Line To Outside Line 3rd I/V Gland	0	0	0	0.000	0.000
359	Suction Line To Outside Line 3rd I/V D/S	0	0	0	0.000	0.000
360	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
361	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
362	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
363	Stainer Flange	0	0	0	0.000	0.000
364	OWS Point	0	0	0	0.000	0.000
365	01-FV-3701 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
366	01-FV-3701 U/S Line I/V Gland	0	0	0	0.000	0.000
367	01-FV-3701 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
368	Drain Line I/V Gland	0	0	0	0.000	0.000
369	Drain Line Safety Flange	0	0	0	0.000	0.000
370	01-FV-3701 C/V U/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
371	01-FV-3701 C/V Gland	0	0	0	0.000	0.000
372	01-FV-3701 C/V D/S Flange	0	0	0	0.000	0.000
373	Drain Line I/V Gland	0	0	0	0.000	0.000
374	Drain Line Safety Flange	0	0	0	0.000	0.000
375	01-FV-3701 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
376	01-FV-3701 D/S Line I/V Gland	0	0	0	0.000	0.000
377	01-FV-3701 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
378	Bypass Line I/V Gland	0	0	0	0.000	0.000
379	To Naptha Pool EX-PA-101 Line I/V U/S	0	0	0	0.000	0.000
380	To Naptha Pool EX-PA-101 Line I/V Gland	0	0	0	0.000	0.000
381	To Naptha Pool EX-PA-101 Line I/V D/S	0	0	0	0.000	0.000
382	Naptha To EE-109 EX-PA-101 Line I/V U/S	0	0	0	0.000	0.000
383	Naptha To EE-109 EX-PA-101 Line I/V Gland	0	0	0	0.000	0.000
384	Naptha To EE-109 EX-PA-101 Line I/V D/S	0	0	0	0.000	0.000
385	01-FV-4005 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
386	01-FV-4005 U/S Line I/V Gland	0	0	0	0.000	0.000
387	01-FV-4005 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
388	Drain Line I/V Gland	0	0	0	0.000	0.000
389	Drain Line Safety Flange	0	0	0	0.000	0.000
390	01-FV-4005 C/V U/S Flange	0	0	0	0.000	0.000
391	01-FV-4005 C/V Gland	0	0	0	0.000	0.000
392	01-FV-4005 C/V D/S Flange	0	0	0	0.000	0.000
393	Drain Line I/V Gland	0	0	0	0.000	0.000
394	Drain Line Safety Flange	0	0	0	0.000	0.000
395	01-FV-4005 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
396	01-FV-4005 D/S Line I/V Gland	0	0	0	0.000	0.000
397	01-FV-4005 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
398	Bypass Line I/V Gland	0	0	0	0.000	0.000
399	01-PA-CF-012A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
400	01-PA-CF-012A Suction Line I/V Gland	0	0	0	0.000	0.000
401	01-PA-CF-012A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
402	Stainer Top Flange	0	0	0	0.000	0.000
403	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
404	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
405	Suction Line Flange	0	0	0	0.000	0.000
406	Pump Seal	0	0	0	0.000	0.000
407	Discharge Line Flange	0	0	0	0.000	0.000
408	NRV I/V U/S Flange	0	0	0	0.000	0.000
409	NRV Top Flange	0	0	0	0.000	0.000
410	NRV I/V D/S Flange	0	0	0	0.000	0.000
411	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
412	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
413	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
414	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
415	Discharge Line I/V Gland	0	0	0	0.000	0.000
416	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
417	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
418	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
419	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
420	Stainer Flange	0	0	0	0.000	0.000
421	OWS Point	0	0	0	0.000	0.000
422	01-PV-04 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
423	01-PV-04 Suction Line I/V Gland	0	0	0	0.000	0.000
424	01-PV-04 Suction Line I/V D/S Flange	0	0	0	0.000	0.000
425	Stainer Top Flange	0	0	0	0.000	0.000
426	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
427	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
428	Suction Line Flange	0	0	0	0.000	0.000
429	Discharge Line 1st Flange	0	0	0	0.000	0.000
430	Discharge Line 2nd Flange	0	0	0	0.000	0.000
431	Meter Line I/V Gland	0	0	0	0.000	0.000
432	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
433	NRV I/V U/S Flange	0	0	0	0.000	0.000
434	NRV Top Flange	0	0	0	0.000	0.000
435	NRV I/V D/S Flange	0	0	0	0.000	0.000
436	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
437	Discharge Line I/V Gland	0	0	0	0.000	0.000
438	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
439	Drain Line I/V Gland	0	0	0	0.000	0.000
440	Drain Line Safety Flange	0	0	0	0.000	0.000
441	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
442	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
443	Stainer Flange	0	0	0	0.000	0.000
444	OWS Point	0	0	0	0.000	0.000
445	01-PV-04A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
446	01-PV-04A Suction Line I/V Gland	0	0	0	0.000	0.000
447	01-PV-04A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
448	Stainer Top Flange	0	0	0	0.000	0.000
449	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
450	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
451	Suction Line Flange	0	0	0	0.000	0.000
452	Pump Seal	0	0	0	0.000	0.000
453	Discharge Line 1st Flange	0	0	0	0.000	0.000
454	Discharge Line 2nd Flange	0	0	0	0.000	0.000
455	Meter line I/V Gland	0	0	0	0.000	0.000
456	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
457	NRV I/V U/S Flange	0	0	0	0.000	0.000
458	NRV Top Flange	0	0	0	0.000	0.000
459	NRV I/V D/S Flange	0	0	0	0.000	0.000
460	Drain Line I/V Gland	0	0	0	0.000	0.000
461	Drain Line Safety Flange	0	0	0	0.000	0.000
462	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
463	Discharge Line I/V Gland	0	0	0	0.000	0.000
464	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
465	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
466	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
467	Stainer Flange	0	0	0	0.000	0.000
468	OWS Point	0	0	0	0.000	0.000
469	01-PA-CF-013-B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
470	01-PA-CF-013-B Suction Line I/V Gland	0	0	0	0.000	0.000
471	01-PA-CF-013-B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
472	Stainer Top Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
473	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
474	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
475	Suction Line Flange	0	0	0	0.000	0.000
476	Pump Seal	0	0	0	0.000	0.000
477	Discharge Line 1st Flange	0	0	0	0.000	0.000
478	Discharge Line 2nd Flange	0	0	0	0.000	0.000
479	Meter line I/V Gland	0	0	0	0.000	0.000
480	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
481	NRV I/V U/S Flange	0	0	0	0.000	0.000
482	NRV Top Flange	0	0	0	0.000	0.000
483	NRV I/V D/S Flange	0	0	0	0.000	0.000
484	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
485	Discharge Line I/V Gland	0	0	0	0.000	0.000
486	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
487	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
488	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
489	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
490	Stainer Flange	0	0	0	0.000	0.000
491	OWS Point	0	0	0	0.000	0.000
492	01-PA-CF-013-A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
493	01-PA-CF-013-B Suction Line I/V Gland	0	0	0	0.000	0.000
494	01-PA-CF-013-B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
495	Stainer Top Flange	0	0	0	0.000	0.000
496	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
497	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
498	Suction Line Flange	0	0	0	0.000	0.000
499	Pump Seal	0	0	0	0.000	0.000
500	Discharge Line 1st Flange	0	0	0	0.000	0.000
501	Discharge Line 2nd Flange	0	0	0	0.000	0.000
502	Meter line I/V Gland	0	0	0	0.000	0.000
503	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
504	NRV I/V U/S Flange	0	0	0	0.000	0.000
505	NRV Top Flange	0	0	0	0.000	0.000
506	NRV I/V D/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
507	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
508	Discharge Line I/V Gland	0	0	0	0.000	0.000
509	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
510	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
511	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
512	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
513	Stainer Flange	0	0	0	0.000	0.000
514	OWS Point	0	0	0	0.000	0.000
515	01-FV-1505 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
516	01-FV-1505 U/S Line I/V Gland	0	0	0	0.000	0.000
517	01-FV-1505 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
518	Drain Line I/V Gland	0	0	0	0.000	0.000
519	Drain Line Safety Flange	0	0	0	0.000	0.000
520	01-FV-1505 C/V U/S Flange	0	0	0	0.000	0.000
521	01-FV-1505 C/V Gland	0	0	0	0.000	0.000
522	01-FV-1505 C/V D/S Flange	0	0	0	0.000	0.000
523	01-FV-1505 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
524	01-FV-1505 D/S Line I/V Gland	0	0	0	0.000	0.000
525	01-FV-1505 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
526	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
527	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
528	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
529	01-PV-2002 U/S line I/V Gland	0	0	0	0.000	0.000
530	Drain Line I/V Gland	0	0	0	0.000	0.000
531	Drain Line Safety Flange	0	0	0	0.000	0.000
532	01-PV-2002 D/S line I/V Gland	0	0	0	0.000	0.000
533	Drain Line I/V Gland	0	0	0	0.000	0.000
534	Drain Line Safety Flange	0	0	0	0.000	0.000
535	Bypass Line I/V Gland	0	0	0	0.000	0.000
536	01-PV-1402 U/S line I/V Gland	0	0	0	0.000	0.000
537	Drain Line I/V Gland	0	0	0	0.000	0.000
538	Drain Line Safety Flange	0	0	0	0.000	0.000
539	01-PV-1402 C/V Gland	0	0	0	0.000	0.000
540	01-PV-1402 D/S Line I/V Gland	0	0	0	0.000	0.000

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
541	Drain Line I/V Gland	0	0	0	0.000	0.000
542	Drain Line Safety Flange	0	0	0	0.000	0.000
543	Bypass Line I/V Gland	0	0	0	0.000	0.000
544	01-PV-1401 U/S Line I/V Gland	0	0	0	0.000	0.000
545	Drain Line I/V Gland	0	0	0	0.000	0.000
546	Drain Line Safety Flange	0	0	0	0.000	0.000
547	01-PV-1401 C/V U/S Flange	0	0	0	0.000	0.000
548	01-PV-1401 C/V Gland	0	0	0	0.000	0.000
549	01-PV-1401 C/V D/S Flange	0	0	0	0.000	0.000
550	01-PV-1401 D/S Line I/V Gland	0	0	0	0.000	0.000
551	Drain Line I/V Gland	0	0	0	0.000	0.000
552	Drain Line Safety Flange	0	0	0	0.000	0.000
553	Bypass Line I/V Gland	0	0	0	0.000	0.000
554	01-SDV-1401 C/V U/S Flange	0	0	0	0.000	0.000
555	01-SDV-1401 C/V Gland	0	0	0	0.000	0.000
556	01-SDV-1401 C/V D/S Flange	0	0	0	0.000	0.000
557	Drain Line I/V Gland	0	0	0	0.000	0.000
558	Drain Line Safety Flange	0	0	0	0.000	0.000
559	01-FV-3804 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
560	01-FV-3804 D/S Line I/V Gland	0	0	0	0.000	0.000
561	01-FV-3804 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
562	01-FV-3804 C/V U/S Flange	0	0	0	0.000	0.000
563	01-FV-3804 C/V Gland	0	0	0	0.000	0.000
564	01-FV-3804 C/V D/S Flange	0	0	0	0.000	0.000
565	01-FV-2702 C/V U/S Flange	0	0	0	0.000	0.000
566	01-FV-2702 C/V Gland	0	0	0	0.000	0.000
567	01-FV-2702 C/V D/S Flange	0	0	0	0.000	0.000
568	01-FV-1702 C/V U/S Flange	0	0	0	0.000	0.000
569	01-FV-1702 C/V Gland	0	0	0	0.000	0.000
570	01-FV-1702 C/V D/S Flange	0	0	0	0.000	0.000
571	Drain Line I/V Gland	0	0	0	0.000	0.000
572	Drain Line Safety Flange	0	0	0	0.000	0.000
Area	Furnace					
573	B.No. - 1 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
574	B.No. - 1 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
575	B.No. - 1 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
576	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
577	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
578	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
579	B.No. - 2 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
580	B.No. - 2 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
581	B.No. - 2 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
582	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
583	B.No. - 3 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
584	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
585	B.No. - 4 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
586	B.No. - 4 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
587	B.No. - 4 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
588	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
589	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
590	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
591	B.No. - 5 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
592	B.No. - 5 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
593	B.No. - 5 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
594	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
595	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
596	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
597	B.No. - 6 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
598	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
599	B.No. - 7 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
600	B.No. - 7 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
601	B.No. - 7 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
602	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
603	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
604	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
605	B.No. - 8 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
606	B.No. - 8 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
607	B.No. - 8 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
608	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
609	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
610	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
611	B.No. - 1 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
612	B.No. - 1 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
613	B.No. - 1 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
614	B.No. - 1 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
615	B.No. - 1 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
616	B.No. - 1 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
617	B.No. - 2 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
618	B.No. - 2 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
619	B.No. - 2 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
620	B.No. - 2 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
621	B.No. - 3 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
622	B.No. - 3 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
623	B.No. - 3 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
624	B.No. - 3 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
625	B.No. - 4 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
626	B.No. - 4 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
627	B.No. - 5 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
628	B.No. - 5 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
629	B.No. - 5 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
630	B.No. - 5 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
631	B.No. - 6 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
632	B.No. - 6 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
633	B.No. - 6 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
634	B.No. - 6 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
635	B.No. - 6 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
636	B.No. - 6 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
637	B.No. - 7 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
638	B.No. - 7 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
639	B.No. - 7 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
640	B.No. - 7 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
641	B.No. - 7 Fuel Gas line I/V Gland	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
642	B.No. - 7 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
643	B.No. - 8 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
644	B.No. - 8 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
645	B.No. - 8 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
646	B.No. - 8 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
647	B.No. - 8 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
648	B.No. - 8 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
649	B.No. - 9 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
650	B.No. - 9 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
651	B.No. - 9 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
652	B.No. - 9 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
653	B.No. - 9 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
654	B.No. - 9 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
655	B.No. - 10 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
656	B.No. - 10 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
657	B.No. - 10 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
658	B.No. - 10 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
659	B.No. - 10 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
660	B.No. - 10 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
661	B.No. - 11 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
662	B.No. - 11 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
663	B.No. - 11 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
664	B.No. - 11 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
665	B.No. - 11 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
666	B.No. - 11 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
667	B.No. - 12 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
668	B.No. - 12 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
669	B.No. - 12 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
670	B.No. - 12 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
671	B.No. - 12 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
672	B.No. - 12 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
673	B.No. - 13 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
674	B.No. - 13 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
675	B.No. - 13 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
676	B.No. - 13 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
677	B.No. - 13 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
678	B.No. - 13 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
679	B.No. - 14 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
680	B.No. - 14 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
681	B.No. - 14 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
682	B.No. - 14 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
683	B.No. - 14 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
684	B.No. - 14 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
685	B.No. - 15 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
686	B.No. - 15 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
687	B.No. - 15 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
688	B.No. - 15 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
689	B.No. - 15 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
690	B.No. - 15 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
691	B.No. - 16 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
692	B.No. - 16 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
693	B.No. - 16 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
694	B.No. - 16 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
695	B.No. - 16 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
696	B.No. - 16 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
697	B.No. - 17 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
698	B.No. - 17 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
699	B.No. - 17 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
700	B.No. - 17 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
701	B.No. - 17 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
702	B.No. - 17 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
703	B.No. - 18 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
704	B.No. - 18 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
705	B.No. - 18 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
706	B.No. - 18 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
707	B.No. - 18 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
708	B.No. - 18 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
709	B.No. - 19 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
710	B.No. - 19 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
711	B.No. - 19 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
712	B.No. - 19 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
713	B.No. - 19 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
714	B.No. - 19 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
715	B.No. - 20 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
716	B.No. - 20 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
717	B.No. - 20 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
718	B.No. - 20 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
719	B.No. - 20 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
720	B.No. - 20 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum

Fugitive Emission Monitoring Survey Report

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum

UNIT-WAX

Area	Pump-18PA109A Wax Scripper Bottom Pump					
1	Suction Line I/V U/s Flange	0	0	0	0.000	0.000
2	I/V Gland	0	0	0	0.000	0.000
3	I/V D/S Flange	0	0	0	0.000	0.000
4	Drain Line I/V Gland	0	0	0	0.000	0.000
5	Drain Line Safety Flange	0	0	0	0.000	0.000
6	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
7	I/V Gland	0	0	0	0.000	0.000
8	I/V D/S Flange	0	0	0	0.000	0.000
9	Pump Seal	0	0	0	0.000	0.000
10	Meter Line I/V Gland	0	0	0	0.000	0.000
11	OWS Point	0	0	0	0.000	0.000
12	18PA109B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
13	I/V Gland	0	0	0	0.000	0.000
14	I/V D/S Flange	0	0	0	0.000	0.000
15	Drain Line I/V Gland	0	0	0	0.000	0.000
16	Drain Line Safety Flange	0	0	0	0.000	0.000
17	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
18	I/V Gland	0	0	0	0.000	0.000
19	I/V D/S Flange	0	0	0	0.000	0.000
20	Pump Seal	0	0	0	0.000	0.000
21	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
22	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
23	OWS Point	0	0	0	0.000	0.000
24	18PA105A Suction Line I/V U/s Flange	0	0	0	0.000	0.000
25	I/V Gland	0	0	0	0.000	0.000
26	I/V D/S Flange	0	0	0	0.000	0.000
27	Drain Line I/V Gland	0	0	0	0.000	0.000
28	Drain Line Safety Flange	0	0	0	0.000	0.000
29	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
30	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
31	Pump Seal	0	0	0	0.000	0.000

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
32	18PA105B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
33	I/V Gland	0	0	0	0.000	0.000
34	I/V D/S Flange	0	0	0	0.000	0.000
35	Discharge Line I/V Gland	0	0	0	0.000	0.000
36	I/V D/S Flange	0	0	0	0.000	0.000
37	Drain Line I/V Gland	0	0	0	0.000	0.000
38	Drain Line Safety Flange	0	0	0	0.000	0.000
39	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
40	Meter Line 2nd I/V gland	0	0	0	0.000	0.000
41	OWS Point	0	0	0	0.000	0.000
42	18PA105C Suction Line I/V U/S flange	0	0	0	0.000	0.000
43	I/V Gland	0	0	0	0.000	0.000
44	I/V D/S Flange	0	0	0	0.000	0.000
45	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
46	I/V Gland	0	0	0	0.000	0.000
47	I/V D/S Flange	0	0	0	0.000	0.000
48	Pump Seal	0	0	0	0.000	0.000
49	Drain line I/V Gland	0	0	0	0.000	0.000
50	Drain Line Safety Flange	0	0	0	0.000	0.000
51	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
52	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
53	OWS Point	0	0	0	0.000	0.000
54	18PA105D Suction Line I/V U/S Flange	0	0	0	0.000	0.000
55	I/V Gland	0	0	0	0.000	0.000
56	I/V D/S Flange	0	0	0	0.000	0.000
57	Pump Seal	0	0	0	0.000	0.000
58	Drain line I/V Gland	0	0	0	0.000	0.000
59	Drain Line Safety Flange	0	0	0	0.000	0.000
60	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
61	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
62	OWS Point	0	0	0	0.000	0.000
63	LV1902 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
64	I/V Gland	0	0	0	0.000	0.000
65	I/V D/S Flange	0	0	0	0.000	0.000

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Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
66	Drain line I/V Gland	0	0	0	0.000	0.000
67	Drain Line Safety Flange	0	0	0	0.000	0.000
68	1902CV Gland	0	0	0	0.000	0.000
69	Discharge Line I/V Gland	0	0	0	0.000	0.000
70	Discharge Line Drain Line I/V Gland	0	0	0	0.000	0.000
71	Drain Line Safety Flange	0	0	0	0.000	0.000
72	LV2002 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
73	I/V Gland	0	0	0	0.000	0.000
74	I/V D/S Flange	0	0	0	0.000	0.000
75	Drain line I/V Gland	0	0	0	0.000	0.000
76	Drain Line Safety Flange	0	0	0	0.000	0.000
77	LV2002 CV Gland	0	0	0	0.000	0.000
78	Discharge Line I/V Gland	0	0	0	0.000	0.000
79	Discharge Line Drain Line I/V Gland	0	0	0	0.000	0.000
80	Drain Line Safety Flange	0	0	0	0.000	0.000
81	LV1802 Suction Line I/V Gland	0	0	0	0.000	0.000
82	LV1802 CV Gland	0	0	0	0.000	0.000
83	Discharge Line I/V Gland	0	0	0	0.000	0.000
84	Drain line I/V Gland	0	0	0	0.000	0.000
85	Drain Line Safety Flange	0	0	0	0.000	0.000
86	PV2401 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
87	I/V Gland	0	0	0	0.000	0.000
88	I/V D/S Flange	0	0	0	0.000	0.000
89	Drain line I/V Gland	0	0	0	0.000	0.000
90	Drain Line Safety Flange	0	0	0	0.000	0.000
91	PV2401 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
92	PV2401 CV Gland	0	0	0	0.000	0.000
93	CV D/S Flange	0	0	0	0.000	0.000
94	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
95	I/V Gland	0	0	0	0.000	0.000
96	I/V D/S Flange	0	0	0	0.000	0.000
97	Drain line I/V Gland	0	0	0	0.000	0.000
98	Drain Line Safety Flange	0	0	0	0.000	0.000
99	NRV U/S Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

Issued To **Numaligarh Refinery Limited**
NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
100	NRV D/S Flange	0	0	0	0.000	0.000
101	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
102	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
103	LV1702 Suction Line I/V Gland	0	0	0	0.000	0.000
104	Drain line I/V Gland	0	0	0	0.000	0.000
105	Drain Line Safety Flange	0	0	0	0.000	0.000
106	LV1702 CV Gland	0	0	0	0.000	0.000
107	CV D/S Flange	0	0	0	0.000	0.000
108	Discharge line I/V Gland	0	0	0	0.000	0.000
109	Discharge line Flange	0	0	0	0.000	0.000
110	Drain line I/V Gland	0	0	0	0.000	0.000
111	Drain Line Safety Flange	0	0	0	0.000	0.000
112	LV1602 Suction Line I/V Gland	0	0	0	0.000	0.000
113	Drain line I/V Gland	0	0	0	0.000	0.000
114	Drain Line Safety Flange	0	0	0	0.000	0.000
115	LV1602 CV Gland	0	0	0	0.000	0.000
116	CV D/S Flange	0	0	0	0.000	0.000
117	Discharge line I/V Gland	0	0	0	0.000	0.000
118	Discharge line Drain Line I/V Gland	0	0	0	0.000	0.000
119	Drain Line Safety Flange	0	0	0	0.000	0.000
120	18PA114A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
121	I/V Gland	0	0	0	0.000	0.000
122	I/V D/S Flange	0	0	0	0.000	0.000
123	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
124	I/V Gland	0	0	0	0.000	0.000
125	I/V D/S Flange	0	0	0	0.000	0.000
126	NRV U/S Flange	0	0	0	0.000	0.000
127	NRV D/S Flange	0	0	0	0.000	0.000
128	Pump Seal	0	0	0	0.000	0.000
129	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
130	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
131	18PA114B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
132	I/V Gland	0	0	0	0.000	0.000
133	I/V D/S Flange	0	0	0	0.000	0.000

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
134	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
135	I/V Gland	0	0	0	0.000	0.000
136	I/V D/S Flange	0	0	0	0.000	0.000
137	NRV U/S Flange	0	0	0	0.000	0.000
138	NRV D/S Flange	0	0	0	0.000	0.000
139	Pump Seal	0	0	0	0.000	0.000
140	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
141	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
142	18PA104A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
143	I/V Gland	0	0	0	0.000	0.000
144	I/V D/S Flange	0	0	0	0.000	0.000
145	Drain line I/V Gland	0	0	0	0.000	0.000
146	Drain Line Safety Flange	0	0	0	0.000	0.000
147	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
148	I/V Gland	0	0	0	0.000	0.000
149	I/V D/S Flange	0	0	0	0.000	0.000
150	Pump Seal	0	0	0	0.000	0.000
151	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
152	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
153	18PA104B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
154	I/V Gland	0	0	0	0.000	0.000
155	I/V D/S Flange	0	0	0	0.000	0.000
156	Drain line I/V Gland	0	0	0	0.000	0.000
157	Drain Line Safety Flange	0	0	0	0.000	0.000
158	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
159	I/V Gland	0	0	0	0.000	0.000
160	I/V D/S Flange	0	0	0	0.000	0.000
161	Pump Seal	0	0	0	0.000	0.000
162	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
163	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
164	18PA104C Suction Line I/V U/S Flange	0	0	0	0.000	0.000
165	I/V Gland	0	0	0	0.000	0.000
166	I/V D/S Flange	0	0	0	0.000	0.000
167	Drain line I/V Gland	0	0	0	0.000	0.000

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Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
168	Drain Line Safety Flange	0	0	0	0.000	0.000
169	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
170	I/V Gland	0	0	0	0.000	0.000
171	I/V D/S Flange	0	0	0	0.000	0.000
172	Pump Seal	0	0	0	0.000	0.000
173	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
174	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
175	18PA104D Suction Line I/V U/S Flange	0	0	0	0.000	0.000
176	I/V Gland	0	0	0	0.000	0.000
177	I/V D/S Flange	0	0	0	0.000	0.000
178	Drain line I/V Gland	0	0	0	0.000	0.000
179	Drain Line Safety Flange	0	0	0	0.000	0.000
180	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
181	I/V Gland	0	0	0	0.000	0.000
182	I/V D/S Flange	0	0	0	0.000	0.000
183	Pump Seal	0	0	0	0.000	0.000
184	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
185	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
186	18PA104E Suction Line I/V U/S Flange	0	0	0	0.000	0.000
187	I/V Gland	0	0	0	0.000	0.000
188	I/V D/S Flange	0	0	0	0.000	0.000
189	Drain line I/V Gland	0	0	0	0.000	0.000
190	Drain Line Safety Flange	0	0	0	0.000	0.000
191	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
192	I/V Gland	0	0	0	0.000	0.000
193	I/V D/S Flange	0	0	0	0.000	0.000
194	Pump Seal	0	0	0	0.000	0.000
195	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
196	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
197	18PA104F Suction Line I/V U/S Flange	0	0	0	0.000	0.000
198	I/V Gland	0	0	0	0.000	0.000
199	I/V D/S Flange	0	0	0	0.000	0.000
200	Drain line I/V Gland	0	0	0	0.000	0.000
201	Drain Line Safety Flange	0	0	0	0.000	0.000

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Fugitive Emission Monitoring Survey Report

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NRL Complex, Numaligarh
Distt. Golaghat, Assam-785 699

Monitoring Period: February 2024
Customer Reference No.: 4600009200-SAR/14.08.2023

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
202	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
203	I/V Gland	0	0	0	0.000	0.000
204	I/V D/S Flange	0	0	0	0.000	0.000
205	Pump Seal	0	0	0	0.000	0.000
206	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
207	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
T.No.43TTCR101A (Service MVGO)						
208	Level Indicator connnecting Point	0	0	0	0.000	0.000
209	US line IV Gland	0	0	0	0.000	0.000
210	US line IV Flange	0	0	0	0.000	0.000
211	Drain line IV Gland	0	0	0	0.000	0.000
212	Drain line Safety Flange	0	0	0	0.000	0.000
213	D/S line IV Gland	0	0	0	0.000	0.000
214	D/S line IV Flange	0	0	0	0.000	0.000
215	Meter line IV Gland	0	0	0	0.000	0.000
T.No.43TTCR101B (Service MVGO)						
216	Level Indicator connnecting Point	0	0	0	0.000	0.000
217	US line IV Gland	0	0	0	0.000	0.000
218	US line IV Flange	0	0	0	0.000	0.000
219	Drain line IV Gland	0	0	0	0.000	0.000
220	Drain line Safety Flange	0	0	0	0.000	0.000
221	D/S line IV Gland	0	0	0	0.000	0.000
222	D/S line IV Flange	0	0	0	0.000	0.000
223	Meter line IV Gland	0	0	0	0.000	0.000
T.No.43TTCR102 (Service HVGO)						
224	Level Indicator connnecting Point	0	0	0	0.000	0.000
225	US line IV Gland	0	0	0	0.000	0.000
226	US line IV Flange	0	0	0	0.000	0.000
227	Drain line IV Gland	0	0	0	0.000	0.000
228	Drain line Safety Flange	0	0	0	0.000	0.000
229	D/S line IV Gland	0	0	0	0.000	0.000
230	D/S line IV Flange	0	0	0	0.000	0.000

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