



To,

DATE: 29.11.2022

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/22-23/04

Sub: Submission of Half Yearly Compliance status on Environment Stipulation during the period **April'22 to September'22.**

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.

Your's faithfully

(Alok Nayan Nath)

**Chief Manager (Tech Service-Environment)**

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

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**

<b>Sl. No.</b>	<b>A. Specific Condition</b>	<b>Remarks</b>
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 93° 43' 30" E & Latitude 26° 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 18thJanuary1994 with six conditions. Details on the present status of compliance on these conditions are enclosed as <b>Annexure A</b> .
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 5 <sup>th</sup> 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. <b>A copy is enclosed as Annexure B.</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 <sub>2</sub> , NO <sub>x</sub> , 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 and CPCB Regional Office. Real-time emission data has been transmitted to CPCB server on continuous basis. <b>Monitoring data attached as Annexure-III/IV</b>
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 modeling 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 Agartoli. -Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality.

		<p>Automatic online stack analysers have been provided in all the major Stacks for continuous monitoring of SO<sub>2</sub>, NO<sub>x</sub>, CO &amp; 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.</p> <p>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.</p> <p><b>Monitoring reports for the period is enclosed as Annexure – III/IV</b></p>
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 NO <sub>x</sub> 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 <sub>x</sub> 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 NO <sub>x</sub> burners have been installed in all the refinery furnaces.
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. <b>Fugitive emission report attached as per Annexure VI.</b>
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 alongwith 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	Zero discharge of effluent has been ensured. Since October, 2006 no effluent from refinery has been discharged into the River Dhansiri and since April, 2007 township effluent also routed to the refinery, so no effluent from refinery & township is discharged outside and the total effluent is recycled and reused within the Refinery as Fire water makeup. Treated effluent quality is enclosed as <b>Annexure-V</b> .
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. Further, as a step towards conservation of water, implementation of storm water recycle scheme as fire water make up is implemented.
17	The solid waste from the ETP and waxy sludge should be incinerated	NRL has installed an Incinerator for disposal of non hazardous incinerable wastes in February, 2008 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 4 <sup>th</sup> 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 construed a new 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. <b>Solid waste disposal plan prepared by NEERI in July 1999 submitted to IRO, GHY.</b> Ground water monitoring report around SLF provided as per <b>Annexure I.</b>
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, should 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. Also, Quantitative Risk Assessment is carried out every 5 years and the latest one was conducted in 2018. All the recommendations have been complied with.
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

		<p>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 15<sup>th</sup> October, 2001).</p> <p>Periodically, massive plantation is 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 &amp; 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.</p> <p>Initiatives for plantation under Compensatory Afforestation drive in degraded areas has been taken up at Nakkati Chapori, Golaghat and Kadoli Reserve Forest, Nagaon.</p>
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 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
	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
<b>Sl. No.</b>	<b>Condition</b>	<b>Remarks</b>
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 <sub>2</sub> ). 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 <sub>2</sub> S 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 SO <sub>x</sub> and NO <sub>x</sub> in the major stacks with proper calibration facilities should be installed. The low NO <sub>x</sub> burners should be installed in all the furnaces.	<p>The total sulphur emission from the refinery including Euro III Motor Spirit Project being maintained below 128 kg/hr as Sulphur (256 kg/hr as SO<sub>2</sub>).</p> <p>-Regular sulphur balance of the refinery is maintained and the average SO<sub>2</sub> emission from the refinery during this period (Apr-Sep'22) is 93.9 kg/hr which is well below the limit.</p> <p>-Off gases from the proposed unit has been treated in the amine absorption and regeneration unit.</p> <p>-Performance evaluation of Sulphur Recovery Block is done on a daily basis.</p> <p><b>- Fugitive emission/VOC data for MS is provided in Annexure VI.</b></p> <p>-Continuous emission monitoring for SO<sub>2</sub>, CO, PM and NO<sub>x</sub> have been provided in all the stacks.</p> <p>-Ultra low NO<sub>x</sub> burners have been provided in all the furnaces.</p>
3	Additional water requirement shall not exceed 1200 m <sup>3</sup> /hr. The total quantity of effluent generation should not exceed 3830 m <sup>3</sup> /day as indicated in the EMP of which (3530 m <sup>3</sup> /d from the existing and 300 m <sup>3</sup> /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 is very minimal as compared to the present requirement and is maintained within the limits. Treated effluent quality in Effluent Treatment Plant is maintained within the prescribed standards and all the treated effluent is reused inside the refinery as FW makeup. NRL has achieved 100 % reuse of treated effluent since October,2006.

4	<p>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.</p>	<p>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 and the monitoring data has been submitted regularly to the MoE&amp;F Regional Office along with the half-yearly report and to SPCB. Spent catalyst is disposed off through authorized recyclers as per Hazardous Waste Management Handling and Tran boundary Movement Rules 2016. Ground water monitoring data around Secured Land Fill is enclosed as <b>Annexure –I</b></p>
5	<p>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</p>	<p>Oily wastewater &amp; contaminated rain water from various units is routed through OWS (Oily Water Sewer) &amp; 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&amp;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 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. Also, Quantitative Risk Assessment is carried out every 5 years and the latest one has been conducted in 2018. All recommendations have ben complied with.</p>
6	<p>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</p>	<p>A Green Belt of width around 100 m surrounding the refinery and around 25 m around the NRMT covering a total area of about 56 hectares has been provided with adequate trees and proper</p>

	consultation with the local DFO. The bio sludge should be used as manure in the Green Belt development.	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 and Kadoli Reserve Forest, 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.	<b>Health check up is conducted and the records are maintained accordingly.</b> <b>Health check up status of workers for 20-21 and 21-22 has been submitted to IRO, GHY.</b>
<b>Sl. No.</b>	<b>General Condition</b>	<b>Remarks</b>
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 <sub>2</sub> NO <sub>x</sub> , 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. <b>Monitoring data attached as Annexure-III/IV</b>
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. For the same, 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 of Sep22 is enclosed as <b>Annexure-II</b>
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. <b>Annual return statements for Hazardous waste are also regularly sent to PCBA.</b> In regards to the same, authorization for collection/treatment/storage and disposal of hazardous wastes has been obtained from the PCBA. <b>Hazardous waste authorization is valid upto April 2026.</b>
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. <b>Environmental expenditure for the period(Apr-Sep'22) is attached as Annexure-D</b>
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 and NOC conditions of Numaligarh Refinery including the compliance status on the environmental Clearance for MS Plant being submitted six monthly regularly

		to the MoE&F 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 <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the 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 18 <sup>th</sup> 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 20 <sup>th</sup> 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**

<b>Sl. No.</b>	<b>A. Specific Condition</b>	<b>Remarks</b>
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 <sub>2</sub> ).	The average SO <sub>2</sub> emission during the period (Apr-Sep'22) is 93.9 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 <sup>3</sup> /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 <sub>2</sub> and NO <sub>x</sub> .	Continuous stack monitoring systems for online measurement of SPM, SO <sub>2</sub> NO <sub>x</sub> 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 Secure Land Fill Facility. Ground water around the secured landfill is monitored regularly and results are submitted along with the half yearly compliance report. Analysis report of ground water around Secured Land Fill is enclosed as <b>Annexure –I</b> .
<b>Sl. No.</b>	<b>General Condition</b>	<b>Remarks</b>
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 and the latest one has been conducted in 2018. All recommendations have ben complied with.
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 <sub>2</sub> , NO <sub>x</sub> , 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. <b>Monitoring data attached as Annexure-III/IV/V.</b>
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 equipment's 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). <b>Noise monitoring result carried out in the Refinery for Sep'22 enclosed as Annexure II</b>
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. <b>Annual return statements for Hazardous waste are also regularly sent to PCBA.</b> In regard to the same, authorization for collection/treatment/storage and disposal of hazardous wastes has been obtained from the PCBA. <b>Hazardous waste authorization is valid upto April 2026.</b>



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. <b>Environmental expenditure for the period(Apr-Sep'22) is attached as Annexure-D</b>
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 monthly compliance report and the monitored data should be submitted to them regularly.	A six monthly compliance report on the Environmental Clearance conditions of NRL along with the monitored data has 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 <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the 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 18 <sup>th</sup> March 2008.	NRL is complying with the new standards/norms as per the MoEF notification 2008. <b>The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure III/IV/V</b> <b>Fugitive emission data is attached as per Annexure VI.</b> 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 13 <sup>th</sup> February 2004 and J-11011/203/2003-IA.II(I) dated 22 <sup>nd</sup> March, 2004.	Complied.
3	The process emissions (SO <sub>2</sub> , NO <sub>x</sub> , HC, VOCs and Benzene) from various units shall conform to the standards prescribed by the Assam State Pollution Control Board from time to time. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.	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 <sub>2</sub> , NO <sub>x</sub> , 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. <b>Monitoring data submitted in Annexure-III/IV</b>
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. <b>Fugitive emission data has been provided as per Annexure VI</b>
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. <b>Health check-up status for 20-21, 21-22 submitted to IRO, GHY.</b>
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 15 <sup>th</sup> 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. Green belt detail submitted to IRO, GHY. Initiatives for plantation under compensatory afforestation drive in degraded areas in Nakkati Chapori, Golaghat and Kandoli Reserve Forest, 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. <b>Form IV (Annual return for Hazardous waste management) is being regularly submitted to PCBA.</b>
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.
<b>Sl. No.</b>	<b>General Condition</b>	<b>Remarks</b>
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 statutory 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 <sub>2</sub> , NO <sub>x</sub> , 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. <b>Monitoring data attached as Annexure-III/IV</b>
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. The effluent generated from refinery and township is totally reused after treatment. Treated effluent quality is enclosed as <b>Annexure-V</b> .
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) <b>Noise monitoring report is enclosed in Annexure-II</b>
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. <b>Hazardous waste authorization is valid upto April 2026 and submitted to IRO,GHY</b>
8	The project authorities will provide adequate funds as non-recurring and recurring expenditure to implement the conditions stipulated by the Ministry of Environment	Adequate funds have been provided for implementing the conditions stipulated by MoEF and the State Govt. and not

	and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	diverted for any other purpose. <b>Environmental expenditure for the period(Apr-Sep'22) is attached as Annexure-D</b>
9	The company shall develop rain water harvesting structures to harvest the runoff water for recharge of ground water.	Storm water reuse system to refinery fire water network scheme commissioned.
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 <a href="http://www.envfor.nic.in">http://www.envfor.nic.in</a> . This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the concerned Regional office of this Ministry.	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**

<b>Sl. No.</b>	<b>A. Specific Condition</b>	<b>Remarks</b>
1	Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J011011/16/90-1A.II dated 31 <sup>st</sup> May, 1991, J011011/92/2003-1A.II (I) dated 13 <sup>th</sup> February, 2004, J011011/203/2003-IA. II (I) dated 22 <sup>nd</sup> March, 2004, J011011/272/2008-IA. II (I) dated 10 <sup>nd</sup> 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 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.
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-lines stack monitoring equipment shall be installed for the measurement of particulate matter, VOCs, SO <sub>2</sub> , NO <sub>x</sub> , non-methanated Hydrocarbons (Benzene, Xylene and Toluene).	SO <sub>2</sub> , NO <sub>x</sub> ,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. <b>Data attached as Annexure-III/IV</b>
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. <b>Fugitive emission data attached as per Annexure VI.</b>
8	The process emissions [SO <sub>2</sub> , NO <sub>x</sub> , 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 <sub>2</sub> , NO <sub>x</sub> , 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. <b>Monitoring data submitted in Annexure-III/IV</b>
9	Ambient air quality monitoring stations [SPM, SO <sub>2</sub> , NO <sub>x</sub> , H <sub>2</sub> S, mercaptan, non-methane-HC, and Benzene shall be set up in the complex in consultation with Assam Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be	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).



	<p>decided based on modeling exercise to represent short term GLCS. Ambient air quality shall also be carried in one location at Kazirang National Park for SO", NO", SPM, CO and HC.</p>	<p>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.</p> <p>-Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. The Ambient Air Quality Monitoring reports are regularly submitted to the PCBA HQ Guwahati, PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong in every month.</p> <p>- Further, continuous ambient air quality data and online stack analyser data have been made accessible to CPCB from NRL's company's website since Sept'11.</p> <p>- 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.</p> <p>-Further, action initiated to install 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. To be installed by Mar'19.</p> <p><b>Ambient air quality for the period is enclosed as Annexure-IV.</b></p>
10	<p>Ambient air quality data shall be collected as per NAAQMSs standard notified by the Ministry on 16<sup>th</sup> 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</p>	<p>Ambient air quality data is monitored in line with NAAQMS, 2009 in totality and trend analysis is carried out.</p>
11	<p>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</p>	<p>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</p>

	hydrocarbon will be routed to the flare system and the flares system shall be designed for smoke less burning.	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. <b>Fugitive emission data attached as per Annexure VI.</b>
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 Iso 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 fresh water requirement from River Dhansiri for the proposed unit shall not exceed 60 m <sup>3</sup> /hr. and prior permission shall be obtained from the competent authority. The industrial effluent generation shall not exceed 5 m <sup>3</sup> /hr. The industrial effluents shall be treated in the ETP and the treated effluent shall meet the prescribed standards. Treated effluents shall be recycled/reused within the factory premises. Domestic sewages shall be treated in sewage treatment plant (STP).	NRL has already obtained consent from State Government for drawl of max. 1200 m <sup>3</sup> /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 no treated effluent is discharged from the refinery into River Dhansiri since October, 2006. Further no treated effluent from township is discharged since April, 2007 The treated effluent is totally reused as FW makeup in the Refinery. <b>Permission letter submitted to IRO, GHY.</b>
15	No effluent shall be discharged outside the factory premises and Zero Water Concept shall be adopted.	Total recycle of treated effluent has been ensured. Since October, 2006 no effluent from refinery has been discharged outside the refinery and since April, 2007 township effluent also routed to the refinery, so no effluent from refinery & township is discharged outside and the total effluent is recycled within the Refinery as FW makeup.

		<b>Treated effluent quality for the period April'22 to September'22 is enclosed as Annexure-V.</b>
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 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 with the help of MOSRU (Mobile Oil Spill Recovery Unit).
17	Methyl-Iso-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. <b>Form-IV Annual return on hazardous waste has been submitted for FY-21-22. Hazardous waste authorization is valid till April, 2026.</b>
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	The rules and regulations under MSIHC1989 as amended in 2000 and Hazardous waste management rules 2016 are strictly adhered to.

	Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and amended time to time.	
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.	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 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.
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.

		<p>Accordingly, 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 15<sup>th</sup> 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 &amp; 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.</p> <p>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.</p>
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 <b>Submitted to IRO,GHY</b>
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 and the latest one conducted in 2018. All recommendations have been complied with.
28	All the issues raised and committed made during the public hearing/consultation meeting held on 14 <sup>th</sup> 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- 11013/41/2006-IA(1) dated 26 <sup>th</sup> April, 2011 and 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( day time) 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). <b>Noise report has been enclosed as per Annexure II.</b>
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. <b>Environmental expenditure Submitted as Annexure-D</b>
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, SO <sub>2</sub> , NO <sub>x</sub> , HC (Methane& Non-methane),VOCs (ambient levels as well 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 31 <sup>st</sup> 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 amended 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 31 <sup>st</sup> 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. <b>The environmental statement for financial year, 21-22 as per Form-V submitted.</b>
12	The Project Proponent shall inform the public that the project has been accorded environmental clearance by Ministry and copies of the clearance letter are available with the SPCB and may also be seen at website of the Ministry of Environment & Forests at <a href="http://envfor.nic.in">http:// envfor.nic.in</a> . this shall be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the 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 alongwith 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 31 <sup>st</sup> May, 1991, J011011/92/2003-IA.II dated 13 <sup>th</sup> February, 2004, J011011/272/2008-IA.II (I) dated 10 <sup>th</sup> 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 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.
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 18 <sup>th</sup> March, 2008.	NRL is complying with the new standards/norms as per the MoEF notification 2008. <b>The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure III/IV/V</b> <b>Fugitive emission report is also enclosed as Annexure VI</b> 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 SO <sub>2</sub> and SPM of all the stacks shall be carried out. SO <sub>2</sub> on-line analysers shall be installed in all the furnace stacks. Low	Low NO <sub>x</sub> burners have been provided in all the furnaces.

	NOx burners shall be installed with online analysers to monitor NOx emissions shall be provided.	Online stack analysers have been provided in all the major stacks for continuous monitoring of SO <sub>2</sub> , NO <sub>x</sub> , CO and SPM with realtime data transmission to CPCB.
6	The process emissions [SO <sub>2</sub> , NO <sub>x</sub> , 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 <sub>2</sub> , NO <sub>x</sub> , 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. <b>Monitoring data submitted in Annexure-III/IV.</b>
7	Ambient air quality monitoring stations [SPM, SO <sub>2</sub> , NO <sub>x</sub> , H <sub>2</sub> S, Mercaptan, non-methane-HC, and benzene] shall be set up in the complex in consultation with 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 SO <sub>x</sub> , NO <sub>x</sub> , 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 <sub>2</sub> , NO <sub>x</sub> , 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

		<p>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.</p> <p><b>Monitoring reports for the period is enclosed as Annexure – IV</b></p>
8	<p>Ambient air quality data shall be collected as per NAAQMS notified by the Ministry on 16<sup>th</sup> 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.</p>	<p>Ambient air quality data is monitored in line with NAAQMS, 2009 in totality and trend analysis is carried out.</p>
9	<p>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.</p>	<p>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.</p> <p>Hydrocarbon are routed to the flare system and the flare system has been designed for smoke less burning.</p> <p><b>Fugitive emission data attached as per Annexure VI.</b></p>
10	<p>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 SO<sub>2</sub> emissions. Sulphur recovery units shall be installed for control of H<sub>2</sub>S emissions. Leak detection and Repair programme shall be implemented to control HC/VOC emissions. Work zone monitoring shall be carried out near the storage tanks besides monitoring of HCs/VOCs in the work zone.</p>	<p>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. Low sulphur fuels is being used in all the furnaces to minimize SO<sub>2</sub> 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.</p>
11	<p>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</p>	<p>The total sulphur emission from the refinery is maintained below 128 kg/hr as Sulphur (256 kg/hr as SO<sub>2</sub>). <b>SO<sub>2</sub> emission from the refinery is 93.9 kg/hr avg for the period(Apr-Sep'22)</b></p>

	from Refinery through products, byproduct (elemental sulphur), and atmospheric emissions.etc.	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 no treated effluent is discharged from the refinery into River Dhansiri since October,2006. Further no treated effluent from township is discharged since April, 2007 The treated effluent is totally reused as FW makeup in the refinery. <b>Permission letter submitted to IRO,GHY.</b>
13	No effluent shall be discharged outside the factory premises and “zero water concept” shall be adopted.	Zero discharge of treated waste water has already been achieved since 2006 and Ministry’s Regional Office is kept informed.
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 fliters 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.

		<b>Form-IV Annual return on hazardous waste has been submitted for FY-21-22</b>
16	The project authorities must strictly comply with the rules and regulation with regard to handling and disposal of Hazardous Waste (Management, Handling and Trans 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. <b>Hazardous waste Authrisation certificate valid upto April, 2026.</b>
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 channed. 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 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.
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.

		<p>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 15<sup>th</sup> October, 2001).</p> <p>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 &amp; 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.</p>
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 <b>Submitted to IRO,GHY</b>
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. Moreover, Quantitative risk assessment is carried out every 5 years and the latest one conducted in 2018. All recommendations have been complied with.
24	All the issue raised in the public hearing/consultation meeting held on 14 <sup>th</sup> 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 26 <sup>th</sup> 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 conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	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 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). <b>Noise monitoring report enclosed as Annexure-II</b>
5	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be 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. <b>Environmental expenditure Submitted as Annexure-D</b>
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 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, SO <sub>2</sub> , NO <sub>x</sub> , 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 31 <sup>st</sup> 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 31 <sup>st</sup> 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. <b>The environmental statement for financial year, 21-22 as per Form-V submitted.</b>
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 <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the 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 21 <sup>st</sup> September'12 and 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. <b>The monitoring reports for gaseous emissions and liquid effluent are attached as per Annexure III/IV/V</b> <b>Fugitive emission report is also enclosed as Anenxure VI</b> 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.II dated 31.05.1991, J011014/2/1991-1A (I) dated 18.01.1994, J011011/92/2003-1A.II (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 regularly being submitted to MoEF,RO.
3	Continuous on-line stack monitoring for SO <sub>2</sub> , NO <sub>x</sub> and CO of all the stacks shall be carried out. Low NO <sub>x</sub> burners shall be installed	Low NO <sub>x</sub> burners installed in all the stacks .Online SO <sub>2</sub> , NO <sub>x</sub> , CO and SPM analyser installed in all the stacks with realitme data transmission to CPCB server.

4	<p>The process emissions [SO<sub>2</sub>, NO<sub>x</sub>, HC (Methane &amp; 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 by the 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.</p>	<p>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<sub>2</sub>, NO<sub>x</sub>, CO &amp; 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. <b>Monitoring data submitted in Annexure-III/IV.</b></p>
5	<p>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.</p>	<p>LDAR program implemented for DHT in line with the existing practice carried out in various units. 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.</p>
6	<p>SO<sub>2</sub> emissions after expansion from the plant shall not exceed 256 kg/hr and further efforts shall be made for reduction of SO<sub>2</sub> load through use of low sulphur fuel. Sulphur recovery unit with tail gas treating facilities having 99.9 % efficiency shall be provided.</p>	<p>SO<sub>2</sub> emission for this period is 93.9 kg/hr avg. which is well below the allowable limit of 256 kg/hr. TGTU being implemented.</p>
7	<p>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</p>	<p>Regular Sulphur balance for the refinery is carried out and record maintained. Also, overall sulphur balance post DHDT is prepared.</p>

	<p>from Refinery through products, byproduct (elemental sulphur), atmospheric emissions etc.</p>	
8	<p>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</p>	<p>As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations:</p> <p>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.</p> <p>-Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. The Ambient Air Quality Monitoring reports are regularly submitted to the PCBA HQ Guwahati, PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong in every month.</p> <p>- Further, continuous ambient air quality data and online stack analyser data have been made accessible to CPCB from NRL's company's website since Sept'11.</p> <p>- 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.</p> <p>-Further, action initiated to install 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. To be installed by Mar'19.</p> <p><b>Ambient air quality for the period is enclosed as Annexure-IV.</b></p>

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 no treated effluent is discharged from the refinery into River Dhansiri since October,2006. Further no treated effluent from township is discharged since April, 2007. The treated effluent is totally reused as FW makeup in the Refinery. <b>Permission letter submitted to IRO, GHY.</b>
11	No effluent shall be discharged outside the plant premises and Zero effluent discharge concept shall be followed	NRL does not discharge ETP treated effluent to outside environment. 100% treated effluent is reused.
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). <b>Construction of 6 nos new oil catcher Near CDU,HCU, OMS north, near ETP, near PH-3, near storm water final O/L completed.</b>
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

		<p>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 bioremediation or is being sold to CPCB authorized recyclers. To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19.</p> <p><b>Form-IV Annual return on hazardous waste has been submitted for FY-21-22.</b></p>
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. <b>Hazardous waste authorization is valid till April,2026.</b>
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.	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 MOSROU 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. Health examination report of workers for 20-21,21-22 submitted to IRO,GHY

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	<p>Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment &amp; 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.</p> <p>Accordingly, 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 15<sup>th</sup> October, 2001).</p> <p>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 &amp; 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.</p> <p>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.</p>
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 and the latest one was conducted in 2018. All recommendations have been complied with.
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.
<b>Sl. No.</b>	<b>General Condition</b>	<b>Remarks</b>
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). <b>Noise report attached as per Annexure II.</b>
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. <b>Environmental expenditure Submitted as Annexure-D</b>
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, SO <sub>2</sub> , NO <sub>x</sub> , HC (Methane& Non-	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.

	methane),VOCs (ambient levels as well 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.	The critical pollutant parameters are also displayed near the Refinery Main gate.
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 31 <sup>st</sup> 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 31 <sup>st</sup> 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. <b>The environmental statement for financial year, 21-22 as per Form-V submitted.</b>
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 <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the 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 26 <sup>th</sup> 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	The same has been noted.

(Management Handling and Transboundary Movement) Rules 2008 and the Public Liability Insurance Act 1991 alongwith their amendments and rules.	
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**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 27<sup>th</sup>, 2020**

SI 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: <ul style="list-style-type: none"><li>• 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.</li><li>• Less consumption of input energy (steam, power, etc.) required for disposal of RO-DM plant reject water (as compared to ZLD plant option).</li><li>• Less fuel requirement for additional power requirement (as compared to ZLD plant option wherein more fuel</li></ul>

		<p>shall be required for generation of power and steam) and lesser emissions.</p> <ul style="list-style-type: none"> <li>• No requirement of secured landfill for disposal of significant quantity (30 TPD) of salt generation as in case of ZLD plant option.</li> <li>• No possibility of ground water contamination in the areas nearby secured landfill site as in case of ZLD plant option.</li> <li>• Lower CAPEX and OPEX involved in plant installation and operation (as compared to ZLD plant option).</li> <li>• Very little maintenance or operator's attention requirement (as compared to ZLD plants which are more prone to downtime).</li> </ul> <p>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-</p> <p>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.</p>
13(iii)	<p>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 refinery area. The project proponent shall submit MoU/commitment from the stakeholders regarding transfer of the land.</p>	<p>Land documents submitted to MoEFCC on 28.06.2022.</p>

13(iv)	The National Emission Standards for Petroleum Oil refinery issued by the Ministry vide G.S.R. 186 (E) dated 18 <sup>th</sup> March, 2008 and G.S.R. 595(E) dated 21 <sup>st</sup> 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 ash from boiler shall be sold to brick manufacturers / cement industry.	Noted for compliance.

13(xi)	<p>The company shall undertake waste minimization measures as below:-</p> <ul style="list-style-type: none"> <li>a) Metering and control of quantities of active ingredients to minimize waste.</li> <li>b) Reuse if by-products from the process as raw materials or as raw material substitutes in other processes.</li> <li>c) Use of automated filling to minimize spillage.</li> <li>d) Use of Close Feed system in to batch reactors.</li> <li>e) Venting equipment through vapour system</li> <li>f) Use of high pressure hoses for equipment cleaning to reduce waste water generation.</li> </ul>	Noted for compliance.
13(xii)	<p>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.</p>	<p>Noted for compliance.</p> <p>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.</p>
13(xiii)	<p>As proposed, at least Rs. 36.51 crore shall be allocated towards Corporate Environment Responsibility (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 &amp; skill development, etc.</p>	<p>CER model prepared.</p> <p><b>CER report for the period Apr-Sep'22 has been attached as per Annexure C.</b></p>
13(xiv)	<p>For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.</p>	Noted for compliance.
13(xv)	<p>The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in</p>	Noted for compliance.

	material handling. Firefighting system shall be as per the norms.	
13(xvi)	Continuous online (24X7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB 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. <b>Monitoring reports attached as per Annexure III, IV,V.</b>
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 for existing 3 MMTPA refinery last carried out in 2018 and all recommendations have complied with. 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.	Site specific conservation plan for Schedule I species as per EIA report for NREP, submitted to Principal Chief Conservator of Forests (PCCF), Assam on 29.09.2022 for initiation of further activities regarding implementation of the plan.
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.	Noted for compliance.



General Conditions

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 16 <sup>th</sup> 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	Noted for compliance.

	Rules, 1989 viz 75dBA (day time) and 70 DBA (night time).	
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.	Noted for compliance.
13.1 (vii)	Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre- employment and routine periodical medical examinations for all employees shall be undertaken on 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. <b>CER activity report for the period Apr-Sep'22 enclosed as per Annexure C.</b>
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 conditions stipulated herein. The funds so diverted for any other purpose.	Noted for compliance.
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 as well as by e-mail) to the respective Regional Office of MoEF & CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six Monthly compliance status report shall be posted on the website of the company.	-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 31 <sup>st</sup> 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. <b>The environmental statement for financial year, 21-22 as per Form-V submitted.</b>
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	The advertisement of granting of EC grant broadly published in widely circulated local newspapers - <b>Amar Asom, Pratidin, Dainik Asom, Asomia Khobor, Dainik Agradoot, Dainik</b>

	available with the SPCB/Committee and may also be seen at Website of the Ministry and at <a href="https://parivesh.nic.in/">https://parivesh.nic.in/</a> . this shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which on shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry.	<b>Janambhumi, Niyamia Barta</b> (Assamese) and <b>The Assam Tribune</b> and <b>The Sentinel</b> (English) on 30 <sup>th</sup> July, 2020 for information to public. The copy of EC letter and paper advertisement sent to MoEF,RO on 06.08.2020
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**

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

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### **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 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

### 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 facilities. 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 approved 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:

<i>Sl. No.</i>	<i>Area</i>	<i>Frequency</i>
<i>1.</i>	<i>Hazardous</i>	<i>Half- yearly</i>
<i>2.</i>	<i>Less hazardous</i>	<i>Annually</i>

3.	<i>Non- hazardous</i>	<ul style="list-style-type: none"> <li>• <i>Annually the employees of age 50 yrs and above.</i></li> <li>• <i>Once in 2 yrs for employees of agegroup 40 – 50 yrs.</i></li> <li>• <i>Once in 3 yrs for employees of agegroup below 40 yrs.</i></li> </ul>
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**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 Dhansiri 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 15<sup>th</sup> 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 m<sup>3</sup> 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<sub>2</sub> 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<sub>2</sub> and NO<sub>x</sub> 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<sub>2</sub> and NO<sub>x</sub> 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<sub>2</sub>, NO<sub>x</sub> 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<sub>2</sub> and flow measuring device at all the stacks. If at any stage SO<sub>2</sub> exceeds the permissible limits immediate shutdown of operations will have to be ensured.**

-Automatic SO<sub>2</sub> online analysers have been installed in all the refinery unit stacks. The total SO<sub>2</sub> 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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NUMALIGARH REFINERY LIMITED



# Activity Report of CER Projects

(April 2022 to September 2022)

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- 1.1 Development of Science and Mathematics laboratory at Numaligarh High School
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- 1.1 To collect and dispose of single used plastic from nearby areas of the Refinery as environment friendly initiative
- 1.2 Plantation of Muga Host Plant at Bogidhola Muga VGR by Sericulture dept. Golaghat
- 1.3 Plantation of seedless Lemon tree sapling at Bogidhola Muga VGR, Marangi :
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### **D. Sports , Health & Culture**

- 1.1 15 days Yoga workshop for promotion of physical, mental and spiritual growth

### **E. Rural Development**

- 1.1 Construction of Information Centres
- 1.2 Construction of Playgrounds
- 1.3 Construction of Interlocking Block Pavement Roads
- 1.4 Preparing the Master plan for the project Transformation of Rajabari Tea Estate as a Model Tea Estate

## **INTRODUCTION**

Corporate Environment Responsibility (CER) refers to the responsibility of the corporations/companies to contribute towards economic, social and environmental development of the affected area around the project. On 1st May 2018, the Ministry of Environment, Forest & Climate change, Govt. of India, issued an Office Memorandum F. No. 22-65/2017-IA.III to suggest a common principal for affixing the corporate environmental responsibility for Greenfield as well as Brownfield projects.

On 27<sup>th</sup> July, 2020 the Expert Appraisal Committee (EAC) of MoEF has recommended granting of Environmental Clearance to prestigious 22,594 crore Numaligarh Refinery Expansion Project (NREP) through notification F. No. J-11011/274/2015-IAII(I). The notification proposed Rs. 36.51 crores towards Corporate Environment Responsibility (CER) of the NREP.

Competent authority of NRL approved modalities for implementations of CER vide approval dtd. 21.09.2020. Accordingly, to identify, access and recommend and monitor activities CER, a steering committee was constituted vide circular HR/CER/2020/01 dated. 10.11.2020. On the other hand, CER Approval system was implemented at NRL and portal become ready by the end of July/2021.

In the environment clearance (EC) of NREP F. No. J-11011/274/2015-IAII(I) stated that proposed fund (36.51 crores) shall be spent mainly for addressing the issues raised during public consultation/hearing including assistance/infrastructure for transport facility, drinking water, socio environmental activities, education and skill development, etc.

In line with the EC of NREP, several discussions were made with DC Golaghat, Officials Gaon Panchayat, Block Development Officer, Officials of Assam State Rural Livelihood Mission (ASRLM), local organizations, etc. to identify activities for socio-economic and environmental upliftment community around Numaligarh Refinery Limited. Suggestions were received for taking up various activities related to rural development, assistance to farmers for scientific cultivation and livestock farming, promotion of sports, education & skill development, health support and positive environmental impact. However, the focus of almost all discussion was to address adverse impact of Covid-19 pandemic by introducing various income generating schemes for unemployed youth/women and thereby improving their livelihood.

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

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

In line with above planning, several activities were identified, discussed in steering committee meeting, and agreed proposals were sent for approval from competent authority. Approved proposals are being executed and



reviewed in steering committee meeting. The process of identification of new activities and taking necessary approval is also in progress. Here is a head wise brief description of NREP CER jobs taken up in the financial year 2022-2023.

### **CER HEADS**

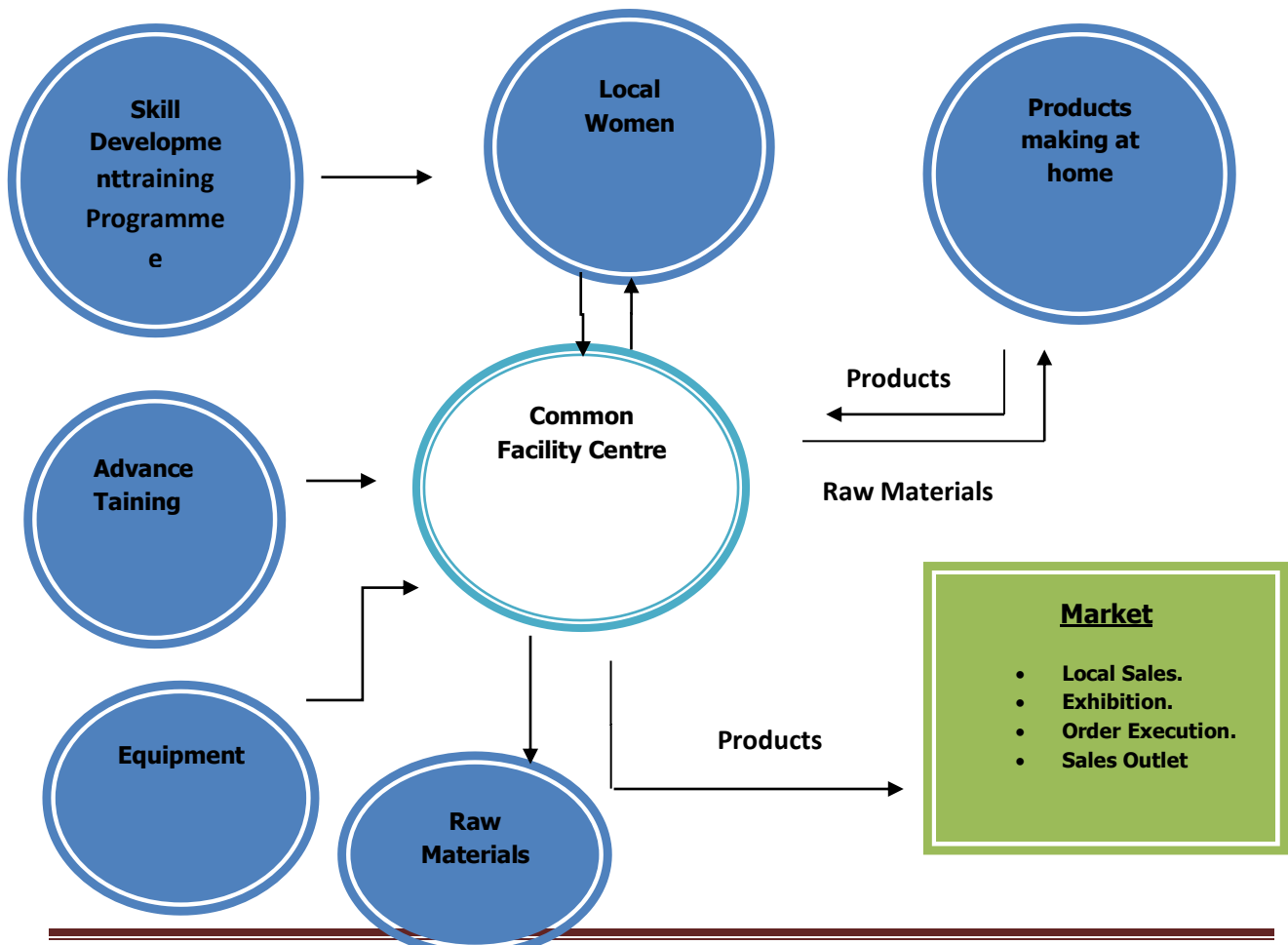


## A. AGRI-ALLIED ACTIVITIES

### 1.1 Water Hyacinth Project :

Livelihood is one of the very important area to be addressed for socio economic development of people of nearby area. Water Hyacinth handicraft has been identified as one of the very good idea for livelihood support of a group of family involving women in preparing various products with fibers of water hyacinth. Therefore NRL jointly with ASRLM under corporate environment responsibility (CER) has undertaken initiatives to promote Water Hyacinth Craft as a sustainable livelihood option for a group of women of Rongbong gram Panchayat. The project was started on 29<sup>th</sup> August 2021. The duration of the project is 18 months. Four SHG's has selected with the help of Assam State Rural Livelihood Mission (ASRLM), Morongi who are interested in preparing various products with fiber of water hyacinth commercially. Availability of water hyacinth has also been checked and found available in water bodies of nearby area.

#### IMPLEMENTATION MODEL



The project was started with a 25 day Skill development and advance training held at Common Facility Centre at Jackson Grant Bokial, from 25<sup>th</sup> January'2022 to 23<sup>rd</sup> February'2022. Total 40nosof Local women participated in these training. Necessary machineries, raw material and consumables were provided for the training. Training was provided by two nos of outsourced trainers trained under NEDFi. After the training programme, womens are now capable of making products and the quality of products have been gradually improved. These products are sold into the market, exhibition and to the high level officers. This project is receiving good response from the customer.



**Current Status as on Sept 30,2022 :** Currently, the members of Jagron Producer Group are engaged in making products which are more in demand such as (Shopping Bags, Ladies Bag, Tray, Pen stand, etc.).The members of the project started improving the quality of the water hyacinth products. Tagging and branding of products has improved. Collection of water hyacinth from Bokial as well as from Borgoria and Doigrung is going on, which is predicted to be of around 2-3 quintals of dry hyacinth.20 nos of products such as bags, trays, pen stands, etc. are ready to be sent to corporate office of NRL, Guwahati. Discussion is also being done on providing an advanced training to the artisans whom we will initiate in the 2 nd week of November.

<b>Financial Position of the project</b>	
Particulars	Amount (In Rs.)
Total approved budget of the project	24,80,000.00
Total expenditure ( 2021-2022)	4,34,133.00
Total expenditure (April 2022- Sept 2022)	3, 34,530.00

Technical, marketing and other assistance have been providing to the group of women under the project which shall be extended up to 18 months so that they become self-sustainable.



**Exhibition Stall of water Hyacinth Project**



**Product offered to DC Golaghat**



**Offered our product to the Honorable President of India on his visit to Assam**



**Mr. Putul Saikia (NRL CGM Finance) visited to training center of the project**



**Products of Water Hyacinth**

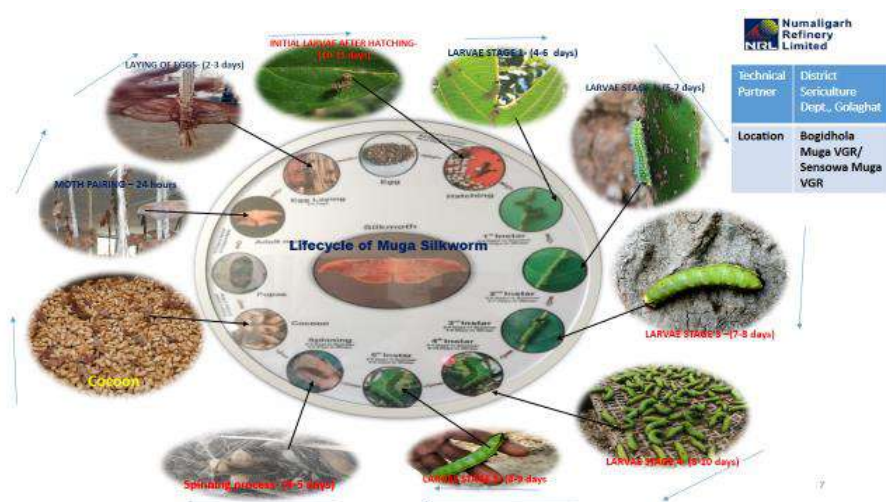


**Collection of water hyacinth from Bokial**

**Glimpses of activities of the project**

## 1.2 Rearing and Reeling of Muga Silkworms at Bogidhala Muga VGR :

The CER section of NRL has started an integrated project of Rearing and reeling of Muga Silkworms at Bogidhala Muga VGR, Sensowa Muga VGR and Bhoga Kaboru Muga VGR to promote and protect the significance of Assam silk industry. The project was started on November 2021 along with the cooperation from Sericulture Deptt. Golaghat and Block Development Office, Golaghat and Marangi College, Golaghat.



Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	9,60,990.00
Total expenditure ( 2021-2022)	6,16,378.00
Total expenditure (April 2022- Sept 2022)	3,75,229.00

Sl No.	Expenditure Break-up (Nov 2021- Nov 22)	Amount (In Rs.)
1	Rearing of Muga Silkworm at Sumani, Marangi	4,90,140.00
2	Rearing of Muga Silkworm at Sensowa Muga VGR	3,60,555.00
3	Reeling of Muga silk at Bogidhola Muga VGR, Marangi and starting 2nd phase of rearing.	1,40,912.00

**Current Status as on Sept 30,2022:** After necessary approvals, the project was started from Nov 2021 with the help of 10,000 nos of seed cocoons brought from Garo Hill in the first phase i.e; from Nov to Feb .In the first phase of Rearing Muga Silkworms, the project faced huge success with total yarn obtained is 14 KG. The project has completed upto the 3<sup>rd</sup> cycle of Muga rearing till Sept 2022. At present, the 4<sup>th</sup> cycles of rearing of Muga Silkworms have been going on.

Up to the 3<sup>rd</sup> phase of rearing and reeling has been completed with production as below:

Result of 1st cycle (Nov 2021- Feb 2022)		Result of 2 <sup>nd</sup> cycle (April 2022- June 2022)		Result of 3 <sup>rd</sup> cycle ( June 2022- Sept 2022)	
No of seed Cocoons	10,000 Nos	No of seed Cocoons	8,000 Nos	No of eggs bought	500gm
Cocoons Yield	1,70,000 Nos	Cocoons Yield	34,000 Nos	Cocoons Yield	Nil ( Due to Schorching Heat)
Total sale of Cocoons	61,000 Nos	Total sale of Cocoons	Nil	Total sale of Cocoons	Nil ( Due to Schorching Heat)
Muga Yarn Obtained	14 Kg	Muga Yarn Obtained	5 kg	Muga Yarn Obtained	Nil ( Due to Schorching Heat)
Total Sale of Muga Yarn	7kg	Total Sale of Muga Yarn	Nil	Total Sale of Muga Yarn	Nil ( Due to Schorching Heat)



Larvae stage 3 during 2<sup>nd</sup> cycle



Moths Pairing during 3<sup>rd</sup> cycle



Sri Biswajit Phukan (MLA Sarupathar, Golaghat) purchasing Muga Yarn



Cocoons during 2<sup>nd</sup> cycle



Reeling activity done by Marangi college students



Mr. Ranjit RATH(Chairman & MD- oil ) Visited to Sumoni on 19<sup>TH</sup> Oct 2022

**Glimpses of activities of the project**

### 1.3 Providing bar bending and cutting machine to local youth:

- a) To assist local youths in entering construction sector as entrepreneur a set of necessary equipment has been provided to eight groups of youth. Each set consists of one bar bending and one bar cutting machine.

Sl No	Implementing Agency	Detail Of Beneficiaries	Approved Amount (In Rs.)	Released Amount (In Rs.) (April 2022- Sept 2022)
1	M/s Tyafone Construction	1. Dibyajoti Borah 2. Rinku Konwar 3. Kamal Konwar 4. Jintu Rajbongshi 5. Ripunjoy Boruah	3,86,804.00	3,53,764.00
2	M/S DD Construction	1. Kulendra Bora 2. Akash Gohain 3. Dipjyoti Lahon 4. Debaraj Sonowal 5. Bhaskar Saikia	3,86,804.00	3,53,764.00
3	TG Construction	1. Chitraranjan Gogoi 2. Nabajit Tamuly 3. Suraj Jyoti Gogoi 4. Diganta Pow 5. Robin Robi Das	3,86,804.00	3,53,764.00
4	M/S Kaliyani Enterprise	1. Tomi Thengal 2. Priyam Das 3. Khogen Cinte 4. Rinku Hazarika 5. Polash Hazarika	3,86,804.00	3,53,764.00
5	M/S Arjun Construction	1. Pankaj Bhumij 2. Amrit Munia 3. Biren Akk 4. Dipak Urang 5. Dayaram Bhumij	3,86,804.00	3,53,764.00
6	M/S Surya Construction	1. Suraj Ekku 2. Aditya Tirki 3. Amrush Xalzo 4. Bikash Karia 5. Karan Gowala 6. Suren Bhumij	3,86,804.00	3,53,764.00
8	M/S Partha Hazarika	1. Partha Hazarika 2. Amrit Thengal Bora 3. Madhurjya Gogoi 4. Mridul Barhoi 5. Bidyut Handique	3,86,804.00	3,53,764.00
<b>Total</b>			<b>30, 94,432.00</b>	<b>28, 30,112.00</b>

<b>Financial Position of the Project</b>	
Particulars	Amount (In Rs.)
Total approved budget of the project	30,94,432.00
Total expenditure ( 2021-2022)	0.00
Total expenditure (April 2022- Sept 2022)	28,30,112.00



M/S Surya Construction



M/S Arjun Construction

### Glimpses of activities of the project



#### 1.4 Project " Self Help Group and Beyond " :

The CER section of Numaligarh Refinery Limited (NRL) has started a project of financing self help groups of nearby refinery areas along with the co-operation of Assam State Rural Livelihood Mission (ASRLM). This project was started on 23 November, 2022. The duration of the project is 2 years. The estimated budget of the project is Rs. Rs. 45, 00,000.00 (Grant Per SHG's with 10 womens- 1, 50,000.00).

The theme of the project is to provide support to various income generating schemes of selected Self Help Groups (SHG) of nearby Gram Panchayat. As a part of 1<sup>st</sup> phase of the project total 30 nos SHGs were selected from Ponka, Letekujan and Rongbong GPs for following as bellow:

SI No	Schemes	Nos of SHGs	SI No	Schemes	Nos of SHGs
1	Piggery	03	6	Duck farming	02
2	Goatary	12	7	Agri farming	01
3	Poultry	01	8	Fishery	02
4	Weaving	06	9	Food processing and packaging	01
5	Cutting and Tailoring	02		<b>Total</b>	<b>30</b>

#### Financial Estimates of the Project

Gaon Panchayat (GP)	No. of SHGs	Approved Amount (In Rs.)	Disbursed Amount (In Rs.) ( FY: 2021-2022)	Disbursed Amount (In Rs.) (April 2022- Sept 2022)
Letekujan GP	10	1,500,000.00	10,00,000.00	5,00,000.00
Ponka GP	11	1,650,000.00	11,00,000.00	5,50,000.00
Rongbong GP	09	1,350,000.00	9,00,000.00	4,50,000.00
<b>Total</b>	<b>30</b>	<b>45, 00,000.00</b>	<b>30,00,000.00</b>	<b>15, 00,000.00</b>

In addition to financial assistance provided to SHG's for respective schemes, technical support is also being provided by a team engaged for supervision, monitoring under the project which shall be extended for 24 months.

The program was inaugurated by Sri Biswajit Phukan, honorable MLA of Sarupathar LA in presence of Sri Mires Narayan Baruah DC Golaghat, Sri Kajal Saikia, GM(HR) NRL, Sri Mintu Kr. Handique-



GM(HR-IR/ER/PR) NRL, Sri S D Choudhary -DVO Golaghat, Sri Sanjib Bora, LDM-Golaghat and other officials of ASRLM and NRL on 23.11.2021. More than 400 people including members of SHGs were present in the inaugural function. The appointment letters of SHG's were also given on that day.

**Current Status as on Sept 30, 2022 :** All the three installments have been provided to all the SHG's and currently the activities of SHG's have been thoroughly monitored by the project team.



Review meeting at Marangi Block Development Office before disbursement of 2<sup>nd</sup> installment



NRL Officers visited to SHG's before disbursement of 3<sup>rd</sup> installment



SHG visited by NRL senior officers before disbursement of 3<sup>rd</sup> installment

### Glimpses of activities of the project

## 1.5 Project "Fish Farming":

Fish farming is another important area for livelihood support; hence the following projects were undertaken for assisting fish farmers:

### a) Procurement of pedal boats (04), Aerators (02) and part of cleaning activities of Sankar Beel, Marangi :

There are total 4 nos of pedal boats, 2 nos of aerators are being provided for cleaning the Sankar Beel at Marangi for fish farming project.



Financial Position of the Project	
Particulars	Amount (In Rs)
Total approved budget of the project	5,00,000.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure (April 2022- Sept 2022)	1,70,000.00

### b) Providing Financial support for procurement of Fish seed, feed and medicine to Fish local farmers

After getting 2<sup>nd</sup> installment, the farmers purchased fish seed and the activities of the fish farmers are being closely monitored by the project team. Till now it has been found satisfactory.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	8, 21,100.00
Total Expenditure (FY 2021-2022)	2,38,001.00
Total expenditure (April 2022- Sept 2022)	2, 01,667.00



Glimpses of activities of the project

## 1.6 Livelihood support to Individual Beneficiaries:

NRL has taken the following individual beneficiaries to support for livelihood activities:

Sl No.	Detail of Activity	Implementing Agency	Approved Amount (In Rs.)	Released Amount (In Rs.)- (April 2022- Sept 2022)
1	Construction of Dairy farm at Letekuchapori.	Eilus Ali, Letekuchapori	1,25,000.00	50,000.00
2	Construction of Dairy farm at Letekuchapori.	Bhim Chetry, Letekuchapori	1,25,000.00	50,000.00
3	Construction of Dairy farm at Letekuchapori.	Huramat Ali, Letekuchapori	1,25,000.00	50,000.00
4	Providing support for extension of Fishery, Letekuchapori.	Benudhar Handique, Letekuchapori	1,25,000.00	50,000.00
5	Financial support to Sumit Deep for development of Sumit Mobile & Sports Centre.	Sri Sumit Deep, 02 no Doigrung (Purabangla), Morongi Bagan, Letekujan, Golaghat	1,25,000.00	1,00,000.00
6	Livelihood support to Manuranjan Bora, Amlakhital, Bishnupur for renovation of Nursery	Manuranjan Bora	1,25,000.00	1,00,000.00
7	Development of Motor Vehicle Spare Shop at Numaligarh	M/s Sanjukta Motors, Numaliarh Parghat, Golaghat	1,25,000.00	1,00,000.00
<b>Total</b>			<b>8, 75,000.00</b>	<b>5,00,000.00</b>



Ramdhenu Nursery



Sumit Deep store

Glimpses of activities of the project

### 1.7 Joint Liability Group (JLG's) :

The followings are the JLG's that are been taken by NRL for financing to promote livelihood activities. The lists of the projects are mentioned below:

Sl No.	Details of project	Approved amount (In Rs.)	Released Amount (In Rs.) (April 2022- Sept 2022)
1	Setting up of a Piggery farm at 02 No Doigrung	3,90,000.00	1,30,000.00
2	Setting up of a Grocery shop at Bogidhola T.E.	3,90,000.00	1,30,000.00
3	Setting up of a Disposable paper plate and Agarwati making shop at Doigrung.	3,90,000.00	3,90,000.00
<b>Total</b>		<b>11,70,000.00</b>	<b>6,50,000.00</b>



Grocery Shop



Piggery Farm

Glimpses of activities of the project

## B. EDUCATION & SKILL DEVELOPMENT

### 1.1 Development of Science and Mathematics laboratory at Numaligarh High School :

NRL took another initiative of the development of Science and Mathematics Laboratory at Numaligarh High School due to lack of practical and digital learning facilities in nearby areas. Under this project, a Science and Mathematics laboratory for class 6<sup>th</sup> to 10<sup>th</sup> standard students will be build which will help the students to create a scientific and logical mind at a very early stage. The project was started on 7<sup>th</sup> October 2021.

The job of the project includes:

- a) Painting work of all Laboratory walls and Floor
- b) To provide supply of all furniture item
- c) To complete all plumbing work
- d) To supply Lab equipment item

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	4,95,118.00
Total Expenditure (FY 2021-2022)	1,29,185.00
Total expenditure (April 2022- Sept 2022)	2,30,533.00



**Glimpses of activities of the project at Numaligarh High School**

## 1.2 To upgrade education to poor students of class IXth and Xth standard of nearby Refinery

A request is received from Siksha, 2 no Ponka Grant, Kanaighat for delivering to upgrade education IX and X standard students of nearby refinery who are economically poor. The no. of students under this project is 80 and the project location is Sankardev Vidyalay, Bishnupur. The project was started from 13<sup>th</sup> June 2022.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	4,80,000.00
Total Expenditure (FY 2021-2022)	1,60,000.00
Total expenditure (April 2022- Sept 2022)	160,000.00



Glimpses of activities of the project

## C. ENVIRONMENT

### 1.1 To collect and dispose of single used plastic from nearby areas of the Refinery as environment friendly initiative :

Another initiative of collecting and dispose of single used plastic from nearby areas of the Refinery is taken on 7<sup>th</sup> June 2022 by Numaligarh Refinery Limited, a proposal received from M/S Go Green Enterprise. The waste plastic materials will be delivered to MSW Co Processing plant located in Umrangsho. This initiative will clean air and make the area free from plastic pollution.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	Rs. 80,000.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure (April 2022- Sept 2022)	Rs. 40,000.00



**Glimpses of activities of the project**



## 1.2 Plantation of Muga Host Plant at Bogidhola Muga VGR by Sericulture dept. Golaghat :

As the Muga Silkworm lives on Som and Soalu trees, therefore NRL has taken another initiative of Plantation of 1200 Som Trees at Bogidhala Muga VGR where the activity of Muga Rearing process is going on. The project was started on 10 June 2022 and it is a project undertaken for 3 years. The estimated budget for the project is Rs. Rs. 3, 70,285.00 and the technical partner is the Sericulture Department of Golaghat District.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	3, 70,285.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure (April 2022- Sept 2022)	1,08,4,00.00

**Current Status as on Sept 30, 2022 :** All the 1200 Som Trees are planted and only the monitoring and maintaining activities are going on.



Inauguration day of the project by NRL Officers



Som Trees covered by Green net



Mr. Ranjit Rath (Chairman & MD of Oil) visited to Sumoni and planted som Tree

### Glimpses of Activities of the project

### 1.3 Plantation of seedless Lemon tree sapling at Bogidhola Muga VGR, Marangi :

This project was undertaken on 21 April 2022 with an estimated budget of Rs. 21, 00,000.00. This initiative was taken because traditionally it is believed by the people that a wild elephants do not move through lemon tree plantation areas. In this way, the area will be protected from wild elephants and the rearing of Muga Silk worm could be possible without any disturbances.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	21, 00,000.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure (April 2022- Sept 2022)	5,40,000.00

On the occasion of NRL Day on 21s April 2022, Mr. Bhaskar Jyoti Phukan (MD –NRL), S.C Mishra (Chairman – NRL) and Mr. Kajal Saikia (CGM-HR) inaugurated the project by planting lemon trees at Sumoni Bogidhala. Apart from them, many NRL Officials , the people of nearby areas of Sumoni , students of Marangi college planted the lemon trees.

**Current Status as on Sept 30 ,2022 :** Total 7,600 Lemon trees are planted and maintaining and monitoring activities are going on.



On 21<sup>ST</sup> April ,2022, Mr. S. C Mishra (Chairman –NRL) visited to Sumoni and planted Lemon tree



Mr. Bhaskar Jyoti Phukan (MD –NRL) visited to Sumoni and planted Lemon tree

#### Glimpses of Activities of the project

#### 1.4 Financial support for plantation of fruit bearing trees at villages under Ponka GP:

NRL has undertaken another project of plantation of fruit bearing trees at Ponka GP where total 2000 nos of fruit tree saplings distributed to total 500 nos of beneficiaries. Beneficiaries were selected by Ponka GP on cluster basis. The project was started from 22 April 2022. A local NGO/Organization is engaged in monitoring, supervision and technical assistance of planted tree saplings for a period of one year. Plantation Includes – Avocado Seedling, Litchi Seedling, Mango Grafter Sapling, Areca nut Hybrid Dwarf.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget of the project	4,80,000.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure ( April 2022- Sept 2022)	3,30,000.00

**Current Status:** Currently the no. of beneficiaries covered is 350 and plants are distributed to them.



Sanu Saora ( Guava Tree)



Kalep Ganak ( Guava Tree)



Mina Saora (Guava Tree)



Pankaj Saikia (Litchi tree)



Guava Tree



Betel Nut Tree

**Glimpses of beneficiaries of the project**

## D. SPORTS , HEALTH & CULTURE :

### 1.1 15 days Yoga workshop for promotion of physical, mental and spiritual growth:

A 10 days Yoga training session was organized by VKNRL School of Nursing at four locations: Kunjaban at Kunjakanan, NRL, Telgaram Ranga Mancha, Letekujan Play Field and Doigrung Community Hall, as a prelude to the celebration of the International Day of Yoga on 21st June 2022. This initiative was taken as to promote physical, mental and spiritual growth of the people.

Financial Position of the Project	
Particulars	Amount (In Rs.)
Total approved budget for the event	2,50,000.00
Total Expenditure (FY 2021-2022)	0.00
Total expenditure April 2022- Sept 2022	1,55,670.00



Location – Kunjaban ,Kunjakanan. Township NRL



Location – Doigrung Community Hall



Location – Letekujan Play Field



Location – Rangamancha, Telgaram

### Glimpses of Activities of the project at 4 different location

**E. RURAL DEVELOPMENT**

**1.1 Construction of Information Centre**

As per proposal received from different organization construction of 3 nos of information centers have been undertaken and the construction activity started from 24<sup>th</sup> May 2022.

SL NO	Details of information	Implementing Agency	Approved Amount (In Rs.)	Total Expenditure (In Rs.) FY 2021-2022	Total Expenditure (In Rs.) April 2022–Sept 2022
1	Information centre at OuguriRajabari Ahom gaon.	Ouguri Rajabari Ahom Chuk Union Committee	10,67,962.00	0.00	7,00,000.00
2	Information centre at Ouguri Chouragaon Junali Club.	Ouguri Chouragaon Management Committee	10,67,962.00	0.00	7,00,000.00
3	Information centre at Marangi T.E. Boys Club.	Marangi Tea Boys Club Managemnt Committee	10,67,962.00	0.00	3,50,000.00



Ouguri Rajabari Ahom Chuk Information Centre



Ouguri Chouragaon Junali Club Information Centre



Marangi T.E. Boys Club Information Centre

**Images before construction**



**Images under construction**

## 1.2 Construction of Playground :

As per proposal received from different organization development of 3 nos of playgrounds have been undertaken on 23<sup>rd</sup> May 2022.

SL No	Details of playground	Approved Amount (In Rs.)	Total Expenditure (In Rs.) April 2022- Sept 2022
1	Playground at Bishnupur Youth Club	20,63,866.18	5,00,000.00
2	Playground at Ouguri Chaoragaon.	24,97,117.39	12,50,000.00
<b>Total</b>		<b>45, 60,983.58</b>	<b>17, 50,000.00</b>



Bishnupur Youth Club playground



Ouguri Chaoragaon Playground

**Images before construction**



**Images under construction**

### 1.3 Construction of Interlocking Block Pavement Roads :

After necessary approvals, the constructions of following roads projects have been started this year near Numaligarh Refinery areas which are mentioned below:

SL No	Description of road work	Project Starting Date	Implementing Agency	Approved Amount (In Rs.)	Total Expenditure In Rs.(April 2022- Sept 2022)
1	Construction of interlocking concrete block pavement road from Letekuchapori chariali to Bio Refinery connecting road	28-03-2022	M/S Dilip Saikia	33,05,922.00	7,03,108.00
2	Construction of interlocking concrete block pavement road from Bahbari to water ATM	12-08-2022	Jiban Jyoti Club Management Committee	1634759.00	4,00,000.00
3	Construction of interlocking concrete block pavement road from Mineswar Saikia House to Prafulla Hazarika House	09-09-2022	M/S Sanjay Kumar Gupta	44,52,065.00	0.00 (Job under construction)
<b>Total</b>				<b>93,92,746.00</b>	<b>11,03,108.00</b>



Letekuchariali to Bio- Refinery Connecting Road



Bahbari to water ATM road



Road from Mineswar Saikia House to Prafulla Hazarika House

#### Images Before construction



#### Images under construction

#### **1.4 Preparing the Master plan for the project Transformation of Rajabari Tea Estate as a Model Tea Estate :**

A request is received from Evergreen Welfare Society , Kamarbandha, Golaghat for preparing the Master plan for the project Transformation of Rajabari Tea Estate as a Model Tea Estate which will promote eco-tourism, infrastructure development , socio-economic upliftment of the community. The project got its approval on 10<sup>th</sup> June 2022.

<b>Financial Position of the Project</b>	
Particulars	Amount (In Rs.)
Total approved budget for the project	2,25,000.00
Total expenditure ( April 2022- Sept 2022)	1,12,500.00



Annexure -D

**ENVIRONMENTAL EXPENDITURE FOR APRIL'22-**  
**SEPTEMBER'22 (FY-2022-23)**

<b>SI No</b>	<b>Name of the Facilities</b>	<b>Apr'22-Sep22</b>
1	Effluent Treatment plant	3,10,50,732.87
2	Sulphur Recovery Unit	6,03,89,479.30
3	Pollution & Environmental Expenses	12,32,976.65
4	Environmental Cell	31,03,143.95
5	R & M Expenses	94,32,686.90
	<b>Grand total</b>	<b>10,52,09,019.67</b>

नुमालीगढ़ रिफाइनरी लिमिटेड

भारत सरकार का उपक्रम

नुमालीगढ़ रिफाइनरी लिमिटेड

ভাৰত চৰকাৰৰ এক প্ৰতিষ্ঠান

NUMALIGARH  
REFINERY  
LIMITED

A GOVERNMENT OF INDIA ENTERPRISE



Ref:

Date:

NRL/ENV/PCBA/22-23/05

Dated: 26<sup>th</sup> September, 2022

To,

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

**Sub : Submission of Environmental statement in Form- V for the year 2021-22**

Dear Sir,

We are submitting herewith the duly filled in "Environmental Statement" in Form-V for the year 2021-22 for your kind perusal.

Hope, the same shall meet the requirement.

Thanking you.

Yours' faithfully,

(Alok Nayan Nath)  
CM (TS-ENV)

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, क्रिश्चनबस्ती, गुवाहाटी - 781005 (असम), दूरभाष: 0361-2203140/2203147, फेक्स: 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 – V]

(See rule 14)

**Environmental Statement of NUMALIGARH REFINERY LIMITED  
for the financial year – 2021-2022**

**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) : Primary  
Secondary-----(SIC Code)**
- (iii) **Production capacity (Crude T'put) : 3.0 MMTPA**
- (iv) **Year of establishment : 22nd April ,1993**
- (v) **Date of the last environmental statement submitted: 27th Sept,2021**

**PART – B**

**Water and River Material Consumption**

- (1) **Water consumption m3/d:**
- |                 |          |             |
|-----------------|----------|-------------|
| <b>Process</b>  | <b>:</b> | <b>3169</b> |
| <b>Cooling</b>  | <b>:</b> | <b>4514</b> |
| <b>Domestic</b> | <b>:</b> | <b>3463</b> |

**Name of Rawmaterial: Crude Oil**

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

	<b>2020-2021</b>	<b>2021-2022</b>
	<b>0.450</b>	<b>0.440</b>

**\*\*\*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:**
- |   |                  |                  |
|---|------------------|------------------|
| <b>Raw material: Crude Oil</b>  | <b>2020-2021</b> | <b>2021-2022</b> |
| <b>T'put during the year (in MT)<br/>(Design Capacity: 3.0 MMTPA)</b> | <b>2707353</b>   | <b>2624409</b>   |
-

**PART - C**

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

**a) Treated Effluent Water: 2021-2022**

Pollutants	CPCB Standard (mg/l)	Concen. of pollutants in discharges(av.) (mg/l)	Quantity of pollutants discharged (kg/yr, exc. pH)	Qty of pollutants in kg/1000 MT of Crude		Percentage of variation from STD. with reasons
				Actual(mg/l)	STD(mg/l)	
pH	6-8.5	7.3	-	-		<b>All parameters are within prescribed limit/stds.</b>
OIL & GREASE	5.0	3.15	3361.10	1.28	2.00	
BOD3	15.0	9.2	9795.22	3.73	6.00	
COD	125.0	62.83	67035.34	25.54	50.00	
TSS	20.0	15.048	16055.94	6.12	8.00	
Phenol	0.35	0.16	165.39	0.06	0.14	
Sulphides	0.5	<0.1	106.70	0.04	0.20	
CN	0.2	0.00	21.34	0.01	0.08	
Ammonia as N	15.0	9.7500	10403.42	3.9641	6.0	
Cr (Hexavalent)	0.1	0.0000	0.00	0.0000	0.04	
Cr (Total)	2.0	0.0048	5.07	0.0019	0.8	
Pb	0.1	0.0033	3.5478	0.0014	0.04	
Zn	5.0	0.0295	31.48	0.0120	2.0	
Ni	1.0	0.0080	8.54	0.0033	0.4	
Cu	1.0	0.0110	11.74	0.0045	0.4	
Benzene	0.1	0.0465	49.62	0.0189	0.04	
Benzo (a)-Pyrene	0.2	0.0538	57.35	0.0219	0.08	
Hg	0.01	0.0039	4.16	0.0016	0.004	
V	0.2	0.0625	66.69	0.0254	0.8	
TKN	40.0	19.4500	20753.48	7.9079	16.0	
P	3.0	1.2050	1285.76	0.4899	1.2	

**(b) AIR**

**Average Sulphur Dioxide emission from the refinery during – 2021-22:**

<b>SO2 Emission, Kg/hr</b>	<b>During April , 2021 to Mar,2022</b>
<b>As per NOC of PCB, Assam max. allowable limit is 256 kg/hr as SO2</b>	<b>90.8 kg/hr</b>

2021-22						
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	14.90	7.40	11.25
	NO2	80 (24 hr avg.)	µg/m3	20.00	9.30	14.85
	O3	100(8 hr avg.)	µg/m3	43.10	13.70	24.45
	CO	2000(8 hr.avg.)	mg/m3	1.100	0.520	0.85
	NH3	400(24 hr.avg.)	µg/m3	37.3	12.9	22.67
	PM 10	100(24 hr.avg.)	µg/m3	72.7	38.1	50.73
	PM 2.5	60(24 hr.avg.)	µg/m3	39.9	17.2	23.15
	Benzene	5.0(Annual)	µg/m3	3.50	1.00	2.17
	BaP	1.0(Annual)	ng/m3	<0.5	<0.5	<0.5
	Pb	1.0(24 hr.avg.)	µg/m3	0.49	0.14	0.28
	As	6.0(Annual)	ng/m3	1.00	1.00	1.000
	Ni	20(Annual)	ng/m3	4.30	1.10	2.31
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	14.60	7.20	10.88
	NO2	80 (24 hr avg.)	µg/m3	19.90	9.30	14.38
	O3	100(8 hr avg.)	µg/m3	41.4	12.5	23.6
	CO	2000(8 hr.avg.)	mg/m3	1.070	0.540	0.772
	NH3	400(24 hr.avg.)	µg/m3	33.6	12.50	21.800
	PM 10	100(24 hr.avg.)	µg/m3	69.5	36.0	51.65
	PM 2.5	60(24 hr.avg.)	µg/m3	36.9	14.8	23.15
	Benzene	5.0(Annual)	µg/m3	3.60	0.90	2.075

	<b>BaP</b>	<b>1.0(Annual)</b>	ng/m3	<0.5	<0.5	<0.5
	<b>Pb</b>	<b>1.0(24 hr.avg.)</b>	µg/m3	0.44	0.15	0.27
	<b>As</b>	<b>6.0(.0Annual)</b>	ng/m3	1.00	1.00	1.00
	<b>Ni</b>	<b>20(Annual)</b>	ng/m3	4.20	1.20	2.493
<b>RAW WATER INTAKE</b>	<b>SO2</b>	<b>80 (24 hr avg.)</b>	µg/m3	13.30	6.90	9.93
	<b>NO2</b>	<b>80 (24 hr avg.)</b>	µg/m3	18.10	9.00	13.08
	<b>O3</b>	<b>100(8 hr avg.)</b>	µg/m3	35.1	12.2	23.03
	<b>CO</b>	<b>2000(8 hr.avg.)</b>	mg/m3	0.960	0.510	0.728
	<b>NH3</b>	<b>400(24 hr.avg.)</b>	µg/m3	32.2	12.20	21.43
	<b>PM 10</b>	<b>100(24 hr.avg.)</b>	µg/m3	88.2	34.5	48.20
	<b>PM 2.5</b>	<b>60(24 hr.avg.)</b>	µg/m3	33.4	13.5	21.43
	<b>Benzene</b>	<b>5.0(Annual)</b>	µg/m3	3.30	0.90	2.05
	<b>BaP</b>	<b>1.0(Annual)</b>	ng/m3	<0.5	<0.5	<0.5
	<b>Pb</b>	<b>1.0(24 hr.avg.)</b>	µg/m3	0.41	0.12	0.26
	<b>As</b>	<b>6.0(Annual)</b>	ng/m3	1.00	1.00	1.00
	<b>Ni</b>	<b>20(Annual)</b>	ng/m3	3.70	1.00	2.18
	<b>NH-39 BYPASS</b>	<b>SO2</b>	<b>80 (24 hr avg.)</b>	µg/m3	16.9	8.6
<b>NO2</b>		<b>80 (24 hr avg.)</b>	µg/m3	22.0	10.9	16.68
<b>O3</b>		<b>100(8 hr avg.)</b>	µg/m3	45.1	15.3	29.38
<b>CO</b>		<b>2000(8 hr.avg.)</b>	mg/m3	1.18	0.53	0.93
<b>NH3</b>		<b>400(24 hr.avg.)</b>	µg/m3	40.1	15.9	28.13

<b>KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI</b>	<b>PM 10</b>	<b>100(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	78.6	43.3	61.53
	<b>PM 2.5</b>	<b>60(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	39.9	17.4	27.8
	<b>Benzene</b>	<b>5.0(Annual)</b>	$\mu\text{g}/\text{m}^3$	4.30	1.10	2.61
	<b>BaP</b>	<b>1.0(Annual)</b>	$\text{ng}/\text{m}^3$	<0.5	<0.5	<0.5
	<b>Pb</b>	<b>1.0(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	0.51	0.16	0.33
	<b>As</b>	<b>6.0(Annual)</b>	$\text{ng}/\text{m}^3$	1.00	1.00	1.00
	<b>Ni</b>	<b>20(Annual)</b>	$\text{ng}/\text{m}^3$	4.60	1.30	2.93
	<b>SO<sub>2</sub></b>	<b>80 (24 hr avg.)</b>	$\mu\text{g}/\text{m}^3$	12.7	6.70	9.6
	<b>NO<sub>2</sub></b>	<b>80 (24 hr avg.)</b>	$\mu\text{g}/\text{m}^3$	16.5	8.1	12.60
	<b>O<sub>3</sub></b>	<b>100(8 hr avg.)</b>	$\mu\text{g}/\text{m}^3$	34.30	11.00	21.7
	<b>CO</b>	<b>2000(8 hr.avg.)</b>	$\text{mg}/\text{m}^3$	0.880	0.480	0.68
	<b>NH<sub>3</sub></b>	<b>400(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	30.70	10.90	20.20
	<b>PM 10</b>	<b>100(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	56.8	32.6	45.28
	<b>PM 2.5</b>	<b>60(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	29.9	11.7	20.4
	<b>Benzene</b>	<b>5.0(Annual)</b>	$\mu\text{g}/\text{m}^3$	3.00	0.10	2.0
	<b>BaP</b>	<b>1.0(Annual)</b>	$\text{ng}/\text{m}^3$	<0.5	<0.5	<0.5
	<b>Pb</b>	<b>1.0(24 hr.avg.)</b>	$\mu\text{g}/\text{m}^3$	0.37	0.12	0.2
	<b>As</b>	<b>6.0(Annual)</b>	$\text{ng}/\text{m}^3$	1.00	1.00	1.00
	<b>Ni</b>	<b>20(Annual)</b>	$\text{ng}/\text{m}^3$	3.50	1.10	2.17

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)**

<b>Hazardous Wastes(Generated/disposed)</b>	<b>Total Quantity (In MT)</b>	
	<b>During the previous Financial Year (2020-21)</b>	<b>During the current Financial year (2021-2022)</b>
<b>a) From Process</b>		
<b>i) Spent Catalyst (Schedule-1, Category-4.3)</b>	<b>Generation: NIL Stock as on 31.03.21: 370 MT</b>	<b>Generation: Nil Stock as on 31.03.22: 370 MT**</b>
<b>ii) Spent Adsorbents</b>	<b>Generation: Nil</b>	<b>Generation: Nil</b>
<b>iii) Tank Bottom (oily Sludge/waste) (Schedule -1, Category -4.1)</b>	<b>Generation: 45 MT  Closing stock as on 31.03.21: 504 MT</b>	<b>Generation: 620 MT  Disposed: NIL  Stock as on 31.03.22: 1124 MT, kept in sealed drum for disposal.</b>
<b>iv) Slop Oil (Schedule-1, Category-4.3)</b>	<b>Generated:32574 MT Disposed: 25756 MT, Processed in CDU/VDU. Closing stock as on 31.03.21: 65322 MT</b>	<b>Generated: 55528 MT Disposed: 9994 MT (sold to recycler) Processed in CDU/VDU:31090 MT Stock as on 31.03.22: 79766 MT</b>
<b>v) Spent lube oil (Schedule-1, Category-5.1)</b>		<b>Generation: 1.026 MT Stock as on 31.03.22: 10.143 MT</b>
<b>b) From Pollution Control Facilities</b>		
<b>Chemical &amp; Oily Sludge (Schedule -1, Category -4.1)</b>	<b>Generated: 70 MT (disposed off in the SLF)</b>	<b>Generated:28 MT (disposed off in the SLF)</b>

**\*\* 350 MT nonprecious catalyst sold to recycler through E-auction conducted on 24.03.2022 and under process of lifting by the party as per HWM Rule 2016. Rest 20 MT (appx) precious catalyst is in advance stage of auction.**




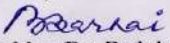
**Part – E**  
**Solid Wastes**

<b>Solid Wastes generated /disposed</b>	<b>Total Quantity ( in M3)</b>	
	<b>During the previous financial Year (2020-21)</b>	<b>During the current financial year 2021-22</b>
<b>(a) From Process</b>		
<b>Generation of Incinerable substances -</b>	<b>3500m3</b>	<b>3500 m3</b>
<b>(b) From pollution control facilities</b>		
<b>Generation at ETP Bio sludge -</b>	<b>450 MT</b>	<b>385 MT</b>
<b>(C)</b>		
<b>(1) Quantity recycled or reutilized within the unit</b>	<b>Nil</b>	<b>Nil</b>
<b>(2) Sold</b>	<b>Nil</b>	<b>Nil</b>
<b>(3) Disposal -</b>		
<b>Incinerable substances -</b>	<b>Entire quantity disposed through incineration</b>	<b>Entire quantity disposed through incineration</b>
<b>Bio sludge -</b>	<b>Entire Quantity disposed off into SLF</b>	<b>Entire Quantity disposed off into SLF</b>

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:

		<b>NUMALIGARH REFINERY LIMITED</b> (Quality Control Department)	
<b>Analysis of Chemical and Oily sludge sample</b>			
Date	SAMPLE SOURCE	PARAMETERS	RESULTS %,wt
29-09-21 11:30 hrs	ETP (Chemical & Oily sludge)	Moisture Content	84.62
		Oil Content	3.7
		Organic & Volatile Matter	9.2
		Iron	0.48
		Sodium	0.12
		Sulphide	0.12
		Phenol	0.003
		SiO <sub>2</sub>	0.045
		Chloride	0.96
		Calcium	0.22
		Magnesium	0.10
		Manganese	0.008
		Nickel	0.0002
		Sulphate	0.42
		Zinc	0.0009
		Lead	0.0001
Copper	0.0009		
Cobalt	0.0005		
Analysed By: Mr Prabhash Kumar Thakur			
			
Certified by: Dr. Bedobrat Barhai Officer (Quality Control) Numaligarh Refinery Limited Golaghat, Assam Pin: 785699			
बेदब्रत बरहै / BEDOBRAT BARHAI अधिकारी (गुणवत्ता नियंत्रण) / Officer (Quality Control) नमालीगारह रिफाइनरी लिमिटेड / Numaligarh Refinery Limited गोलाघाट, असम - 785 699 / Golaghat, Assam - 785 699			

## **Disposal practice adopted for both categories of wastes**

Numaligarh Refinery, popularly known as the “Accord Refinery” has been set up in the district of Golaghat, Assam as the part of fulfillment of the commitment made by the Govt. of India in the historic Assam Accord for providing the thrust towards industrial and economic development of North-East. Environment management initiatives of Numaligarh Refinery is guided by the principle of sustainable development and its corporate vision statement of committing itself to attain the excellence in environment management with a prime focus on management of environment. In its quest for environmental excellence and continual improvement, NRL has been pursuing a focused programme towards environment protection through well-defined objectives and has taken up several initiatives that has been implemented in well- defined and systematic manner. NRL being an energy efficient & environment friendly refinery, committed to control of all kinds of pollution & protection of natural environment.

Numaligarh Refinery was conceptualized as one of the most Environment friendly Refinery in the country. Right from its inception, conscious efforts have been taken at every stage to preserve the environment and to attain the excellency in Environment Management. A fully functional "Environment Cell" is continuously working for improvement, monitoring, safe-guarding and reporting of environmental activities.

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). To cater the needs of future requirement, a Secured Land Fill with a capacity of 6000m<sup>3</sup> has been constructed inside the Refinery Premises and has been used. 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 facility available for bioremediation of Crude Tank cleaning sludge.

Spent catalysts are generally generated after a gap of 3/4 years when the catalyst required to replace 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:-**

Numaligarh Refinery Limited, as a good Corporate Citizen, from the very onset itself has been pursuing a focused program towards environment management by formulating a comprehensive policy towards its commitment for the protection, preservation and development of the environment. Numaligarh Refinery was conceptualized as one of the most Environment friendly and Energy efficient Refinery in the country. Right from its inception, conscious efforts have been taken at every stage to preserve the environment and to attain the Excellency in Environment Management.

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 advance and comprehensive steps towards controlling pollution. Its corporate vision statement commits itself to attain the excellent in environment management. From the very onset, selection of 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. As a measure of conservation of water, 100 % recycle of the treated effluents in our Effluent Treatment plant inside refinery has been achieved since October 2006. Further, 100% recycle of the effluents from Sewage Treatment Plant has been achieved 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 been blinded and the discharge from township STP also has been routed to ETP through the same line. So, no treated effluent is discharged to outside environment from the refinery. 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 2018-19. Plantation drive in nearby area of the refinery taken 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 600 Ton of Carbon absorption), 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 400 Ton of Carbon absorption), 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.

A new SRU has been commissioned and is under operation. 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 SO<sub>2</sub> 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 SO<sub>x</sub>, NO<sub>x</sub>, PM, CO have been provided for all the furnace stacks and low NO<sub>x</sub> 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.

## **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 in order to further removal of 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 BLABO/ Mechanized process which is a close loop process and by which nearly 100% recovery of hydrocarbon could be achieved.

## **8. Spent Catalyst & Tank Boom Sludge**

Spent catalysts are generally 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 guide lines. 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. Bio remediation of 500 MT tank bottom is under progress. Approx. 350 MT spent catalyst generated during Refinery Turn Around (RTA) was sold to CPCB approved recyclers and action has been initiated for sale of approx. 30 MT spent catalyst containing precious metals.

### **9. Implementation of Hydrogen Peroxide Treatment**

In pursuance of latest development, H<sub>2</sub>O<sub>2</sub> treatment process has been introduced for the chemical treatment of wastewater in the ETP by replacing the conventional FeCl<sub>3</sub> 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 are placed in the refinery storm water system as a preventive measure to eliminate any possibility of oil carry over to outside environment. A scheme for reusing entire storm water in fire water network and in Cooling Tower as makeup is under operation.

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

As a step towards NRL's commitment for protection of environment and to assess its contribution towards GHG emission leading to global warming, NRL has developed a Carbon Management Strategy for mapping of Green House Gas (GHG) emission /carbon foot print accounting for its activities. NRL commenced the activity for estimation of Green House Gas (GHG) Emission and carbon foot print of the refinery taking 2009-10 as base year, the study was carried out by engaging a reputed consultant. NRL is focusing on energy efficiency, building carbon sink to minimize 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 0.817 and 0.740 Million ton CO<sub>2</sub> equivalent during FY 2020-21 & 2021-22 respectively. The carbon footprint has been reduced by 10.4% as compared to previous year.

## **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 Pipe Line (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 m<sup>3</sup> has been constructed and is in operation in the Refinery premises to cater the needs for disposal of Chemical & Oil Sludge.

### **2. Bioremediation facility**

Construction of an additional new bioremediation facility has been completed to facilitate bioremediation of tank bottom oily sludge (calorific value >2500kcal/kg) in future.

### **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 SO<sub>x</sub>, NO<sub>x</sub>, CO, PM and Ambient Air quality to CPCB and SPCB Server has been implemented. As per direction 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.

### **7. 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 reduce specific energy consumption of the refinery but has also reduced Greenhouse gas emission.

## **8. 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.

## **9. 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 recently 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:**

Numaligarh Refinery emphasizes utmost importance to maintain energy efficiency and energy conservation. Refinery closely monitor the key Energy performance measurement indicators viz Specific Energy Consumption (SEC) and Energy Intensity Index (EII) out of several operations parameters. Unit performance is gauged on a continual basis and efforts are on incorporating best in class technology and global best practices.

To reduce fuel consumption, NRL has started installing solar panel to generate electricity and inject the same in the refinery grid. Numaligarh Refinery has a portfolio of 1.05 MW of Solar photovoltaic capacity, which is 0.4% of the total captive power generation. The 1.025 MW solar plant installed in 2018 reduces power requirement to the extent of heat generation during the day time. The total generation from the project is 1083 MWh in 2021-22 which translates to reduction of global warming potential at 10 lac lbs CO<sub>2</sub>.

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

The energy savings out of the Encon schemes commissioned in 2021-22 are outcome of internal initiative as well as quick win recommendation from external audit. The total direct energy savings is 7400 SRFT and monetary savings of 25 Crore. Further, around 0.27 Lac ton CO2 reduction by means of energy conservation projects and 20 ton of CO2 emission reduction achieved through pipeline transportation.

**The details relating to energy conservation measures is as below:**

S.I.	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° 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

S.I.	Details of energy efficiency best practice measures in 2021-22
1	Reuse of phenolic stripped water ex SRB as Desalter wash water make up replacing DMW make up.
2	Utilise Enriched Oxygen in Utility Boiler and improved fuel efficiency and capacity utilization
3	Decanter system skid for efficient slop processing at 10-20KL per day
4	Closed sampling process for LPG and Fuel gas to enhance safety and reduce flushing loss
5	APC up gradated version implementation in process unit (uptime >98%) viz CDUVDU, HCU, HGU, DCU, MSP, Wax unit.
6	Dedicated Stack for individual HRSG 1 and 2 along with GTG1 and GTG2 during parallel GTG operation to recover waste heat steam generation fully.
7	New elevated flare (77m height) commissioned replacing the old one(60m height) with FT to measure loss during ground flare isolation

**Energy conservation measures planned for commissioning in FY 2022-23 and beyond:**

1. Online predictive analysis tools with AI & ML to detect loss from steam traps, ultrasonic PSV, IP21, wireless sensors
2. Condensate recovery scheme in balance units
3. Replacement with energy efficient motor and pump in process units
4. VAM for low heat recovery /reduce waste steam energy
5. Pressure energy recovery from PRDS with turbo generator
6. PRT arrangement to run motor in sync and reduce waste energy

### **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/cm<sup>2</sup> to 39.0 kg/cm<sup>2</sup> 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 reformatte 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 38KW 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. Upgrading 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 300m<sup>3</sup>/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 HRSO 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 Coker 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 BOO mode. Basic Engineering & Design Package for all the major units are complete and overall progress made as on 31<sup>st</sup> March 2022 is 19.4%. Noteworthy technologies adopted are PFCC giving high yield of Propylene & Ebullated Bed Resid Hydrocracker of 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.

### **2. Bio Refinery Project**

NRL is setting up a 49 TMTA 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. Major equipment like Digester & Washpress are erected at site. Physical progress of the project is 70.2%.

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 (Ethanol Blended Petrol at 20%) EBP20 programme of GOI's National Bio-fuel 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**

For 50 TMTPA Wax plant, NRL wax is marketed only as slabs of 5kg produced in an Automatic Slabbing and Packaging Unit (ASPU). However, to cater customers requirement and augment wax sale with flexibility in marketing, NRL is going for a new Wax Pastillation Unit (WPU) having production capacity 144 TPD. M/s IPCO, Germany is the technology provider and process licensor of the WPU. This involves an efficient and cost effective process, in which molten liquid wax is converted to pastille form (5 to 6 mm size) with the help of Rotoformer and Steel belt cooler. The wax pastille is then shifted to bagging/storage facility with the help of conveyor belt and bucket elevator. Mechanical progress of WPU is near completion and target commission of the unit is FY 2022-23.

With commissioning of WPU, NRL will be able to cater additional customers requirement and augment wax sale with the flexibility in marketing. This plant will also improve capacity utilization of Wax block as existing ASPU is sensitive to maintenance.

### **4. Aq. Ammonia Project**

Aq. Ammonia 25% (NH<sub>3</sub>) project will be set up 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. NH<sub>3</sub> (25%) from a waste NH<sub>3</sub> rich stream of sour water stripper utilizing technology that is developed & licensed indigenously by EIL and it is 1st of its kind that NRL is going to implement in refinery. It will be a skid mounted solution with target completion period of 28 months from date of order.

This project will reduce NOX generation it releases to atmosphere. 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 Unit and petroleum refining. This has the potential to reduce the country's dependence on fossil fuels, energy security and decrease the carbon footprint of these industrial processes.

The MNRE on 31<sup>st</sup> May 2021 came up with a mandate for production of green hydrogen upto 10% of total hydrogen consumption by 2030 in PSUs of Fertilisers and Refining sector. The draft mandate was further revised on 20<sup>th</sup> January 2022 to change the GHCO targets to 50% by 2029-30 and 70% by 2034-35. To meet the target of this mandate, NRL floated an EOI on October 2021 for detail Engg., Supply, Installation and Commissioning of Electrolyser module/s along with all auxiliaries for production of 3 KTPA (375 Kg/h) Green Hydrogen. Multiple responses received against EOI having different electrolyser technology namely AEL (alkaline water electrolysis), PEM (proton exchange membrane) and SOEC (solid oxide electrolyser cell).

Based on the information received against the responses of EOI, a tender was floated on 3rd April 2022 for "Design, Engg, Supply, Installation & Commissioning of Water Electrolyser system for 300 KG/HR (2.4 KTPA) of Green Hydrogen production at Numaligarh". By implementing 3 KTPA green hydrogen production, NRL shall meet 5% of GHCO by 2024-25.

## **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.

## **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 polyethylene 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)”. Under this project, a pilot plant for research study on polymer material has been installed at NRL-CoE, IITG.

### **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 are entering into a Memorandum of Agreement (MoA) for joint development and commercialization of Above Ground Sulphur Seal technology.

#### **7. 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.

In terms of project progress and achievement of major milestones, process licensors for all the major process units of the new 6 million refinery have been finalized. Engineering activities are in progressive stage and 60% model review for process units have commenced. All three EPC packages for process units have been awarded and jobs commenced at site. All major utility and off-site packages have been ordered. Procurement activities for long lead items are nearing completion. Manufacturing activities are in progress at vendor shop and first lot of equipment is expected by 3<sup>rd</sup> quarter for FY 22-23. Piling jobs are in progress in all construction areas. Civil and structural contracts are being lined up for all areas under EPCM scope. Process Design Basis (PDB), Engineering Design Basis (EDB) and HAZOP have been completed for COIT and PNCPL. Tendering activities for COIT are in progressive stage. Enabling contracts for boundary wall construction and construction power lined up. Enabling works II and BOOT contract is under award. Dredging jobs are in progress. Line Pipe manufacturing for PNCPL, receipt at site is



nearing completion and Pipeline laying jobs have commenced. Contracts for HDD works at various river locations are being progressively awarded.

Overall progress of NREP as on 31<sup>st</sup> March 2022 is 16.2%. Progress for refinery scope of job is 11.1% while progress for pipeline scope of jobs is 24.5%.

## **2. Indo-Bangladesh Friendship pipeline (IBFPL)**

NRL is constructing a 129.50 km long India Bangla Friendship Product Pipeline (IBFPL) from NRL's Siliguri Marketing Terminal in India to Parbatipur in Bangladesh. The 10 inch diameter pipeline will facilitate export of 1 MMT HSD annually. Procurement of all materials was completed and Pipeline laying & Terminal construction works are in progress. As on 31.03.2022, overall progress of the project was 90.3%.

### **Future Projects:**

#### **1. 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. The process licensor for the technology has been already engaged and process package is under preparation.

### **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, 2022 was 43.1%.

## **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 15<sup>th</sup> June 2007 with an authorized share capital of ₹170.00 Crore. The present shareholding of the Company as on 31<sup>st</sup> 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 2021-22, the Company transported 2,86,038 TSCM of natural gas as against 3,00,136 TSCM of natural gas in 2020-21.

## **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, 2022 was 66.6%. Due to travel restrictions as well as uncertainties for COVID-19 pandemic situation, scheduled engineering activities were delayed and accordingly, the Project schedule has been revised with commissioning by December, 2022.

**Awards and Recognitions :**

NRL was honoured with FAME International Award (Platinum Category ) -2020-21 for excellence in Environment Management.

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नुमालीगढ़ रिफाइनरी लिमिटेड

भारत सरकार का उपक्रम

নুমলীগড় বিফাইनेरी লিমিটেড

ভারত চৰকাৰৰ এক প্ৰতিষ্ঠান

NUMALIGARH  
REFINERY  
LIMITED

A GOVERNMENT OF INDIA ENTERPRISE



Ref:

Date:

NRL/ENV/PCBA/22-23/01

Dated: 24<sup>th</sup> June, 2022

To,

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

**Sub : Submission of Annual Return on Hazardous Waste (Management & Handling) as per the provision of "Hazardous and other Waste (Management & Trans boundary Movement) Rules, 2016" in Form- 4 for the year 2021-22**

Dear Sir,

We are submitting herewith the **Annual Return on Hazardous Waste (Management & Handling)** as per the provision of **Hazardous and other Waste (Management & Trans boundary Movement) Rule 2016 in Form 4** along with other enclosures for the year **2021-22**.

Hope, the same shall meet the requirement.

Thanking you.

Yours' faithfully,

(Alok Nayan Nath)  
CM (TS-ENV)

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, क्रिश्चनबास्ती, 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 30<sup>th</sup> day of June of every year for the preceding period **April, 2021 to March, 2022**

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: 20<sup>th</sup> April, 2021(for five years)**
3. Name of the authorized person and: **Mr. Bimlesh Kumar Gupta, CGM(TS)**  
full address with telephone, fax **Technical Services Department.**  
number and e-mail: **2<sup>nd</sup> 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 : 2021-22**
- i) **Chem & Oily Sludge from ETP** : **28 MT**  
(Schedule -1, Category -4.1)
- ii) **Tank Bottom sludge** : **620 MT**  
(Schedule-1, Category -4.1)
- iii) **Slop Oil from Process Unit** : **55528 MT**  
(Schedule-1, Category-4.3)
- iv) **Spent Catalyst** : **Nil**  
(Schedule-1, Category-4.3)
- v) **Spent lube oil (used oil)** : **1.026 MT**  
(Schedule-1, Category-5.1)

2. Quantity **dispatched/disposed** -

(i) to disposal facility-

A) **Secured Land Fill** -

**Chem. & Oily Sludge** : **28 MT**

B) **Bioremediation** -

**Tank Bottom sludge** : **NIL**

*[Handwritten signature]*

C) **Reprocessing -**

Slop Oil : 31090 MT (Reprocessed in CDU/VDU)

(ii) to recycler or co-processors or pre-processor :

Chem. & Oily Sludge : Nil  
Tank Bottom Oily Sludge Oily sludge: Nil  
Slop Oil : 9994 MT  
Spent Catalyst : Nil

(iii) others : Nil

3. Quantity utilized in-house, if any) : Slop Oil 31090 MT (Reprocessed in  
CDU/VDU)

4. Quantity in storage at end of the year (31.03.2022) :

Chem. & Oily Sludge : Nil  
Tank Bottom Oily sludge : 1124 MT  
Slop Oil : 79766 MT  
Spent lube oil (used oil) : 10.143 MT  
Spent Catalyst \*\* : 370 MT

\*\* 350 MT nonprecious catalyst sold to recycler through E-auction conducted on 24.03.2022 and under process of lifting by the party. Rest 20 MT (appx) precious catalyst is in advance stage of auction.

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

1. Total quantity received during 2021 -2022 : As per Part -A

2. Quantity in stock at beginning of year (on 01.04.2021) :

Chem. & Oily Sludge : Nil  
Tank Bottom Oily sludge : 504.0 MT  
Spent Catalyst : 370.0 MT  
Slop Oil : 65322 MT  
Spent lube oil (used oil) : 9.117 MT

*Handwritten signature*

3. Quantity treated – : Nil
4. Quantity disposed in **Landfills** as such and after treatment (**During 2021-22**):
- Chem & Oily sludge (from ETP) : 28 MT**
5. Quantity incinerated (if applicable) - : N / A
6. Quantity processed other than specified above - : N / A
7. Quantity in storage at the end of the year (**on 31.03.2022**):

**Tank Bottom Oily sludge : 1124 MT (kept in sealed drum )**

**Spent Catalyst : 370 MT**

**Slop Oil : 79766 MT**

**Spent lube oil (used oil) : 10.143 MT**

**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 : 24.06.2022  
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

Format –A 1 for submission of Annual Inventory on Hazardous Waste Management by Occupiers: **N/A**

Name of SPCB/PCC: .....

Year.....

A1 Details on Hazardous Waste Generation

Sl	Name of the District	Number of HW Generating Industry	Authorized Quantity of Hazardous Waste (Metric Ton)				Quantity of Hazardous Waste generated as per Annual Return within the State/Ut (Metric ton)				Qty of HW imported during the year (Metric ton)	Qty of HW Exported during the year (Metric ton)
			Land fillable	Incinerable	Recyclable	Utilizable	Land fillable	Incinerable	Recyclable	Utilizable		

- This shall also include Hazardous waste generated during recycling/ utilization of hazardous waste imported from other countries as well as received from other state/ UTs, However, it shall be reported only in Metric tonne.

*Ed. 200*



Format A2: Details on Interstate movement of Hazardous Waste for recycling/ Utilization/ disposal: **N/A**

Sl No	Hazardous Waste	Hazardous Waste Received from other State/UT		Hazardous Waste sent to other State/UT	
		Name of State/UT from which waste received	Quantity Received (MT)	Name of State/UT where waste sent	Quantity sent(MT)
			12		13
1	For disposal at common secured landfill				
2	For disposal at common incinerator				
3	For Recycling by Schedule IV recyclers				
4	For utilization in Co processing (cement plants)				
5	For utilization under rule 9 (Other than co processing)				

*[Handwritten signature]*

**A3 Details on Hazardous waste Recycled and Utilized: N/A**

Sl No	Name of the District	Recycling/Utilization of Hazardous Waste (Generated within the State/UT)			Recycling/Utilization of Hazardous Waste (Received from other State/UT)				
		Quantity of Waste recycled (listed under schedule IV Hazardous waste) MT	Quantity Utilize (MT)			Quantity of Waste recycled (listed under schedule IV Hazardous waste) MT	Quantity Utilize (MT)		
			Co Processing in Cement in Kiln	Other Than Co Processing	Captive Utilization (other than Column 15 & 16)		Co Processing in Cement in Kiln	Under Rule 9 Other Than Co Processing	Captive Utilization (other than Column 19 & 20)

**A4 Details on Hazardous waste Disposed: N/A**

Sl No	Name of the District	Recycling/Utilization of Hazardous Waste (Generated within the State/UT)				Recycling/Utilization of Hazardous Waste (Received from other State/UT)			
		Quantity disposed in secured landfill (MT)		Quantity disposed Through Incinerator (MT)		Quantity disposed in secured landfill (MT)		Quantity disposed Through Incinerator (MT)	
		Common	Captive	Common	Captive	Common	Captive	Common	Captive

*Handwritten signature*

A5 Details on Hazardous waste stored at occupier premises: **N/A**

SI No	Name of the District	Total quantity of HW stored at occupier premises at the beginning of the financial year ie-01.04.17 (MT)				Total quantity of HW stored at occupier premises during the financial year ie- 1 <sup>st</sup> Apr 17 to 31 <sup>st</sup> March 2018 (MT)			
		landfillable	Incinerable	Recyclable	Utilizable	landfillable	Incinerable	Recyclable	Utilizable

The Quantity of land fillable hazardous waste generated quantity in stock at the beginning of year and quantity transported from other state shall be equal to quantity disposed in common and captive secured landfill including transported to other state, quantity sent to other state and quantity stored at occupier premises at the end of financial year (i.e. Column no 6+ column no 30+ net value of column no 12 at s no 1 of Table A2]=[column no 22+ column no 23+ column no 26+ column no 27+ net value of column no 13 at s. no 1 of table A2+ column no 34]

Similarly in case of incinerable hazardous waste (I,e, column no 7+ column no 31+ net value of column no 12 at s. no 2 of table A2)=[ Column no 24+ column no 25+ column no28+ column no 29+ net value of column no 13 at s no 1 of table A2+ column no 34]

For recycle hazardous waste (Schedule IV item) (i.e. column no 8+ column no 32+ net value of column no 12 at s.no 3 of table A2)=[column no 14+ column no 18 net value of column no 13 at s no 3 of Table A2+ column no36])

For utilizable hazardous waste (i.e.[column no 9+ column no 33+ Net value of column no 12 at s. no 4 &5 of table A2]=[ column no 15+ column no16+ column no17+ column no19+ column no 20+ column no 21+ net value of column no 13 at s no 4&5 of table A2+ column no 37])

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Format B: Annual Inventory on recycling / Utilization / CO-Processing of Hazardous Waste: **N/A**

Name of SPCB/PCC:.....

Year:.....

S. No	Type of Recycling Facilities	No of facilities authorized for recycling/ utilization/ Co- processing of HW	Total Authorized capacity (MTA)	Quantity recycled/ utilized/ co-Processed (MT) during the year
A	Company Recyclable HW			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

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**Format-D1 Annual Inventory w.r.t Common TDS (s): N/A**

Name of SPCB/ PCC .....

Year:.....

Sl No	Name & Address of the TSDF	Quantity in stock at the beginning of the year (MT)		Quantity of Hazardous Waste Received (MT)			Quantity of Hazardous Waste Disposed (MT)			Quantity preprocessed for Utilization (MT)	Quantity in Stock at the end of the year		Cumulative HW disposed in self by the end of financial year (MT)	Capacity			
		Landfillable	Incinerable	For direct Landfillable	For Landfillable after treatment	For Incineration	Quantity Landfilled directly	Quantity Landfillable after treatment	Quantity Incinerated		Landfillable	Incinerable		Incinerator	Incinerator	landfill	

**Format-D1 Annual Inventory w.r.t Common TDS (s) : N/A**

Name of SPCB/ PCC .....

Year:.....

Sl No	Name & Address of Captive Facility	Type of Facility (Landfillable/ Incinerable / both)	Incinerator (T/H)	Landfill (MTA)	HW disposed during the year	Cumulative HW disposed till the end of financial year

*Handwritten signature*

## Annexure 1

### Results of Ground water around Secured Landfill for the months of August'22 and September'22:



#### NUMALIGARH REFINERY LIMITED (Quality Control Department)

Analysis of ground water around secured land fills

Date of sampling: 08.08.2022

Tested by: Prabhas Kumar Thakur

SI No.	Parameters	Results of piezometric tubes
1	Odour	Odourless
2	pH Value	7.0
3	Iron , mg/lit	2.88
4	Copper , mg/lit	0.000
5	Nickel , mg/lit	0.000
6	Cadmium , mg/lit	0.002
7	Arsenic. mg/lit	0.000
8	Lead , mg/lit	0.000
9	Zinc, mg/lit	0.004
10	Chromium,mg/lit	0.000
11	Magnesium, mg/lit	2.88
12	Calcium, mg/lit	23.38
13	Selenium, mg/lit	0.0006
14	Sodium	18.200

Certified by: Dr. Bedobrat Barhai  
Officer(Quality Control)  
For Numaligarh Refinery Limited

बेदब्रत बर्है/BEDOB RAT BARHAI  
अधिकारी (गुणवत्ता नियंत्रण)/Officer(Quality Control)  
नुमलीगर्ह रिफाइनरी लिमिटेड / Numaligarh Refinery Limited  
गोलाघाट, असम - 785 699 / Golaghat, Assam - 785 699



**NUMALIGARH REFINERY LIMITED**  
(Quality Control Department)

Analysis of ground water around secured land fills  
Date of sampling: 12.09.2022  
Tested by: Prabhas Kumar Thakur

Sl No.	Parameters	Results of piezometric tubes
1	Odour	Odourless
2	pH Value	7.0
3	Iron , mg/lit	2.94
4	Copper , mg/lit	0.000
5	Nickel , mg/lit	0.000
6	Cadmium , mg/lit	0.003
7	Arsenic. mg/lit	0.000
8	Lead , mg/lit	0.000
9	Zinc, mg/lit	0.007
10	Chromium,mg/lit	0.000
11	Magnesium, mg/lit	3.2
12	Calcium, mg/lit	24.60
13	Selenium, mg/lit	0.0002
14	Sodium	19.600

*Prabhas*

Certified by: Dr. Bedobrat Barhai  
Officer(Quality Control)  
For Numaligarh Refinery Limited

बेदब्रत बडई/BEDOBRAT BARHAI  
अधिकारी (गुणवत्ता नियंत्रण)/Officer(Quality Control)  
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गोलाघाट, असम - 785 699 / Golaghat, Assam - 785 699



### BUILDING & ROAD, MATERIAL, SOIL, ENVIRONMENTAL & CALIBRATION TESTING LAB

#### Test Report

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

**Test Report Date** 10/10/2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

#### Sample Particulars

Nature of the Sample : **Ambient Noise**  
Date of Sampling : 30/09/2022  
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	TC636622000001148F to TC636622000001202F	CDU/VDU	Field Cabin (Inside)	61.3	60.1	92 for 6 hrs
2			Crude Booster Pump Area (C)	89.6	88.3	
3			Crude Booster (B)	89.8	88.2	
4		DCU	Filed Cabin	60.1	58.1	
5			LPG Compressor	89.2	87.4	
6		HCU	Field Cabin (Inside)	58.2	57.0	
7			Near RGC Area	78.3	76.1	
8		H2U	Field Cabin (Inside)	55.6	53.3	
9			PSA Area	90.5	89.2	
10		SRB	Field Cabin (Inside)	59.0	57.1	
11			Control Rooms	55.2	53.2	
12		PH#1	Field Cabin (Inside)	58.3	56.1	
13		PH#3	Field Cabin (Inside)	56.2	54.4	
14		CPP	Control Rooms	63.2	60.1	
15			Field Cabin (Inside)	57.2	55.3	
16			Instrumentation Room	59.2	57.1	
17			Air Compressor (Utility)	90.8	88.6	
18		CPP (2)	Cabin (2)	54.6	53.2	
19			Sound Prone Zone	88.9	87.1	

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.



C-6366



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### BUILDING & ROAD, MATERIAL, SOIL, ENVIRONMENTAL & CALIBRATION TESTING LAB

#### Test Report

**Issued To** M/s Numaligarh Refinery Limited **Test Report Date** 10/10/2022  
 NRL Complex, Numaligarh **Customer Reference No.:** 4600008282-NIR/26.08.2021  
 Distt. Golaghat, Assam-785 699

#### Analysis Report

Sr. No.	URL No.	Area	Location	Observed Value dB(A)		Standard dB(A)
				Day	Night	
20	TC636622000001148F to TC636622000001202F	CPP 3	Cooling Tower ( North Side)	88.6	86.2	92 for 6 hrs
21			Cooling Tower (South Side)	88.5	86.3	
22		DM Plant	Field Cabin (Inside)	61.2	59.3	
23		WPH	Control Rooms (T-side)	59.1	57.2	
24		ETP	Disposal Pump (House)	63.2	61.6	
25			Control Rooms (Inside)	57.4	55.2	
26		CCU	Control Rooms (Inside)	59.8	57.1	
27			Near BFW	86.1	85.8	
28			Near Air Blower	83.2	81.3	
29		MSP	Filed Cabin	57.2	55.5	90 for 8 hrs
30			Near Compressor House	78.2	76.1	
31		Near Furnace Area	79.2	77.6		
32		N2 Plant	Control Rooms (Inside)	62.3	60.1	
33		/Compressor	Near Compressor House	91.2	89.1	
34		N2 Plant	LP Compressor ( 27- KA0002A)	92.3	90.2	
35			LP Compressor ( 27- KA0002B)	91.4	89.3	
36		Wax (ASPU)	Compressor ( 304- A)	84.2	82.2	
37			Compressor ( 304- B)	85.6	83.1	
38			Office Cabin (ASPU)	59.2	57.2	
39	Wax (SDU)	Field Cabin	58.1	56.1		

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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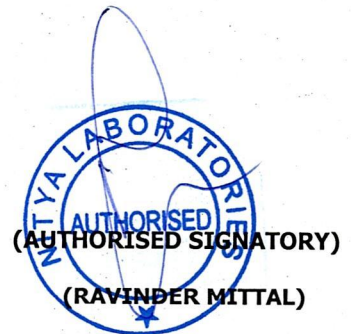
### Test Report

**Issued To** M/s Numaligarh Refinery Limited **Test Report Date** 10/10/2022  
 NRL Complex, Numaligarh **Customer Reference No.:** 4600008282-NIR/26.08.2021  
 Distt. Golaghat, Assam-785 699

### Analysis Report

Sr. No.	URL No.	Area	Location	Observed Value dB(A)		Standard dB(A)	
				Day	Night		
40	TC636622000001148F to TC636622000001202F	LPG B Plant	Casual 1	108.3	106.2	92 for 6 hrs	
41			Unloading	102.2	100.1		
42			Cyling	103.1	101.3		
43			Loading	105.2	103.4		
44		DHDT	F. Cabin	66.1	64.2	90 for 8 hrs	
45		WAX	F. Cabin (Plant Area-Hydro finishing)	65.2	63.1		
46		Lab	Lab	Outside Lab Building	65.2	62.1	75
47				Near Laboratory	61.3	59.8	
48			IT Deptt.	Server Room	54.1	52.0	
49			ADM Building	Near AC Room	57.2	55.1	
				Near ADM Building	65.1	63.2	
51			Watch Tower No.	Near W.T. No.1	60.1	58.3	
52			Central Control Room	In front of CCR	65.5	63.0	
53			Flare Area	Near Flare Area	56.2	54.1	
54			VKNRL Hospital	Hospital Premises	65.3	63.2	
55	DPS		DPS Premises	58.1	56.4		

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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### Annexure III

<u>QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.</u>							
<u>DURING QUARTER I (APR-JUN'22), 2022-23</u>							
<u>Online Stack Analyser data</u>							
UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE in mg/Nm3			Limiting Concentration in mg/Nm3	Remarks
			MAX.	MIN.	AVG.		
CDU/VDU	FF-01/02	SO2	213.05	44.80	137.56	619	Stack with dual firing (FG:FO=66:34)
		NOx	156.39	8.46	26.40	384	
		CO	8.33	5.49	6.78	167	
		PM	34.81	4.74	12.67	41	
DCU	FF-01	SO2	280.49	125.42	222.59	913	Stack with dual firing (FG:FO=48:52)
		NOx	187.87	100.97	174.71	402	
		CO	18.72	2.56	10.70	176	
		PM	14.55	4.94	8.89	57	
HCU	FF-01/02	SO2	15.72	3.74	37.02	50	Stack with Gas firing
		NOx	283.10	24.83	37.02	350	
		CO	81.96	1.66	24.08	150	
		PM	6.57	4.41	5.32	10	
HCU	FF-03	SO2	214.25	20.07	79.00	272	Stack with dual firing (FG:FO=87:13)
		NOx	302.47	3.04	32.48	363	
		CO	47.82	1.94	22.42	157	
		PM	8.68	6.11	7.33	22	

<b>H2U</b>	FF-01	SO2	47.00	1.13	29.68	<b>50</b>	Stack with Gas firing
		NOx	47.80	11.91	27.92	<b>350</b>	
		CO	33.27	7.02	10.30	<b>150</b>	
		PM	8.06	5.31	6.81	<b>10</b>	
<b>CPP(HRSG)</b>		SO2	49.05	2.71	41.53	<b>50</b>	Stack with Gas firing
		NOx	40.05	7.73	34.85	<b>350</b>	
		CO	19.39	4.24	15.52	<b>150</b>	
		PM	10.00	0.60	3.12	<b>10</b>	
<b>CPP (UB)</b>		SO2	35.27	29.01	32.25	<b>50</b>	Stack with dual firing (FG:FO=100:0)
		NOx	105.95	51.48	82.32	<b>350</b>	
		CO	68.44	0.33	4.34	<b>150</b>	
		PM	10.00	3.27	5.26	<b>10</b>	
<b>MSP (CRU)</b>		SO2	40.27	15.45	31.82	<b>50</b>	Stack with Gas firing
		NOx	88.48	56.65	70.29	<b>350</b>	
		CO	2.85	0.57	1.74	<b>150</b>	
		PM	9.95	4.66	6.36	<b>10</b>	
<b>MSP (NHTU)</b>		SO2	22.44	19.41	21.01	<b>50</b>	Stack with Gas firing
		NOx	70.49	50.24	63.77	<b>350</b>	
		CO	7.89	0.56	3.10	<b>150</b>	
		PM	9.95	4.66	6.36	<b>10</b>	
<b>DHDT</b>		SO2	48.99	15.04	38.75	<b>50</b>	Stack with Gas firing

	NOx	76.84	27.90	56.66	<b>250</b>	
	CO	27.56	0.00	6.96	<b>100</b>	
	PM	0.66	0.60	0.63	<b>5</b>	
Limiting concentration of emission calculated as per MOEF notification on standard vide GSR-186 (E) dated 18th March, 2008.						

### Annexure III

<u>QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.</u>							
<u>DURING QUARTER II (JULY-SEP'22), 2022-23</u>							
<u>Online Stack Analyser data</u>							
UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE in mg/Nm3			Limiting Concentration in mg/Nm3	Remarks
			MAX.	MIN.	AVG		
CDU/VDU	FF-01/02	SO2	322.07	14.41	218.49	<b>753</b>	Stack with dual firing (FG:FO=57:43)
		NOx	196.31	5.42	46.46	<b>393</b>	
		CO	7.79	3.10	5.40	<b>171</b>	
		PM	36.91	2.92	14.17	<b>48</b>	
DCU	FF-01	SO2	219.95	8.02	118.52	<b>934</b>	Stack with dual firing (FG:FO=46:54)
		NOx	164.07	22.16	109.74	<b>404</b>	
		CO	18.55	0.20	4.02	<b>177</b>	
		PM	14.55	1.40	5.66	<b>58</b>	
HCU	FF-01/02	SO2	19.15	2.81	32.53	<b>50</b>	Stack with Gas firing
		NOx	44.83	11.28	32.53	<b>350</b>	
		CO	81.96	2.17	14.79	<b>150</b>	

		PM	6.96	4.41	5.87	<b>10</b>	
<b>HCU</b>	FF-03	SO2	181.55	8.98	91.01	<b>188</b>	Stack with dual firing (FG:FO=92:8)
		NOx	50.30	5.13	26.62	<b>358</b>	
		CO	47.82	1.94	13.78	<b>154</b>	
		PM	8.08	6.09	7.05	<b>18</b>	
<b>H2U</b>	FF-01	SO2	45.46	9.38	22.81	<b>50</b>	Stack with Gas firing
		NOx	44.88	4.66	30.71	<b>350</b>	
		CO	33.27	2.18	7.01	<b>150</b>	
		PM	7.638	5.31	6.43	<b>10</b>	
<b>CPP(HRSG)</b>		SO2	49.05	2.73	24.20	<b>50</b>	Stack with Gas firing
		NOx	93.77	6.37	55.65	<b>350</b>	
		CO	19.39	5.61	12.07	<b>150</b>	
		PM	9.58	2.10	4.94	<b>10</b>	
<b>CPP (UB)</b>		SO2	33.99	4.95	22.94	<b>91</b>	Stack with dual firing (FG:FO=97:3)
		NOx	140.83	13.22	60.26	<b>353</b>	
		CO	25.10	1.26	6.98	<b>151</b>	
		PM	11.76	3.27	8.14	<b>12</b>	
<b>MSP (CRU)</b>		SO2	45.07	1.25	25.67	<b>50</b>	Stack with Gas firing
		NOx	83.15	32.79	63.86	<b>350</b>	
		CO	2.70	0.45	1.40	<b>150</b>	
		PM	9.47	4.66	6.32	<b>10</b>	
<b>MSP (NHTU)</b>		SO2	27.19	8.85	15.46	<b>50</b>	Stack with Gas firing

	NOx	82.19	39.91	68.38	<b>350</b>	
	CO	6.81	0.54	2.63	<b>150</b>	
	PM	9.24	4.66	6.32	<b>10</b>	
<b>DHDT</b>	SO2	123.88	25.19	62.79	<b>50</b>	Stack with Gas firing
	NOx	76.84	9.60	45.75	<b>250</b>	
	CO	96.07	3.72	25.18	<b>100</b>	
	PM	0.68	0.59	0.64	<b>5</b>	
<p style="text-align: center;"><b>Limiting concentration of emission calculated as per MOEF notification on standard vide GSR-186 (E) dated 18th March, 2008.</b></p>						



**Annexure IV**

**NUMALIGARH REFINERY LIMITED**

**QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS**

**DURING QUARTER I (APR-JUN'22), 2022-23**

<b>Ambient Air Quality Data</b>						
<b>STATION</b>	<b>PARAMETER</b>	<b>STD NAAQS-2009</b>	<b>Unit</b>	<b>OBSERVATIONS</b>		
				<b>MAX</b>	<b>MIN</b>	<b>AVG</b>
<b>REFINERY (WATCH TOWER NO. 6)</b>	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	13.6	8.20	11.1
	NO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	18.5	10.3	14.7
	O <sub>3</sub>	100 (8 hr avg.)	µg/m <sup>3</sup>	36.1	17.5	24.7
	CO	2.000 (8 hr.avg.)	mg/m <sup>3</sup>	1.000	0.62	0.823
	NH <sub>3</sub>	400 (24 hr.avg.)	µg/m <sup>3</sup>	32.8	14.4	23.42
	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	65.2	44.8	54.0
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	32.6	18.2	24.4
	Benzene	05 (Annual)	µg/m <sup>3</sup>	3.20	1.30	2.33
	HC	-	mg/m <sup>3</sup>	1.21	0.68	0.89
	BaP	01 (Annual)	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.43	0.17	0.29
	As	06 (Annual)	ng/m <sup>3</sup>	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m <sup>3</sup>	4.00	1.50	2.54
	<b>ECO-PARK IN NRL TOWNSHIP</b>	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	14.60	8.20
NO <sub>2</sub>		80 (24 hr avg.)	µg/m <sup>3</sup>	19.90	10.80	14.9
O <sub>3</sub>		100 (8 hr avg.)	µg/m <sup>3</sup>	41.4	14.30	26.0
CO		2.000 (8 hr.avg.)	mg/m <sup>3</sup>	1.070	0.610	0.820
NH <sub>3</sub>		400 (24 hr.avg.)	µg/m <sup>3</sup>	33.6	15.80	22.5
PM 10		100 (24 hr.avg.)	µg/m <sup>3</sup>	69.5	41.0	54.1

	PM 2.5	60 (24 hr.avg.)	µg/m3	33.4	17.8	25.3	
	Benzene	05 (Annual)	µg/m3	3.40	1.00	2.3	
	HC		mg/m3	1.28	0.67	0.9	
	BaP	1.0 (Annual)	ng/m3	<0.5	<0.5	<0.5	
	Pb	1.0 (24 hr.avg.)	µg/m3	0.44	0.18	0.293	
	As	6.0 (Annual)	ng/m3	1.00	1.00	1.00	
	Ni	20 (Annual)	ng/m3	4.10	1.30	2.40	
<b>RAW WATER INTAKE</b>	SO2	80 (24 hr avg.)	µg/m3	13.0	7.4	10.1	
	NO2	80 (24 hr avg.)	µg/m3	18.1	9.7	13.4	
	O3	100 (8 hr avg.)	µg/m3	32.8	16.0	24.2	
	CO	2.000 (8 hr.avg.)	mg/m3	0.93	0.58	0.73	
	NH3	400 (24 hr.avg.)	µg/m3	32.20	14.70	21.59	
	PM 10	100 (24 hr.avg.)	µg/m3	61.6	39.5	49.4	
	PM 2.5	60 (24 hr.avg.)	µg/m3	33.4	13.5	22.1	
	Benzene	05 (Annual)	µg/m3	3.10	1.00	1.9	
	HC		mg/m3	1.05	0.65	0.8	
	BaP	01 (Annual)	ng/m3	<0.5	<0.5	<0.5	
	Pb	1.0 (24 hr.avg.)	µg/m3	0.360	0.16	0.25	
	As	06 (Annual)	ng/m3	1.00	1.00	1.00	
		Ni	20 (Annual)	ng/m3	3.20	1.10	2.02
	<b>NH-39 BYPASS</b>	SO2	80 (24 hr avg.)	µg/m3	17.2	9.9	13.1
NO2		80 (24 hr avg.)	µg/m3	22.0	12.6	17.2	
O3		100 (8 hr avg.)	µg/m3	40.1	16.6	27.8	
CO		2.000 (8 hr.avg.)	mg/m3	1.180	0.700	0.920	
NH3		400 (24 hr.avg.)	µg/m3	39.4	17.2	28.6	

	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	72.5	50.1	62.3
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	37.8	18.7	100.9
	Benzene	05 (Annual)	µg/m <sup>3</sup>	4.20	1.40	2.77
	HC	-	mg/m <sup>3</sup>	1.43	0.79	1.07
	BaP	1	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.51	0.17	0.310
	As	6	ng/m <sup>3</sup>	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m <sup>3</sup>	3.90	1.70	2.84
<b>KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI</b>	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	11.60	7.10	9.51
	NO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	16.2	9.9	12.9
	O <sub>3</sub>	100 (8 hr avg.)	µg/m <sup>3</sup>	32.3	14.60	22.2
	CO	2.000 (8 hr.avg.)	mg/m <sup>3</sup>	0.860	0.610	0.7
	NH <sub>3</sub>	400 (24 hr.avg.)	µg/m <sup>3</sup>	29.00	14.40	20.8
	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	52.6	36.2	45.0
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	28.2	13.9	19.8
	Benzene	05 (Annual)	µg/m <sup>3</sup>	2.80	1.20	2.0
	HC	-	mg/m <sup>3</sup>	1.02	0.60	0.8
	BaP	1.0	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.35	0.13	0.24
	As	6.0	ng/m <sup>3</sup>	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m <sup>3</sup>	3.30	1.40	2.30

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

**Annexure IV**

**NUMALIGARH REFINERY LIMITED**

**QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS**

**DURING QUARTER II (JULY-SEP'22), 2022-23**

**Ambient Air Quality Data**

STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS		
				MAX	MIN	AVG
REFINERY (WATCH TOWER NO. 6)	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	28.6	8.50	15.4
	NO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	18.2	10.7	14.4
	O <sub>3</sub>	100 (8 hr avg.)	µg/m <sup>3</sup>	36.1	15.8	24.8
	CO	2.000 (8 hr.avg.)	mg/m <sup>3</sup>	0.980	0.65	0.827
	NH <sub>3</sub>	400 (24 hr.avg.)	µg/m <sup>3</sup>	32.1	16.0	22.48
	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	63.3	44.4	53.9
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	29.9	16.9	24.5
	Benzene	05 (Annual)	µg/m <sup>3</sup>	3.30	1.10	2.31
	HC	-	mg/m <sup>3</sup>	1.16	0.72	0.90
	BaP	01 (Annual)	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.39	0.16	0.28
	As	06 (Annual)	ng/m <sup>3</sup>	<1	<1	<1
	Ni	20 (Annual)	ng/m <sup>3</sup>	3.80	1.20	2.42
ECO-PARK IN NRL TOWNSHIP	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	13.00	8.20	10.9
	NO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	17.90	11.10	14.5
	O <sub>3</sub>	100 (8 hr avg.)	µg/m <sup>3</sup>	34.9	14.00	23.5
	CO	2.000 (8 hr.avg.)	mg/m <sup>3</sup>	0.960	0.590	0.793
	NH <sub>3</sub>	400 (24 hr.avg.)	µg/m <sup>3</sup>	31.2	14.00	23.6
	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	59.1	40.4	50.8
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	29.5	16.1	21.7

	Benzene	05 (Annual)	µg/m3	3.00	1.00	2.0
	HC		mg/m3	1.13	0.63	0.9
	BaP	1.0 (Annual)	ng/m3	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m3	0.41	0.14	0.257
	As	6.0 (Annual)	ng/m3	<1	<1	<1
	Ni	20 (Annual)	ng/m3	3.60	1.40	2.55
<b>RAW WATER INTAKE</b>	SO2	80 (24 hr avg.)	µg/m3	11.9	7.5	9.9
	NO2	80 (24 hr avg.)	µg/m3	16.1	10.4	13.1
	O3	100 (8 hr avg.)	µg/m3	31.9	14.5	22.4
	CO	2.000 (8 hr.avg.)	mg/m3	0.89	0.60	0.76
	NH3	400 (24 hr.avg.)	µg/m3	30.10	16.00	22.58
	PM 10	100 (24 hr.avg.)	µg/m3	56.4	38.0	47.5
	PM 2.5	60 (24 hr.avg.)	µg/m3	28.2	16.1	21.2
	Benzene	05 (Annual)	µg/m3	3.10	1.10	2.0
	HC		mg/m3	1.00	0.56	0.8
	BaP	01 (Annual)	ng/m3	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m3	0.370	0.14	0.26
	As	06 (Annual)	ng/m3	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m3	3.30	1.20	2.08
	<b>NH-39 BYPASS</b>	SO2	80 (24 hr avg.)	µg/m3	15.3	10.2
NO2		80 (24 hr avg.)	µg/m3	19.5	13.3	16.8
O3		100 (8 hr avg.)	µg/m3	42.1	17.4	30.5
CO		2.000 (8 hr.avg.)	mg/m3	1.110	0.730	0.963
NH3		400 (24 hr.avg.)	µg/m3	37.9	18.0	28.2
PM 10		100 (24 hr.avg.)	µg/m3	73.1	50.2	58.7

	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	39.1	19.5	27.5
	Benzene	05 (Annual)	µg/m <sup>3</sup>	3.70	1.40	2.50
	HC	-	mg/m <sup>3</sup>	1.38	0.72	1.02
	BaP	1	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.48	0.17	0.317
	As	6	ng/m <sup>3</sup>	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m <sup>3</sup>	4.60	1.40	3.02
<b>KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI</b>	SO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	11.90	7.90	9.35
	NO <sub>2</sub>	80 (24 hr avg.)	µg/m <sup>3</sup>	16.1	10.6	12.5
	O <sub>3</sub>	100 (8 hr avg.)	µg/m <sup>3</sup>	31.4	12.60	21.3
	CO	2.000 (8 hr.avg.)	mg/m <sup>3</sup>	0.850	0.550	0.7
	NH <sub>3</sub>	400 (24 hr.avg.)	µg/m <sup>3</sup>	28.60	12.10	20.2
	PM 10	100 (24 hr.avg.)	µg/m <sup>3</sup>	52.9	37.5	45.4
	PM 2.5	60 (24 hr.avg.)	µg/m <sup>3</sup>	26.9	15.2	20.4
	Benzene	05 (Annual)	µg/m <sup>3</sup>	2.90	1.10	1.9
	HC	-	mg/m <sup>3</sup>	1.00	0.53	0.8
	BaP	1.0	ng/m <sup>3</sup>	<0.5	<0.5	<0.5
	Pb	1.0 (24 hr.avg.)	µg/m <sup>3</sup>	0.35	0.14	0.24
	As	6.0	ng/m <sup>3</sup>	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m <sup>3</sup>	3.30	1.20	2.31

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

**Annexure V**

**QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT  
DURING QR. I (APR-JUN'22) 2022 -23**

<b>TABLE-1 LIQUID EFFLUENT POLLUTANT LEVEL -</b>								
<b>MONITORED VALUES in mg/lit.except pH</b>						<b>Limiting value for conc. (mg/l except for pH)</b>	<b>Quantum limit in Kg / 1000 MT of crude processed</b>	
<b>SL. NO</b>	<b>PARAMETERS</b>	<b>NO. OF OBS</b>	<b>MAX.</b>	<b>MIN.</b>	<b>AVG.</b>		<b>Actual</b>	<b>Standard</b>
1	pH	90	7.5	5.5	6.8	6-8.5	-	-
2	OIL & GREASE	90	4.5	1.1	1.85	5	0.49	2.0
3	SULPHIDE	90	<0.1	<0.1	<0.1	0.5	0.03	0.2
4	PHENOL	90	0.16	0.05	0.11	0.35	0.03	0.14
5	S. SOLID	90	20.0	9.0	15.71	20.0	4.16	8.0
6	COD	90	110.0	23.00	58.2	125.0	15.4	50.0
7	BOD3	90	11.0	2.0	5.00	15.0	1.32	6.0
8	CN	90	<0.02	<0.02	<0.02	0.2	0.01	0.08
9	Ammonia as N	3			9.33	15.0	2.47	6.0
10	Cr (Hexavalent)	3			0.00	0.1	0.00	0.04
11	Cr (Total)	3			0.001	2.0	0.00	0.8
12	Pb	3			0.0000	0.1	0.000	0.04
13	Zn	3			0.015	5.0	0.00	2.0
14	Ni	3			0.002	1.0	0.00	0.4
15	Cu	3			0.001	1.0	0.000	0.4
16	Benzene	3			0.035	0.1	0.009	0.04
17	Benzo (a)- Pyrene	3			0.040	0.2	0.011	0.08
18	Hg	3			0.0033	0.01	0.00	0.004
19	V	3			0.07	0.2	0.0	0.8
20	TKN	3			18.2	40.0	4.83	16.0
21	P	3			1.36	3.0	0.36	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 ENVIRONMENTAL ASPECT**

**DURING QR. II (JULY-SEPT'22) 2022 -23**

<b>TABLE-1 LIQUID EFFLUENT POLLUTANT LEVEL -</b>								
<b>MONITORED VALUES in mg/lit.except pH</b>								
<b>SL. NO</b>	<b>PARAMETERS</b>	<b>NO. OF OBS</b>	<b>MAX.</b>	<b>MIN.</b>	<b>AVG.</b>	<b>Limiting value for conc. (mg/l except for pH)</b>	<b>Quantum limit in Kg / 1000 MT of crude processed</b>	
							<b>Actual</b>	<b>Standard</b>
1	pH	90	7.5	6.0	6.9	6-8.5	-	-
2	OIL & GREASE	90	3.4	1.0	1.93	5	0.42	2.0
3	SULPHIDE	90	<0.1	<0.1	<0.1	0.5	0.02	0.2
4	PHENOL	90	0.32	0.05	0.10	0.35	0.02	0.14
5	S. SOLID	90	20.0	6.0	15.74	20.0	3.44	8.0
6	COD	90	88.0	28.00	51.2	125.0	11.19	50.0
7	BOD3	90	15.0	2.0	9.95	15.0	2.17	6.0
8	CN	90	<0.02	<0.02	<0.02	0.2	0.00	0.08
9	Ammonia as N	3	11.0	9	10.07	15.0	2.20	6.0
10	Cr (Hexavalent)	3	0	0	0.00	0.1	0.00	0.04
11	Cr (Total)	3	0.003	0.002	0.002	2.0	0.001	0.8
12	Pb	3	0	0	0.0000	0.1	0.00	0.04
13	Zn	3	0.032	0.004	0.020	5.0	0.004	2.0
14	Ni	3	0.028	0.001	0.010	1.0	0.002	0.4
15	Cu	3	0.039	0.001	0.014	1.0	0.003	0.4
16	Benzene	3	0.034	0.024	0.031	0.1	0.01	0.04
17	Benzo (a)- Pyrene	3	0.044	0.032	0.040	0.2	0.01	0.08
18	Hg	3	0.005	0.004	0.0047	0.01	0.00	0.004
19	V	3	0.063	0.042	0.05	0.2	0.0	0.8
20	TKN	3	19.6	13.5	17.6	40.0	3.84	16.0
21	P	3	1.31	1.19	1.23	3.0	0.27	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**



### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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UNIT: MSP						
Area	16 Unit					
1	16-PA-CF-0011A Suction line I/V U/S Flange	0	0	0	0.000	0.000
2	16-PA-CF-0011A Suction line I/V Gland	0	0	0	0.000	0.000
3	16-PA-CF-0011A Suction line I/V D/S Flange	0	0	0	0.000	0.000
4	Stainer Flange	0	0	0	0.000	0.000
5	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
6	Stainer Flange	0	0	0	0.000	0.000
7	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
8	Suction Line Flange	0	0	0	0.000	0.000
9	Pump Seal	0	0	0	0.000	0.000
10	Discharge Line Flange	0	0	0	0.000	0.000
11	Drain Line I/V Gland	0	0	0	0.000	0.000
12	Drain Line Safety Flange	0	0	0	0.000	0.000
13	Meter Line I/V Gland	0	0	0	0.000	0.000
14	Suction Line Outlet line to 1st I/V U/S Flange	0	0	0	0.000	0.000
15	Suction Line Outlet line to 1st I/V Gland	0	0	0	0.000	0.000
16	Suction Line Outlet line to 1st I/V D/S Flange	0	0	0	0.000	0.000
17	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
18	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
19	OWS Point	0	0	0	0.000	0.000
20	NRV U/S Flange	0	0	0	0.000	0.000
21	NRV Top Flange	0	0	0	0.000	0.000
22	NRV D/S Flange	0	0	0	0.000	0.000
23	Drain Line I/V Gland	0	0	0	0.000	0.000
24	Drain Line Safety Flange	0	0	0	0.000	0.000
25	Suction Line Outlet line to 2nd I/V U/S Flange	0	0	0	0.000	0.000
26	Suction Line Outlet line to 2nd I/V Gland	0	0	0	0.000	0.000
27	Suction Line Outlet line to 2nd I/V D/S Flange	0	0	0	0.000	0.000
28	16-PA-CF-0011B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
29	16-PA-CF-0011B Suction Line I/V Gland	0	0	0	0.000	0.000
30	16-PA-CF-0011B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
31	Stainer Top Flange	0	0	0	0.000	0.000



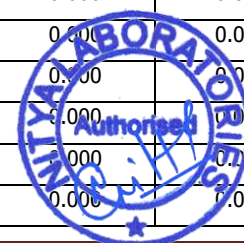
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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32	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
33	Stainer Flange	0	0	0	0.000	0.000
34	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
35	Suction Line Flange	0	0	0	0.000	0.000
36	Pump Seal	0	0	0	0.000	0.000
37	Discharge Line Flange	0	0	0	0.000	0.000
38	Drain Line I/V Gland	0	0	0	0.000	0.000
39	Drain Line Safety Flange	0	0	0	0.000	0.000
40	P.G. Meter I/V Gland	0	0	0	0.000	0.000
41	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
42	Discharge Line I/V Gland	0	0	0	0.000	0.000
43	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
44	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
45	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
46	OWS Point	0	0	0	0.000	0.000
47	NRV U/S Flange	0	0	0	0.000	0.000
48	NRV Top Flange	0	0	0	0.000	0.000
49	NRV D/S Flange	0	0	0	0.000	0.000
50	Discharge Line To Outlet Line I/V Gland	0	0	0	0.000	0.000
51	Discharge Line To Outlet Line Top Flange	0	0	0	0.000	0.000
52	Drain Line I/V Gland	0	0	0	0.000	0.000
53	Drain Line Safety Flange	0	0	0	0.000	0.000
	16-PA-CF-013A					
54	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
55	Suction Line I/V Gland	0	0	0	0.000	0.000
56	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
57	Stainer Top Flange	0	0	0	0.000	0.000
58	Suction Line to Outlet Line 1st I/V U/S Flange	0	0	0	0.000	0.000
59	Suction Line to Outlet Line 1st I/V Gland	0	0	0	0.000	0.000
60	Suction Line to Outlet Line 1st I/V D/S Flange	0	0	0	0.000	0.000
61	Suction Line To Outlet line 2nd I/V U/S Flange	0	0	0	0.000	0.000
62	Suction Line To Outlet line 2nd I/V Gland	0	0	0	0.000	0.000
63	Suction Line To Outlet line 2nd I/V D/S Flange	0	0	0	0.000	0.000



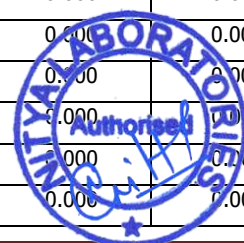
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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64	Suction Line To Outlet line 3rd I/V U/S Flange	0	0	0	0.000	0.000
65	Suction Line To Outlet line 3rd I/V Gland	0	0	0	0.000	0.000
66	Suction Line To Outlet line 3rd I/V D/S Flange	0	0	0	0.000	0.000
67	OWS Point	0	0	0	0.000	0.000
68	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
69	Steamer Flange	0	0	0	0.000	0.000
70	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
71	Suction Line Flange	0	0	0	0.000	0.000
72	Discharge Line Flange	0	0	0	0.000	0.000
73	P.G. Meter I/V Gland	0	0	0	0.000	0.000
74	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
75	Discharge Line I/V Gland	0	0	0	0.000	0.000
76	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
77	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
78	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
79	OWS Point	0	0	0	0.000	0.000
80	NRV U/S Flange	0	0	0	0.000	0.000
81	NRV Top Flange	0	0	0	0.000	0.000
82	NRV D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-013B					
83	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
84	Suction Line I/V Gland	0	0	0	0.000	0.000
85	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
86	Stainer Top Flange	0	0	0	0.000	0.000
87	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
88	Steamer Flange	0	0	0	0.000	0.000
89	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
90	Suction Line Flange	0	0	0	0.000	0.000
91	Discharge Line Flange	0	0	0	0.000	0.000
92	P.G. Meter I/V Gland	0	0	0	0.000	0.000
93	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
94	Discharge Line I/V Gland	0	0	0	0.000	0.000
95	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000



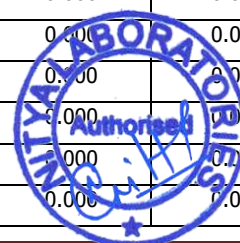
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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96	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
97	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
98	OWS Point	0	0	0	0.000	0.000
99	NRV U/S Flange	0	0	0	0.000	0.000
100	NRV Top Flange	0	0	0	0.000	0.000
101	NRV D/S Flange	0	0	0	0.000	0.000
102	16-FV-2201 line C/V U/S Flange	0	0	0	0.000	0.000
103	16-FV-2201 line C/V Gland	0	0	0	0.000	0.000
104	16-FV-2201 line C/V D/S Flange	0	0	0	0.000	0.000
105	Drain Line I/V Gland	0	0	0	0.000	0.000
106	16-FV-2201 line C/V U/S Flange	0	0	0	0.000	0.000
107	16-FV-2201 line C/V Gland	0	0	0	0.000	0.000
108	16-FV-2201 line C/V D/S Flange	0	0	0	0.000	0.000
109	Drain Line I/V Gland	0	0	0	0.000	0.000
110	16-FV-2201 D/S line I/V U/S Flange	0	0	0	0.000	0.000
111	16-FV-2201 D/S line I/V Gland	0	0	0	0.000	0.000
112	16-FV-2201 D/S line I/V D/S Flange	0	0	0	0.000	0.000
113	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
114	Bypass line I/V Gland	0	0	0	0.000	0.000
115	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
116	16-FV-2103 U/S line I/V U/S Flange	0	0	0	0.000	0.000
117	16-FV-2103 U/S line I/V Gland	0	0	0	0.000	0.000
118	16-FV-2103 U/S line I/V D/S Flange	0	0	0	0.000	0.000
119	Drain Line I/V Gland	0	0	0	0.000	0.000
120	16-FV-2103 C/V U/S Flange	0	0	0	0.000	0.000
121	16-FV-2103 C/V Gland	0	0	0	0.000	0.000
122	16-FV-2103 C/V D/S Flange	0	0	0	0.000	0.000
123	Drain Line I/V Gland	0	0	0	0.000	0.000
124	16-FV-2103 D/S line I/V U/S Flange	0	0	0	0.000	0.000
125	16-FV-2103 D/S line I/V Gland	0	0	0	0.000	0.000
126	16-FV-2103 D/S line I/V D/S Flange	0	0	0	0.000	0.000
127	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
128	Bypass line I/V Gland	0	0	0	0.000	0.000



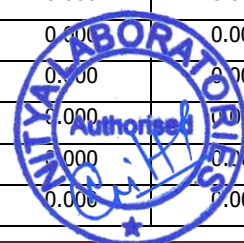
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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129	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
130	16-FV-2205 U/S line I/V U/S Flange	0	0	0	0.000	0.000
131	16-FV-2205 U/S line I/V Gland	0	0	0	0.000	0.000
132	16-FV-2205 U/S line I/V D/S Flange	0	0	0	0.000	0.000
133	Drain Line I/V Gland	0	0	0	0.000	0.000
134	16-FV-2205 line C/V U/S Flange	0	0	0	0.000	0.000
135	16-FV-2205 line C/V Gland	0	0	0	0.000	0.000
136	16-FV-2205 line C/V D/S Flange	0	0	0	0.000	0.000
137	Drain Line I/V Gland	0	0	0	0.000	0.000
138	16-FV-2205 D/S line I/V U/S Flange	0	0	0	0.000	0.000
139	16-FV-2205 D/S line I/V Gland	0	0	0	0.000	0.000
140	16-FV-2205 D/S line I/V D/S Flange	0	0	0	0.000	0.000
141	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
142	Bypass line I/V Gland	0	0	0	0.000	0.000
143	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-010A					
144	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
145	Suction Line I/V Gland	0	0	0	0.000	0.000
146	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
147	Stainer Top Flange	0	0	0	0.000	0.000
148	Suction Line to Outlet Line 1st I/V U/S Flange	0	0	0	0.000	0.000
149	Suction Line to Outlet Line 1st I/V Gland	0	0	0	0.000	0.000
150	Suction Line to Outlet Line 1st I/V D/S Flange	0	0	0	0.000	0.000
151	Suction Line to Outlet Line 2nd I/V U/S Flange	0	0	0	0.000	0.000
152	Suction Line to Outlet Line 2nd I/V Gland	0	0	0	0.000	0.000
153	Suction Line to Outlet Line 2nd I/V D/S Flange	0	0	0	0.000	0.000
154	Suction Line to Outlet Line 3rd I/V U/S Flange	0	0	0	0.000	0.000
155	Suction Line to Outlet Line 3rd I/V Gland	0	0	0	0.000	0.000
156	Suction Line to Outlet Line 3rd I/V D/S Flange	0	0	0	0.000	0.000
157	OWS Point	0	0	0	0.000	0.000
158	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
159	Steamer Flange	0	0	0	0.000	0.000
160	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000



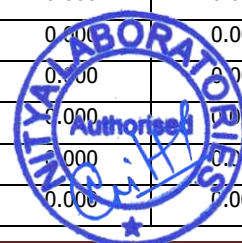
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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161	Suction Line Flange	0	0	0	0.000	0.000
162	Pump Seal	0	0	0	0.000	0.000
163	Discharge Line Flange	0	0	0	0.000	0.000
164	P.G. Meter I/V Gland	0	0	0	0.000	0.000
165	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
166	Discharge Line I/V Gland	0	0	0	0.000	0.000
167	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
168	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
169	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
170	OWS Point	0	0	0	0.000	0.000
171	NRV U/S Flange	0	0	0	0.000	0.000
172	NRV Top Flange	0	0	0	0.000	0.000
173	NRV D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-010B					
174	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
175	Suction Line I/V Gland	0	0	0	0.000	0.000
176	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
177	Stainer Top Flange	0	0	0	0.000	0.000
178	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
179	Steamer Flange	0	0	0	0.000	0.000
180	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
181	Suction Line Flange	0	0	0	0.000	0.000
182	Pump Seal	0	0	0	0.000	0.000
183	Discharge Line Flange	0	0	0	0.000	0.000
184	P.G. Meter I/V Gland	0	0	0	0.000	0.000
185	NRV U/S Flange	0	0	0	0.000	0.000
186	NRV Top Flange	0	0	0	0.000	0.000
187	NRV D/S Flange	0	0	0	0.000	0.000
188	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
189	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
190	OWS Point	0	0	0	0.000	0.000
191	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
192	Discharge Line I/V Gland	0	0	0	0.000	0.000



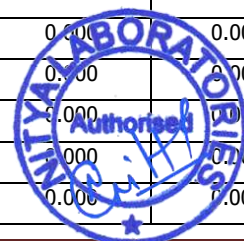
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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193	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-012A					
194	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
195	Suction Line I/V Gland	0	0	0	0.000	0.000
196	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
197	Stainer Top Flange	0	0	0	0.000	0.000
198	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
199	Steamer Flange	0	0	0	0.000	0.000
200	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
201	Suction Line Flange	0	0	0	0.000	0.000
202	Discharge Line Flange	0	0	0	0.000	0.000
203	Meter Line I/V Gland	0	0	0	0.000	0.000
204	Top Flange	0	0	0	0.000	0.000
205	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
206	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
207	OWS Point	0	0	0	0.000	0.000
208	Discharge Line I/V Gland	0	0	0	0.000	0.000
	16-PA-CF-012B					
209	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
210	Suction Line I/V Gland	0	0	0	0.000	0.000
211	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
212	Stainer Top Flange	0	0	0	0.000	0.000
213	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
214	Steamer Flange	0	0	0	0.000	0.000
215	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
216	Suction Line Flange	0	0	0	0.000	0.000
217	Discharge Line Flange	0	0	0	0.000	0.000
218	Meter Line I/V Gland	0	0	0	0.000	0.000
219	Top Flange	0	0	0	0.000	0.000
220	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
221	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
222	OWS Point	0	0	0	0.000	0.000
223	Discharge Line I/V Gland	0	0	0	0.000	0.000



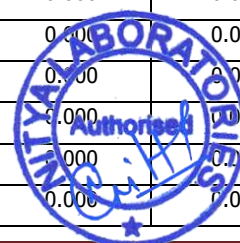
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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224	16-FV-2204 D/S Line I/V Gland	0	0	0	0.000	0.000
225	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
226	Stainer Flange	0	0	0	0.000	0.000
227	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
228	16-FV-2204 line C/V U/S Flange	0	0	0	0.000	0.000
229	16-FV-2204 line C/V Gland	0	0	0	0.000	0.000
230	16-FV-2204 line C/V D/S Flange	0	0	0	0.000	0.000
231	Drain Line I/V Gland	0	0	0	0.000	0.000
232	D/S line I/V Gland	0	0	0	0.000	0.000
233	Bypass line I/V Gland	0	0	0	0.000	0.000
234	16-FV-2206 U/S line I/V Gland	0	0	0	0.000	0.000
235	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
236	Stainer Flange	0	0	0	0.000	0.000
237	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
238	16-FV-2206 C/V U/S Flange	0	0	0	0.000	0.000
239	16-FV-2206 C/V Gland	0	0	0	0.000	0.000
240	16-FV-2206 C/V D/S Flange	0	0	0	0.000	0.000
241	Drain Line I/V Gland	0	0	0	0.000	0.000
242	D/S line I/V Gland	0	0	0	0.000	0.000
243	Bypass Line Stainer Flange	0	0	0	0.000	0.000
244	Bypass line I/V Gland	0	0	0	0.000	0.000
	16-PA-CF-006A					
245	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
246	Suction Line I/V Gland	0	0	0	0.000	0.000
247	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
248	Stainer Top Flange	0	0	0	0.000	0.000
249	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
250	Steamer Flange	0	0	0	0.000	0.000
251	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
252	Suction Line Flange	0	0	0	0.000	0.000
253	Pump Seal	0	0	0	0.000	0.000
254	Discharge Line Flange	0	0	0	0.000	0.000
255	Vrain Line I/V Gland	0	0	0	0.000	0.000





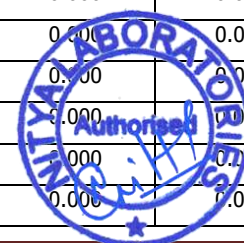
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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256	Vrain Line Safety Flange	0	0	0	0.000	0.000
257	Meter Line I/V Gland	0	0	0	0.000	0.000
258	NRV U/S Flange	0	0	0	0.000	0.000
259	NRV Top Flange	0	0	0	0.000	0.000
260	NRV D/S Flange	0	0	0	0.000	0.000
261	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
262	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
263	OWS Point	0	0	0	0.000	0.000
264	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
265	Discharge Line I/V Gland	0	0	0	0.000	0.000
266	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-006B					
267	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
268	Suction Line I/V Gland	0	0	0	0.000	0.000
269	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
270	Stainer Top Flange	0	0	0	0.000	0.000
271	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
272	Steamer Flange	0	0	0	0.000	0.000
273	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
274	Suction Line Flange	0	0	0	0.000	0.000
275	Pump Seal	0	0	0	0.000	0.000
276	Discharge Line Flange	0	0	0	0.000	0.000
277	Vrain Line I/V Gland	0	0	0	0.000	0.000
278	Vrain Line Safety Flange	0	0	0	0.000	0.000
279	Meter Line I/V Gland	0	0	0	0.000	0.000
280	NRV U/S Flange	0	0	0	0.000	0.000
281	NRV Top Flange	0	0	0	0.000	0.000
282	NRV D/S Flange	0	0	0	0.000	0.000
283	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
284	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
285	OWS Point	0	0	0	0.000	0.000
286	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
287	Discharge Line I/V Gland	0	0	0	0.000	0.000



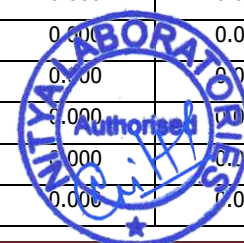
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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288	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
289	MIN FLOW to 16 WV-06 U/S line I/V U/S Flange	0	0	0	0.000	0.000
290	MIN FLOW to 16 WV-06 U/S line I/V Gland	0	0	0	0.000	0.000
291	MIN FLOW to 16 WV-06 U/S line I/V D/S Flange	0	0	0	0.000	0.000
292	NRV U/S Flange	0	0	0	0.000	0.000
293	NRV Top Flange	0	0	0	0.000	0.000
294	NRV D/S Flange	0	0	0	0.000	0.000
295	Drain Line I/V Gland	0	0	0	0.000	0.000
296	Drain Line Safety Flange	0	0	0	0.000	0.000
297	Heavy Reformate to Storage U/S line I/V	0	0	0	0.000	0.000
298	Top 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	D/S line Stainer Flange	0	0	0	0.000	0.000
302	D/S line I/V Gland	0	0	0	0.000	0.000
303	16-PV-2102 U/S line I/V Gland	0	0	0	0.000	0.000
304	Drain Line I/V Gland	0	0	0	0.000	0.000
305	16-PV-2102 line C/V U/S Flange	0	0	0	0.000	0.000
306	16-PV-2102 line C/V Gland	0	0	0	0.000	0.000
307	16-PV-2102 line C/V D/S Flange	0	0	0	0.000	0.000
308	Drain Line I/V Gland	0	0	0	0.000	0.000
309	D/S line I/V Gland	0	0	0	0.000	0.000
310	Bypass Line Stainer Flange	0	0	0	0.000	0.000
311	Bypass line I/V Gland	0	0	0	0.000	0.000
	16-PA-CF-003A					
312	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
313	Suction Line I/V Gland	0	0	0	0.000	0.000
314	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
315	Stainer Top Flange	0	0	0	0.000	0.000
316	Suction Line to Outlet Line 1st I/V U/S Flange	0	0	0	0.000	0.000
317	Suction Line to Outlet Line 1st I/V Gland	0	0	0	0.000	0.000
318	Suction Line to Outlet Line 1st I/V D/S Flange	0	0	0	0.000	0.000
319	Suction Line to Outlet Line 2nd I/V U/S Flange	0	0	0	0.000	0.000



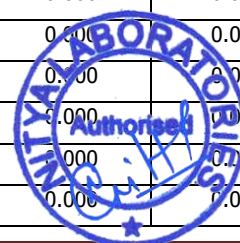
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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320	Suction Line to Outlet Line 2nd I/V Gland	0	0	0	0.000	0.000
321	Suction Line to Outlet Line 2nd I/V D/S Flange	0	0	0	0.000	0.000
322	Vrain Line I/V Gland	0	0	0	0.000	0.000
323	Vrain Line Safety Flange	0	0	0	0.000	0.000
324	Suction Line to Outlet Line 3rd I/V U/S Flange	0	0	0	0.000	0.000
325	Suction Line to Outlet Line 3rd I/V Gland	0	0	0	0.000	0.000
326	Suction Line to Outlet Line 3rd I/V D/S Flange	0	0	0	0.000	0.000
327	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
328	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
329	Steamer Flange	0	0	0	0.000	0.000
330	Suction Line Flange	0	0	0	0.000	0.000
331	Discharge Line Flange	0	0	0	0.000	0.000
332	P.G. Meter I/V Gland	0	0	0	0.000	0.000
333	Meter Line To Drain Line I/V Gland	0	0	0	0.000	0.000
334	Meter Line To Drain Line Safety Flange	0	0	0	0.000	0.000
335	NRV U/S Flange	0	0	0	0.000	0.000
336	NRV Top Flange	0	0	0	0.000	0.000
337	NRV D/S Flange	0	0	0	0.000	0.000
338	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
339	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
340	OWS Point	0	0	0	0.000	0.000
341	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
342	Discharge Line I/V Gland	0	0	0	0.000	0.000
343	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-003B					
344	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
345	Suction Line I/V Gland	0	0	0	0.000	0.000
346	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
347	Stainer Top Flange	0	0	0	0.000	0.000
348	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
349	Steamer Flange	0	0	0	0.000	0.000
350	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
351	Suction Line Flange	0	0	0	0.000	0.000



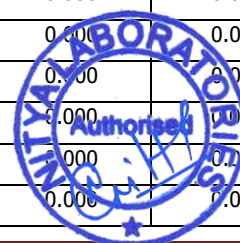
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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352	Discharge Line Flange	0	0	0	0.000	0.000
353	Meter Line I/V Gland	0	0	0	0.000	0.000
354	Meter Line To Drain Line I/V Gland	0	0	0	0.000	0.000
355	Meter Line To Drain Line Safety Flange	0	0	0	0.000	0.000
356	NRV U/S Flange	0	0	0	0.000	0.000
357	NRV Top Flange	0	0	0	0.000	0.000
358	NRV D/S Flange	0	0	0	0.000	0.000
359	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
360	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
361	OWS Point	0	0	0	0.000	0.000
362	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
363	Discharge Line I/V Gland	0	0	0	0.000	0.000
364	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
365	16-FV-1803 U/S line I/V Gland	0	0	0	0.000	0.000
366	Drain Line I/V Gland	0	0	0	0.000	0.000
367	16-FV-1803 C/V U/S Flange	0	0	0	0.000	0.000
368	16-FV-1803 C/V Gland	0	0	0	0.000	0.000
369	16-FV-1803 C/V D/S Flange	0	0	0	0.000	0.000
370	Drain Line I/V Gland	0	0	0	0.000	0.000
371	D/S line I/V Gland	0	0	0	0.000	0.000
372	Bypass line I/V Gland	0	0	0	0.000	0.000
373	16-FV-1802 D/S line I/V U/S Flange	0	0	0	0.000	0.000
374	16-FV-1802 D/S line I/V Gland	0	0	0	0.000	0.000
375	16-FV-1802 D/S line I/V D/S Flange	0	0	0	0.000	0.000
376	Drain Line I/V Gland	0	0	0	0.000	0.000
377	16-FV-1802 C/V U/S Flange	0	0	0	0.000	0.000
378	16-FV-1802 C/V Gland	0	0	0	0.000	0.000
379	16-FV-1802 C/V D/S Flange	0	0	0	0.000	0.000
380	Drain Line I/V Gland	0	0	0	0.000	0.000
381	16-FV-1802 D/S line I/V U/S Flange	0	0	0	0.000	0.000
382	16-FV-1802 D/S line I/V Gland	0	0	0	0.000	0.000
383	16-FV-1802 D/S line I/V D/S Flange	0	0	0	0.000	0.000
384	Bypass line I/V U/S Flange	0	0	0	0.000	0.000



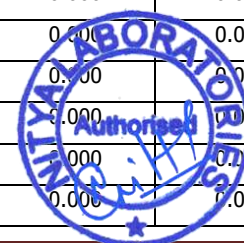
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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385	Bypass line I/V Gland	0	0	0	0.000	0.000
386	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-005A					
387	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
388	Suction Line I/V Gland	0	0	0	0.000	0.000
389	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
390	Stainer Top Flange	0	0	0	0.000	0.000
391	Drain Line I/V Gland	0	0	0	0.000	0.000
392	Suction Line Flange	0	0	0	0.000	0.000
393	Discharge Line Flange	0	0	0	0.000	0.000
394	Meter Line I/V Gland	0	0	0	0.000	0.000
395	Top Flange	0	0	0	0.000	0.000
396	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
397	Steamer Flange	0	0	0	0.000	0.000
398	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
399	OWS Point	0	0	0	0.000	0.000
400	Discharge Line I/V Gland	0	0	0	0.000	0.000
	16-PA-CF-005B					
401	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
402	Suction Line I/V Gland	0	0	0	0.000	0.000
403	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
404	Stainer Top Flange	0	0	0	0.000	0.000
405	Drain Line I/V Gland	0	0	0	0.000	0.000
406	Suction Line Flange	0	0	0	0.000	0.000
407	Discharge Line Flange	0	0	0	0.000	0.000
408	P.G. Meter I/V Gland	0	0	0	0.000	0.000
409	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
410	Steamer Flange	0	0	0	0.000	0.000
411	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
412	OWS Point	0	0	0	0.000	0.000
413	Top Flange	0	0	0	0.000	0.000
414	Discharge Line I/V Gland	0	0	0	0.000	0.000
415	16-PV-2301 U/S line I/V U/S Flange	0	0	0	0.000	0.000



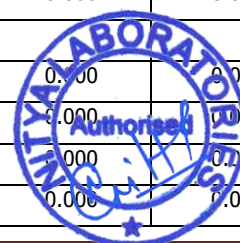
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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416	16-PV-2301 U/S line I/V Gland	0	0	0	0.000	0.000
417	16-PV-2301 U/S line I/V D/S Flange	0	0	0	0.000	0.000
418	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
419	Stainer Flange	0	0	0	0.000	0.000
420	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
421	Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
422	16-PV-2301 C/V U/S Flange	0	0	0	0.000	0.000
423	16-PV-2301 C/V Gland	0	0	0	0.000	0.000
424	16-PV-2301 C/V D/S Flange	0	0	0	0.000	0.000
425	Drain Line I/V Gland	0	0	0	0.000	0.000
426	16-PV-2301 D/S line I/V U/S Flange	0	0	0	0.000	0.000
427	16-PV-2301 D/S line I/V Gland	0	0	0	0.000	0.000
428	16-PV-2301 D/S line I/V D/S Flange	0	0	0	0.000	0.000
429	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
430	Bypass line I/V Gland	0	0	0	0.000	0.000
431	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
432	16-FV-1701 U/S line I/V U/S Flange	0	0	0	0.000	0.000
433	16-FV-1701 U/S line I/V Gland	0	0	0	0.000	0.000
434	16-FV-1701 U/S line I/V D/S Flange	0	0	0	0.000	0.000
435	16-FV-1701 C/V U/S Flange	0	0	0	0.000	0.000
436	16-FV-1701 C/V Gland	0	0	0	0.000	0.000
437	16-FV-1701 C/V D/S Flange	0	0	0	0.000	0.000
438	16-FV-1701 D/S line I/V U/S Flange	0	0	0	0.000	0.000
439	16-FV-1701 D/S line I/V Gland	0	0	0	0.000	0.000
440	16-FV-1701 D/S line I/V D/S Flange	0	0	0	0.000	0.000
441	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
442	Bypass line I/V Gland	0	0	0	0.000	0.000
443	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
Area	16 Unit					
1	16-FV-1102 U/S line I/V U/S Flange	0	0	0	0.000	0.000
2	16-FV-1102 U/S line I/V Gland	0	0	0	0.000	0.000
3	16-FV-1102 U/S line I/V D/S Flange	0	0	0	0.000	0.000
4	Drain Line 1st I/V Gland	0	0	0	0.000	0.000



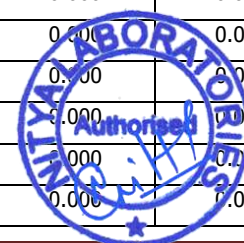
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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5	Stainer Flange	0	0	0	0.000	0.000
6	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
7	16-FV-1102 C/V U/S Flange	0	0	0	0.000	0.000
8	16-FV-1102 C/V Gland	0	0	0	0.000	0.000
9	16-FV-1102 C/V D/S Flange	0	0	0	0.000	0.000
10	Drain Line I/V Gland	0	0	0	0.000	0.000
11	16-FV-1102 D/S line I/V U/S Flange	0	0	0	0.000	0.000
12	16-FV-1102 D/S line I/V Gland	0	0	0	0.000	0.000
13	16-FV-1102 D/S line I/V D/S Flange	0	0	0	0.000	0.000
14	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
15	Bypass line I/V Gland	0	0	0	0.000	0.000
16	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
17	16-FV-1703 C/V U/S Flange	0	0	0	0.000	0.000
18	Drain Line I/V Gland	0	0	0	0.000	0.000
19	16-FV-1703 C/V U/S Flange	0	0	0	0.000	0.000
20	16-FV-1703 C/V Gland	0	0	0	0.000	0.000
21	16-FV-1703 C/V D/S Flange	0	0	0	0.000	0.000
22	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
23	Stainer Flange	0	0	0	0.000	0.000
24	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
25	16-FV-1703 D/S line I/V Gland	0	0	0	0.000	0.000
26	Bypass line I/V Gland	0	0	0	0.000	0.000
	16-PA-CF-001A					
27	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
28	Suction Line I/V Gland	0	0	0	0.000	0.000
29	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
30	Stainer Top Flange	0	0	0	0.000	0.000
31	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
32	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
33	OWS Point	0	0	0	0.000	0.000
34	Suction Line Flange	0	0	0	0.000	0.000
35	Pump Seal	0	0	0	0.000	0.000
36	Discharge Line Flange	0	0	0	0.000	0.000



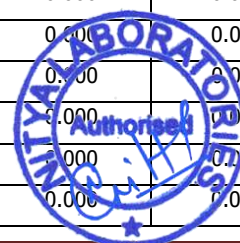
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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37	P.G. Meter line I/V Gland	0	0	0	0.000	0.000
38	NRV U/S Flange	0	0	0	0.000	0.000
39	NRV Top Flange	0	0	0	0.000	0.000
40	NRV D/S Flange	0	0	0	0.000	0.000
41	Steamer Flange	0	0	0	0.000	0.000
42	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
43	Steamer Flange	0	0	0	0.000	0.000
44	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
45	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
46	Discharge Line I/V Gland	0	0	0	0.000	0.000
47	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
	16-PA-CF-001B					
48	Suction Line I/V U/S Flange	0	0	0	0.000	0.000
49	Suction Line I/V Gland	0	0	0	0.000	0.000
50	Suction Line I/V D/S Flange	0	0	0	0.000	0.000
51	Stainer Top Flange	0	0	0	0.000	0.000
52	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
53	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
54	OWS Point	0	0	0	0.000	0.000
55	Suction Line Flange	0	0	0	0.000	0.000
56	Pump Seal	0	0	0	0.000	0.000
57	Discharge Line Flange	0	0	0	0.000	0.000
58	P.G. Meter line I/V Gland	0	0	0	0.000	0.000
59	NRV U/S Flange	0	0	0	0.000	0.000
60	NRV Top Flange	0	0	0	0.000	0.000
61	NRV D/S Flange	0	0	0	0.000	0.000
62	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
63	Steamer Flange	0	0	0	0.000	0.000
64	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
65	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
66	Discharge Line I/V Gland	0	0	0	0.000	0.000
67	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
68	From FEED DRYER line D/S I/V U/S Flange	0	0	0	0.000	0.000





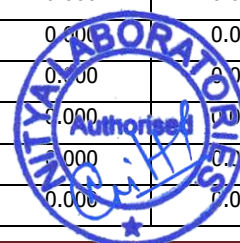
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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69	Top Flange	0	0	0	0.000	0.000
70	Stainer Flange	0	0	0	0.000	0.000
71	D/S line I/V Gland	0	0	0	0.000	0.000
72	Drain Line I/V Gland	0	0	0	0.000	0.000
73	Drain Line Safety Flange	0	0	0	0.000	0.000
74	From 16-C-01 Bottom line 1st I/V U/S Flange	0	0	0	0.000	0.000
75	From 16-C-01 Bottom line 1st I/V Gland	0	0	0	0.000	0.000
76	From 16-C-01 Bottom line 1st I/V D/S Flange	0	0	0	0.000	0.000
77	NRV U/S Flange	0	0	0	0.000	0.000
78	NRV Top Flange	0	0	0	0.000	0.000
79	From 16-C-01 Bottom line 2nd I/V U/S Flange	0	0	0	0.000	0.000
80	From 16-C-01 Bottom line 2nd I/V Gland	0	0	0	0.000	0.000
81	From 16-C-01 Bottom line 2nd I/V D/S Flange	0	0	0	0.000	0.000
82	NRV U/S Flange	0	0	0	0.000	0.000
83	NRV Top Flange	0	0	0	0.000	0.000
84	16-FV-1804 U/S line I/V U/S Flange	0	0	0	0.000	0.000
85	16-FV-1804 U/S line I/V Gland	0	0	0	0.000	0.000
86	16-FV-1804 U/S line I/V D/S Flange	0	0	0	0.000	0.000
87	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
88	Stainer Flange	0	0	0	0.000	0.000
89	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
90	16-FV-1804 C/V U/S Flange	0	0	0	0.000	0.000
91	16-FV-1804 C/V Gland	0	0	0	0.000	0.000
92	16-FV-1804 C/V D/S Flange	0	0	0	0.000	0.000
93	Drain Line I/V Gland	0	0	0	0.000	0.000
94	16-FV-1804 D/S line I/V U/S Flange	0	0	0	0.000	0.000
95	16-FV-1804 D/S line I/V Gland	0	0	0	0.000	0.000
96	16-FV-1804 D/S line I/V D/S Flange	0	0	0	0.000	0.000
97	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
98	Bypass line I/V Gland	0	0	0	0.000	0.000
99	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
100	ISOMER From DRYER DEGASSER U/S line	0	0	0	0.000	0.000
101	ISOMER From DRYER DEGASSER U/S line	0	0	0	0.000	0.000



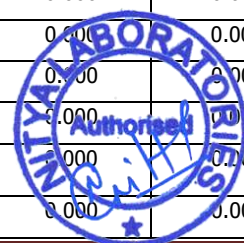
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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102	ISOMER From DRYER DEGASSER U/S line	0	0	0	0.000	0.000
103	NRV U/S Flange	0	0	0	0.000	0.000
104	NRV Top Flange	0	0	0	0.000	0.000
105	NRV 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	D/S line I/V U/S Flange	0	0	0	0.000	0.000
109	D/S line I/V Gland	0	0	0	0.000	0.000
110	D/S line I/V D/S Flange	0	0	0	0.000	0.000
111	16-FV-2301 U/S line I/V U/S Flange	0	0	0	0.000	0.000
112	16-FV-2301 U/S line I/V Gland	0	0	0	0.000	0.000
113	16-FV-2301 U/S line I/V D/S Flange	0	0	0	0.000	0.000
114	Drain Line 1st I/V Gland	0	0	0	0.000	0.000
115	Stainer Flange	0	0	0	0.000	0.000
116	Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
117	16-FV-2301 D/S line I/V U/S Flange	0	0	0	0.000	0.000
118	16-FV-2301 D/S line I/V Gland	0	0	0	0.000	0.000
119	16-FV-2301 D/S line I/V D/S Flange	0	0	0	0.000	0.000
120	Drain Line I/V Gland	0	0	0	0.000	0.000
121	16-FV-2301 D/S line I/V U/S Flange	0	0	0	0.000	0.000
122	16-FV-2301 D/S line I/V Gland	0	0	0	0.000	0.000
123	16-FV-2301 D/S line I/V D/S Flange	0	0	0	0.000	0.000
124	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
125	Bypass line I/V Gland	0	0	0	0.000	0.000
126	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
Area	Furnace					
127	From CBD Pump Discharge line 1st I/V U/S Flange	0	0	0	0.000	0.000
128	From CBD Pump Discharge line 1st I/V Gland	0	0	0	0.000	0.000
129	From CBD Pump Discharge line 1st I/V D/S Flange	0	0	0	0.000	0.000
130	Drain Line I/V Gland	0	0	0	0.000	0.000
131	Drain Line Safety Flange	0	0	0	0.000	0.000
132	From CBD Pump Discharge line 2nd I/V U/S Flange	0	0	0	0.000	0.000
133	From CBD Pump Discharge line 2nd I/V Gland	0	0	0	0.000	0.000



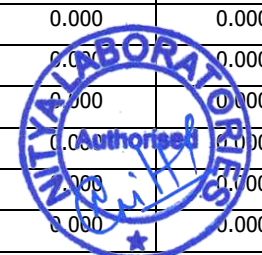
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:**                    August 2022  
**Customer Reference No.:**    4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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134	From CBD Pump Discharge line 2nd I/V D/S Flange	0	0	0	0.000	0.000
135	FEED NAPTHA line 1st I/V U/S Flange	0	0	0	0.000	0.000
136	FEED NAPTHA line 1st I/V Gland	0	0	0	0.000	0.000
137	FEED NAPTHA line 1st I/V D/S Flange	0	0	0	0.000	0.000
138	Drain Line I/V Gland	0	0	0	0.000	0.000
139	Drain Line Safety Flange	0	0	0	0.000	0.000
140	FEED NAPTHA line 2ndt I/V U/S Flange	0	0	0	0.000	0.000
141	FEED NAPTHA line 2ndt I/V Gland	0	0	0	0.000	0.000
142	FEED NAPTHA line 2ndt I/V D/S Flange	0	0	0	0.000	0.000
143	NRV U/S Flange	0	0	0	0.000	0.000
144	NRV Top Flange	0	0	0	0.000	0.000
145	NRV D/S Flange	0	0	0	0.000	0.000
146	MS Product line 1st I/V U/S Flange	0	0	0	0.000	0.000
147	MS Product line 1st I/V Gland	0	0	0	0.000	0.000
148	MS Product line 1st I/V D/S Flange	0	0	0	0.000	0.000
149	NRV U/S Flange	0	0	0	0.000	0.000
150	NRV Top Flange	0	0	0	0.000	0.000
151	NRV D/S Flange	0	0	0	0.000	0.000
152	Drain Line I/V Gland	0	0	0	0.000	0.000
153	Drain Line Safety Flange	0	0	0	0.000	0.000
154	MS Product line 2nd I/V U/S Flange	0	0	0	0.000	0.000
155	MS Product line 2nd I/V Gland	0	0	0	0.000	0.000
156	MS Product line 2nd I/V D/S Flange	0	0	0	0.000	0.000
157	OFF SPEC NAP to Storage line 1st I/V U/S Flange	0	0	0	0.000	0.000
158	OFF SPEC NAP to Storage line 1st I/V Gland	0	0	0	0.000	0.000
159	OFF SPEC NAP to Storage line 1st I/V D/S Flange	0	0	0	0.000	0.000
160	NRV U/S Flange	0	0	0	0.000	0.000
161	NRV Top Flange	0	0	0	0.000	0.000
162	NRV D/S Flange	0	0	0	0.000	0.000
163	Drain Line I/V Gland	0	0	0	0.000	0.000
164	Drain Line Safety Flange	0	0	0	0.000	0.000
165	OFF SPEC NAP to Storage line 2nd I/V U/S Flange	0	0	0	0.000	0.000
166	OFF SPEC NAP to Storage line 2nd I/V Gland	0	0	0	0.000	0.000



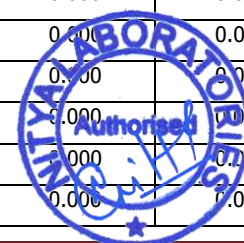
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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167	OFF SPEC NAP to Storage line 2nd I/V D/S Flange	0	0	0	0.000	0.000
168	Sl. No. 342963 line I/V U/S Flange	0	0	0	0.000	0.000
169	Sl. No. 342963 line I/V Gland	0	0	0	0.000	0.000
170	Sl. No. 342963 line I/V D/S Flange	0	0	0	0.000	0.000
171	Drain Line I/V Gland	0	0	0	0.000	0.000
172	Drain Line Safety Flange	0	0	0	0.000	0.000
173	Sl. No. 342966 line I/V U/S Flange	0	0	0	0.000	0.000
174	Sl. No. 342966 line I/V Gland	0	0	0	0.000	0.000
175	Sl. No. 342966 line I/V D/S Flange	0	0	0	0.000	0.000
176	Bypass Line Stainer Flange	0	0	0	0.000	0.000
177	Bypass line I/V Gland	0	0	0	0.000	0.000
178	14-UV-1804 line C/V U/S Flange	0	0	0	0.000	0.000
179	14-UV-1804 line C/V Gland	0	0	0	0.000	0.000
180	14-UV-1804 line C/V D/S Flange	0	0	0	0.000	0.000
181	Sl. No. 342945 line I/V U/S Flange	0	0	0	0.000	0.000
182	14-UV-1805 line C/V U/S Flange	0	0	0	0.000	0.000
183	14-UV-1805 line C/V Gland	0	0	0	0.000	0.000
184	14-UV-1805 line C/V D/S Flange	0	0	0	0.000	0.000
185	Sl. No. 342975 line I/V U/S Flange	0	0	0	0.000	0.000
186	Sl. No. 342975 line I/V Gland	0	0	0	0.000	0.000
187	Sl. No. 342975 line I/V D/S Flange	0	0	0	0.000	0.000
188	Sl. No. 342958 line I/V U/S Flange	0	0	0	0.000	0.000
189	Sl. No. 342958 line I/V Gland	0	0	0	0.000	0.000
190	Sl. No. 342958 line I/V D/S Flange	0	0	0	0.000	0.000
191	Sl. No. 342977 line I/V U/S Flange	0	0	0	0.000	0.000
192	Sl. No. 342977 line I/V Gland	0	0	0	0.000	0.000
193	Sl. No. 342977 line I/V D/S Flange	0	0	0	0.000	0.000
194	Sl. No. 342976 line I/V U/S Flange	0	0	0	0.000	0.000
195	Sl. No. 342976 line I/V Gland	0	0	0	0.000	0.000
196	Sl. No. 342976 line I/V D/S Flange	0	0	0	0.000	0.000
197	Sl. No. 342971 line I/V U/S Flange	0	0	0	0.000	0.000
198	Sl. No. 342971 line I/V Gland	0	0	0	0.000	0.000
199	Sl. No. 342971 line I/V D/S Flange	0	0	0	0.000	0.000



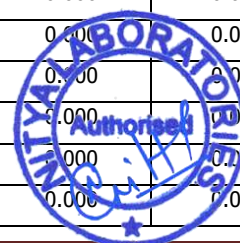
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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200	FG To 14-FF-01 Main Burner Sl. No. 3429	0	0	0	0.000	0.000
201	FG To 14-FF-01 Main Burner Sl. No. 3429	0	0	0	0.000	0.000
202	FG To 14-FF-01 Main Burner Sl. No. 3429	0	0	0	0.000	0.000
203	Sl. No. 343005 line I/V U/S Flange	0	0	0	0.000	0.000
204	Sl. No. 343005 line I/V Gland	0	0	0	0.000	0.000
205	Sl. No. 343005 line I/V D/S Flange	0	0	0	0.000	0.000
206	Sl. No. 342983 line I/V U/S Flange	0	0	0	0.000	0.000
207	Sl. No. 342983 line I/V Gland	0	0	0	0.000	0.000
208	Sl. No. 342983 line I/V D/S Flange	0	0	0	0.000	0.000
209	Sl. No. 343003 line I/V U/S Flange	0	0	0	0.000	0.000
210	Sl. No. 343003 line I/V Gland	0	0	0	0.000	0.000
211	Sl. No. 343003 line I/V D/S Flange	0	0	0	0.000	0.000
212	Sl. No. 342990 line I/V U/S Flange	0	0	0	0.000	0.000
213	Sl. No. 342990 line I/V Gland	0	0	0	0.000	0.000
214	Sl. No. 342990 line I/V D/S Flange	0	0	0	0.000	0.000
215	14-UV-1801 line I/V U/S Flange	0	0	0	0.000	0.000
216	14-UV-1801 line I/V Gland	0	0	0	0.000	0.000
217	14-UV-1801 line I/V D/S Flange	0	0	0	0.000	0.000
218	14-UV-1802 line I/V U/S Flange	0	0	0	0.000	0.000
219	14-UV-1802 line I/V Gland	0	0	0	0.000	0.000
220	14-UV-1802 line I/V D/S Flange	0	0	0	0.000	0.000
221	Sl. No. 342943 line I/V U/S Flange	0	0	0	0.000	0.000
222	Sl. No. 342943 line I/V Gland	0	0	0	0.000	0.000
223	Sl. No. 342943 line I/V D/S Flange	0	0	0	0.000	0.000
224	Sl. No. 342993 line I/V U/S Flange	0	0	0	0.000	0.000
225	Sl. No. 342993 line I/V Gland	0	0	0	0.000	0.000
226	Sl. No. 342993 line I/V D/S Flange	0	0	0	0.000	0.000
227	14-PV-1801 line C/V U/S Flange	0	0	0	0.000	0.000
228	14-PV-1801 line C/V Gland	0	0	0	0.000	0.000
229	14-PV-1801 line C/V D/S Flange	0	0	0	0.000	0.000
230	15-FF-3 PILOT F.G. Line Sl. No. 34297 line	0	0	0	0.000	0.000
231	15-FF-3 PILOT F.G. Line Sl. No. 34297 line	0	0	0	0.000	0.000
232	15-FF-3 PILOT F.G. Line Sl. No. 34297 line	0	0	0	0.000	0.000



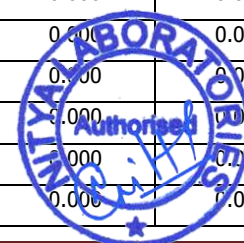
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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233	Drain Line I/V U/S Flange	0	0	0	0.000	0.000
234	Drain Line I/V Gland	0	0	0	0.000	0.000
235	Drain Line I/V D/S Flange	0	0	0	0.000	0.000
236	Sl. No. 342950 line I/V U/S Flange	0	0	0	0.000	0.000
237	Sl. No. 342950 line I/V Gland	0	0	0	0.000	0.000
238	Sl. No. 342950 line I/V D/S Flange	0	0	0	0.000	0.000
239	Sl. No. 342973 line I/V U/S Flange	0	0	0	0.000	0.000
240	Sl. No. 342973 line I/V Gland	0	0	0	0.000	0.000
241	Sl. No. 342973 line I/V D/S Flange	0	0	0	0.000	0.000
242	Sl. No. 342953 line I/V U/S Flange	0	0	0	0.000	0.000
243	Sl. No. 342953 line I/V Gland	0	0	0	0.000	0.000
244	Sl. No. 342953 line I/V D/S Flange	0	0	0	0.000	0.000
245	Sl. No. 342960 line I/V U/S Flange	0	0	0	0.000	0.000
246	15-UV-2305 line C/V U/S Flange	0	0	0	0.000	0.000
247	15-UV-2305 line C/V Gland	0	0	0	0.000	0.000
248	15-UV-2305 line C/V D/S Flange	0	0	0	0.000	0.000
249	Sl. No. 342946 line I/V U/S Flange	0	0	0	0.000	0.000
250	Sl. No. 342946 line I/V Gland	0	0	0	0.000	0.000
251	Sl. No. 342946 line I/V D/S Flange	0	0	0	0.000	0.000
252	15-UV-2304 line C/V U/S Flange	0	0	0	0.000	0.000
253	15-UV-2304 line C/V Gland	0	0	0	0.000	0.000
254	15-UV-2304 line C/V D/S Flange	0	0	0	0.000	0.000
255	Near 15-PT-2304 to PTY-2305 U/S line I/V	0	0	0	0.000	0.000
256	Near 15-PT-2304 to PTY-2305 U/S line I/V	0	0	0	0.000	0.000
257	Near 15-PT-2304 to PTY-2305 U/S line I/V	0	0	0	0.000	0.000
258	Drain Line I/V Gland	0	0	0	0.000	0.000
259	Drain Line Safety Flange	0	0	0	0.000	0.000
260	Near 15-PT-2304 to PTY-2305 D/S line I/V	0	0	0	0.000	0.000
261	Near 15-PT-2304 to PTY-2305 D/S line I/V	0	0	0	0.000	0.000
262	Near 15-PT-2304 to PTY-2305 D/S line I/V	0	0	0	0.000	0.000
263	15-PV-2301 U/S line I/V U/S Flange	0	0	0	0.000	0.000
264	15-PV-2301 U/S line I/V Gland	0	0	0	0.000	0.000
265	15-PV-2301 U/S line I/V D/S Flange	0	0	0	0.000	0.000



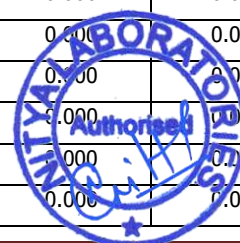
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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266	15-PV-2301 line C/V U/S Flange	0	0	0	0.000	0.000
267	15-PV-2301 line C/V Gland	0	0	0	0.000	0.000
268	15-PV-2301 line C/V D/S Flange	0	0	0	0.000	0.000
269	15-PV-2301 D/S line I/V U/S Flange	0	0	0	0.000	0.000
270	15-PV-2301 D/S line I/V Gland	0	0	0	0.000	0.000
271	15-PV-2301 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	15-UV-2301 line C/V U/S Flange	0	0	0	0.000	0.000
276	15-UV-2301 line C/V Gland	0	0	0	0.000	0.000
277	15-UV-2301 line C/V D/S Flange	0	0	0	0.000	0.000
278	15-FF-03 MAIN-FG To Sl. No. 342992 line	0	0	0	0.000	0.000
279	15-FF-03 MAIN-FG To Sl. No. 342992 line	0	0	0	0.000	0.000
280	15-FF-03 MAIN-FG To Sl. No. 342992 line	0	0	0	0.000	0.000
281	Drain Line I/V U/S Flange	0	0	0	0.000	0.000
282	Drain Line I/V Gland	0	0	0	0.000	0.000
283	Drain Line I/V D/S Flange	0	0	0	0.000	0.000
284	Sl. No. 343002 line I/V U/S Flange	0	0	0	0.000	0.000
285	Sl. No. 343002 line I/V Gland	0	0	0	0.000	0.000
286	Sl. No. 343002 line I/V D/S Flange	0	0	0	0.000	0.000
287	Sl. No. 342986 line I/V U/S Flange	0	0	0	0.000	0.000
288	Sl. No. 342986 line I/V Gland	0	0	0	0.000	0.000
289	Sl. No. 342986 line I/V D/S Flange	0	0	0	0.000	0.000
290	Sl. No. 342981 line I/V U/S Flange	0	0	0	0.000	0.000
291	Sl. No. 342981 line I/V Gland	0	0	0	0.000	0.000
292	Sl. No. 342981 line I/V D/S Flange	0	0	0	0.000	0.000
293	Sl. No. 343001 line I/V U/S Flange	0	0	0	0.000	0.000
294	Sl. No. 343001 line I/V Gland	0	0	0	0.000	0.000
295	Sl. No. 343001 line I/V D/S Flange	0	0	0	0.000	0.000
296	15-UV-2302 line C/V U/S Flange	0	0	0	0.000	0.000
297	15-UV-2302 line C/V Gland	0	0	0	0.000	0.000
298	15-UV-2302 line C/V D/S Flange	0	0	0	0.000	0.000



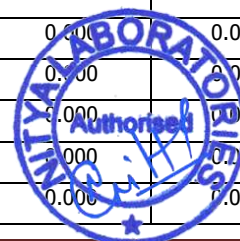
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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299	Sl. No. 342947 line I/V U/S Flange	0	0	0	0.000	0.000
300	Sl. No. 342947 line I/V Gland	0	0	0	0.000	0.000
301	Sl. No. 342947 line I/V D/S Flange	0	0	0	0.000	0.000
Area	Battery Area					
1	Fuel Gas Inlet line U/S I/V U/S Flange	0	0	0	0.000	0.000
2	Fuel Gas Inlet line U/S I/V Gland	0	0	0	0.000	0.000
3	Fuel Gas Inlet line U/S I/V D/S Flange	0	0	0	0.000	0.000
4	Fuel Gas Inlet line D/S I/V U/S Flange	0	0	0	0.000	0.000
5	Fuel Gas Inlet line D/S I/V Gland	0	0	0	0.000	0.000
6	Fuel Gas Inlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
7	Sour Gas Outlet line U/S I/V U/S Flange	0	0	0	0.000	0.000
8	Sour Gas Outlet line U/S I/V Gland	0	0	0	0.000	0.000
9	Sour Gas Outlet line U/S I/V D/S Flange	0	0	0	0.000	0.000
10	Drain Line I/V Gland	0	0	0	0.000	0.000
11	LPG R/D First I/V Gland	0	0	0	0.000	0.000
12	Sour Gas Outlet line D/S I/V U/S Flange	0	0	0	0.000	0.000
13	Sour Gas Outlet line D/S I/V Gland	0	0	0	0.000	0.000
14	Sour Gas Outlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
15	LPG R/D Outlet line U/S I/V U/S Flange	0	0	0	0.000	0.000
16	LPG R/D Outlet line U/S I/V Gland	0	0	0	0.000	0.000
17	LPG R/D Outlet line U/S I/V D/S Flange	0	0	0	0.000	0.000
18	Drain line I/V Gland	0	0	0	0.000	0.000
19	Drain line Safety Flange	0	0	0	0.000	0.000
20	LPG R/D Outlet line D/S I/V U/S Flange	0	0	0	0.000	0.000
21	LPG R/D Outlet line D/S I/V Gland	0	0	0	0.000	0.000
22	LPG R/D Outlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
23	Hydrogen Rich Gas To PSA Outlet line U/	0	0	0	0.000	0.000
24	Hydrogen Rich Gas To PSA Outlet line U/	0	0	0	0.000	0.000
25	Hydrogen Rich Gas To PSA Outlet line U/	0	0	0	0.000	0.000
26	Drain Line I/V Gland	0	0	0	0.000	0.000
27	Drain line Safety Flange	0	0	0	0.000	0.000
28	NRV U/S Flange	0	0	0	0.000	0.000
29	NRV Top Flange	0	0	0	0.000	0.000



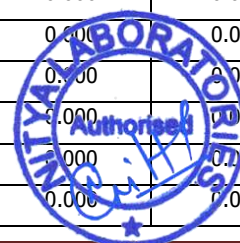


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
30	NRV D/S Flange	0	0	0	0.000	0.000
31	Hydrogen Rich Gas To PSA Outlet line D/	0	0	0	0.000	0.000
32	Hydrogen Rich Gas To PSA Outlet line D/	0	0	0	0.000	0.000
33	Hydrogen Rich Gas To PSA Outlet line D/	0	0	0	0.000	0.000
34	Hydrogen From PSA Inlet line U/S I/V U/S	0	0	0	0.000	0.000
35	Hydrogen From PSA Inlet line U/S I/V Gland	0	0	0	0.000	0.000
36	Hydrogen From PSA Inlet line U/S I/V D/S	0	0	0	0.000	0.000
37	NRV U/S Flange	0	0	0	0.000	0.000
38	NRV Top Flange	0	0	0	0.000	0.000
39	NRV D/S Flange	0	0	0	0.000	0.000
40	Drain Line I/V Gland	0	0	0	0.000	0.000
41	Drain line Safety Flange	0	0	0	0.000	0.000
42	Hydrogen From PSA Inlet line D/S I/V U/S	0	0	0	0.000	0.000
43	Hydrogen From PSA Inlet line D/S I/V Gland	0	0	0	0.000	0.000
44	Hydrogen From PSA Inlet line D/S I/V D/S	0	0	0	0.000	0.000
45	To 14-VV-01 S/U H. NAPTHA To 1st I/V U	0	0	0	0.000	0.000
46	To 14-VV-01 S/U H. NAPTHA To 1st I/V G	0	0	0	0.000	0.000
47	To 14-VV-01 S/U H. NAPTHA To 1st I/V D	0	0	0	0.000	0.000
48	NRV U/S Flange	0	0	0	0.000	0.000
49	NRV Top Flange	0	0	0	0.000	0.000
50	NRV D/S Flange	0	0	0	0.000	0.000
51	Drain Line I/V Gland	0	0	0	0.000	0.000
52	Drain line Safety Flange	0	0	0	0.000	0.000
53	To 14-VV-01 S/U H. NAPTHA To 2nd I/V U	0	0	0	0.000	0.000
54	To 14-VV-01 S/U H. NAPTHA To 2nd I/V G	0	0	0	0.000	0.000
55	To 14-VV-01 S/U H. NAPTHA To 2nd I/V D	0	0	0	0.000	0.000
56	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
57	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
58	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
59	NRV U/S Flange	0	0	0	0.000	0.000
60	NRV Top Flange	0	0	0	0.000	0.000
61	NRV D/S Flange	0	0	0	0.000	0.000
62	Drain line I/V Gland	0	0	0	0.000	0.000



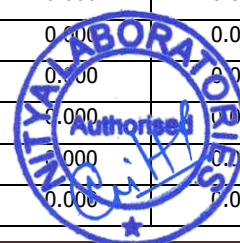
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Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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63	Drain line Safety Flange	0	0	0	0.000	0.000
64	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
65	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
66	To 14-VV-01 S/U H. NAPTHA To Storage	0	0	0	0.000	0.000
67	14-LV-1701 U/S line I/V U/S Flange	0	0	0	0.000	0.000
68	14-LV-1701 U/S line I/V Gland	0	0	0	0.000	0.000
69	14-LV-1701 U/S line I/V D/S Flange	0	0	0	0.000	0.000
70	CDE line 1st I/V Gland	0	0	0	0.000	0.000
71	CDE line 2nd I/V Gland	0	0	0	0.000	0.000
72	Stainer Flange	0	0	0	0.000	0.000
73	CDE line 3rd I/V Gland	0	0	0	0.000	0.000
74	14-LV-1701 line C/V U/S Flange	0	0	0	0.000	0.000
75	14-LV-1701 line C/V Gland	0	0	0	0.000	0.000
76	14-LV-1701 line C/V D/S Flange	0	0	0	0.000	0.000
77	14-LV-1701 D/S line I/V U/S Flange	0	0	0	0.000	0.000
78	14-LV-1701 D/S line I/V Gland	0	0	0	0.000	0.000
79	14-LV-1701 D/S line I/V D/S Flange	0	0	0	0.000	0.000
80	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
81	Bypass line I/V Gland	0	0	0	0.000	0.000
82	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
83	15-FV-1401 U/S line I/V U/S Flange	0	0	0	0.000	0.000
84	15-FV-1401 U/S line I/V Gland	0	0	0	0.000	0.000
85	IS-FV-1401 U/S line I/V D/S Flange	0	0	0	0.000	0.000
86	CDE line 1st I/V Gland	0	0	0	0.000	0.000
87	CDE line 2nd I/V Gland	0	0	0	0.000	0.000
88	Stainer Flange	0	0	0	0.000	0.000
89	CBD Drain line Top Flange	0	0	0	0.000	0.000
90	15-FV-1401 line C/V U/S Flange	0	0	0	0.000	0.000
91	15-FV-1401 line C/V Gland	0	0	0	0.000	0.000
92	15-FV-1401 line C/V D/S Flange	0	0	0	0.000	0.000
93	15-FV-1401 D/S line I/V U/S Flange	0	0	0	0.000	0.000
94	15-FV-1401 D/S line I/V Gland	0	0	0	0.000	0.000
95	15-FV-1401 D/S line I/V D/S Flange	0	0	0	0.000	0.000



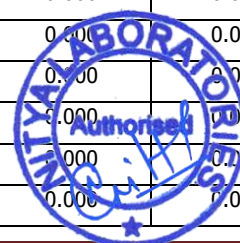
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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96	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
97	Bypass line t/V Gland	0	0	0	0.000	0.000
98	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
99	15-PV-1401 U/S line I/V U/S Flange	0	0	0	0.000	0.000
100	15-PV-1401 U/S line I/V Gland	0	0	0	0.000	0.000
101	15-PV-1401 U/S line I/V D/S Flange	0	0	0	0.000	0.000
102	15-PV-1401 line C/V U/S Flange	0	0	0	0.000	0.000
103	15-PV-1401 line C/V Gland	0	0	0	0.000	0.000
104	15-PV-1401 line C/V D/S Flange	0	0	0	0.000	0.000
105	15-PV-1401 D/S line I/V U/S Flange	0	0	0	0.000	0.000
106	15-PV-1401 D/S line I/V Gland	0	0	0	0.000	0.000
107	15-PV-1401 D/S line I/V D/S Flange	0	0	0	0.000	0.000
108	To Flare line 1st I/V U/S Flange	0	0	0	0.000	0.000
109	To Flare line 1st I/V Gland	0	0	0	0.000	0.000
110	To Flare line 1st I/V D/S Flange	0	0	0	0.000	0.000
111	NRV U/S Flange	0	0	0	0.000	0.000
112	NRV Top Flange	0	0	0	0.000	0.000
113	NRV 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	To Flare line 2nd I/V U/S Flange	0	0	0	0.000	0.000
117	To Flare line 2nd I/V Gland	0	0	0	0.000	0.000
118	To Flare line 2nd I/V D/S Flange	0	0	0	0.000	0.000
119	To FG Header line 1st I/V U/S Flange	0	0	0	0.000	0.000
120	To FG Header line 1st I/V Gland	0	0	0	0.000	0.000
121	To FG Header line 1st I/V D/S Flange	0	0	0	0.000	0.000
122	NRV Top Flange	0	0	0	0.000	0.000
123	NRV D/S Flange	0	0	0	0.000	0.000
124	Drain line I/V Gland	0	0	0	0.000	0.000
125	Drain line Safety Flange	0	0	0	0.000	0.000
126	To FG Header line 2nd I/V U/S Flange	0	0	0	0.000	0.000
127	To FG Header line 2nd I/V Gland	0	0	0	0.000	0.000
128	To FG Header line 2nd I/V D/S Flange	0	0	0	0.000	0.000



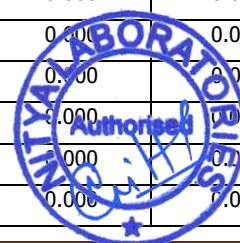
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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	15-PA-CF-001A					
129	Suction line I/V U/S Flange	0	0	0	0.000	0.000
130	Suction line I/V Gland	0	0	0	0.000	0.000
131	Suction line I/V D/S Flange	0	0	0	0.000	0.000
132	Stainer Top Flange	0	0	0	0.000	0.000
133	P.G. Meter line I/V Gland	0	0	0	0.000	0.000
134	Suction line Flange	0	0	0	0.000	0.000
135	Pump Seal	0	0	0	0.000	0.000
136	CBD line 1st I/V Gland	0	0	0	0.000	0.000
137	Stainer Flange	0	0	0	0.000	0.000
138	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
139	Drain line I/V Gland	0	0	0	0.000	0.000
140	OWS Point	0	0	0	0.000	0.000
141	Discharge line U/S Flange	0	0	0	0.000	0.000
142	Meter line Flange	0	0	0	0.000	0.000
143	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
144	Discharge line I/V Gland	0	0	0	0.000	0.000
145	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
146	NRV U/S Flange	0	0	0	0.000	0.000
147	NRV Top Flange	0	0	0	0.000	0.000
148	NRV D/S Flange	0	0	0	0.000	0.000
	15-PA-CF-001B					
149	Suction line I/V U/S Flange	0	0	0	0.000	0.000
150	Suction line I/V Gland	0	0	0	0.000	0.000
151	Suction line I/V D/S Flange	0	0	0	0.000	0.000
152	Stainer Top Flange	0	0	0	0.000	0.000
153	P.G. Meter line I/V Gland	0	0	0	0.000	0.000
154	Suction line Flange	0	0	0	0.000	0.000
155	Pump Seal	0	0	0	0.000	0.000
156	CBD line 1st I/V Gland	0	0	0	0.000	0.000
157	Stainer Flange	0	0	0	0.000	0.000
158	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
159	Drain line I/V Gland	0	0	0	0.000	0.000

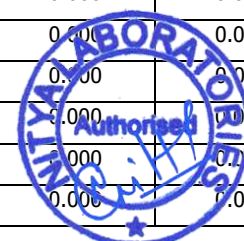


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
160	OWS Point	0	0	0	0.000	0.000
161	Discharge line U/S Flange	0	0	0	0.000	0.000
162	Meter line Flange	0	0	0	0.000	0.000
163	NRV U/S Flange	0	0	0	0.000	0.000
164	NRV Top Flange	0	0	0	0.000	0.000
165	NRV D/S Flange	0	0	0	0.000	0.000
166	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
167	Discharge line I/V Gland	0	0	0	0.000	0.000
168	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
169	15-PV-1301 A U/S I/V U/S Flange	0	0	0	0.000	0.000
170	15-PV-1301A U/S I/V Gland	0	0	0	0.000	0.000
171	15-PV-1301A U/S I/V D/S Flange	0	0	0	0.000	0.000
172	15-PV-1301A C/V U/S Flange	0	0	0	0.000	0.000
173	15-PV-1301A C/V Gland	0	0	0	0.000	0.000
174	15-PV-1301 A C/V D/S Flange	0	0	0	0.000	0.000
175	15-PV-1301 A D/S I/V U/S Flange	0	0	0	0.000	0.000
176	15-PV-1301 A D/S I/V Gland	0	0	0	0.000	0.000
177	15-PV-1301 A D/S I/V D/S Flange	0	0	0	0.000	0.000
178	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
179	Bypass line I/V Gland	0	0	0	0.000	0.000
180	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	15-PA-CF-002A					
181	Suction line I/V U/S Flange	0	0	0	0.000	0.000
182	Suction line I/V Gland	0	0	0	0.000	0.000
183	Suction line I/V D/S Flange	0	0	0	0.000	0.000
184	Stainer Top Flange	0	0	0	0.000	0.000
185	P.G. Meter I/V Gland	0	0	0	0.000	0.000
186	Suction line Flange	0	0	0	0.000	0.000
187	Pump Seal	0	0	0	0.000	0.000
188	CBD line 1st I/V Gland	0	0	0	0.000	0.000
189	Stainer Flange	0	0	0	0.000	0.000
190	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
191	Drain line I/V Gland	0	0	0	0.000	0.000



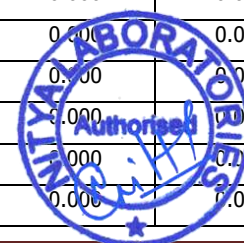
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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192	OWS Point	0	0	0	0.000	0.000
193	Discharge line Flange	0	0	0	0.000	0.000
194	Meter line I/V Gland	0	0	0	0.000	0.000
195	NRV U/S Flange	0	0	0	0.000	0.000
196	NRV Top Flange	0	0	0	0.000	0.000
197	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
198	Discharge line I/V Gland	0	0	0	0.000	0.000
199	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
	15-PA-CF-002B					
200	Suction line I/V U/S Flange	0	0	0	0.000	0.000
201	Suction line I/V Gland	0	0	0	0.000	0.000
202	Suction line I/V D/S Flange	0	0	0	0.000	0.000
203	Stainer Top Flange	0	0	0	0.000	0.000
204	Meter line I/V Gland	0	0	0	0.000	0.000
205	Suction line Flange	0	0	0	0.000	0.000
206	Pump Seal	0	0	0	0.000	0.000
207	CBD line 1st I/V Gland	0	0	0	0.000	0.000
208	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
209	Stainer Flange	0	0	0	0.000	0.000
210	Drain line I/V Gland	0	0	0	0.000	0.000
211	OWS Point	0	0	0	0.000	0.000
212	Discharge line Flange	0	0	0	0.000	0.000
213	Meter line I/V Gland	0	0	0	0.000	0.000
214	NRV Top Flange	0	0	0	0.000	0.000
215	NRV D/S Flange	0	0	0	0.000	0.000
216	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
217	Discharge line I/V Gland	0	0	0	0.000	0.000
218	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
219	15-FV-1503 U/S line I/V Gland	0	0	0	0.000	0.000
220	CBD line 1st I/V Gland	0	0	0	0.000	0.000
221	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
222	Stainer Flange	0	0	0	0.000	0.000
223	CBD line 3rd I/V Gland	0	0	0	0.000	0.000

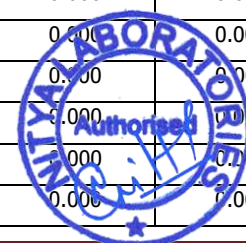


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
224	15-FV-1503 line C/V U/S Flange	0	0	0	0.000	0.000
225	15-FV-1503 line C/V Gland	0	0	0	0.000	0.000
226	15-FV-1503 line C/V D/S Flange	0	0	0	0.000	0.000
227	15-FV-1503 D/S line I/V Gland	0	0	0	0.000	0.000
228	Bypass line I/V Gland	0	0	0	0.000	0.000
	14-PACF-004A					
229	Suction line I/V U/S Flange	0	0	0	0.000	0.000
230	Suction line I/V Gland	0	0	0	0.000	0.000
231	Suction line I/V D/S Flange	0	0	0	0.000	0.000
232	Stainer Top Flange	0	0	0	0.000	0.000
233	Suction line Flange	0	0	0	0.000	0.000
234	Pump Seal	0	0	0	0.000	0.000
235	Discharge line Flange	0	0	0	0.000	0.000
236	Meter line I/V Gland	0	0	0	0.000	0.000
237	NRV U/S Flange	0	0	0	0.000	0.000
238	NRV Top Flange	0	0	0	0.000	0.000
239	NRV D/S Flange	0	0	0	0.000	0.000
240	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
241	Discharge line I/V Gland	0	0	0	0.000	0.000
242	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
243	CBD line 1st I/V Gland	0	0	0	0.000	0.000
244	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
245	Drain line I/V Gland	0	0	0	0.000	0.000
246	OWS Point	0	0	0	0.000	0.000
247	Stainer Flange	0	0	0	0.000	0.000
	14-PACF-004B					
248	Suction line I/V U/S Flange	0	0	0	0.000	0.000
249	Suction line I/V Gland	0	0	0	0.000	0.000
250	Suction line I/V D/S Flange	0	0	0	0.000	0.000
251	Stainer Top Flange	0	0	0	0.000	0.000
252	Suction line Flange	0	0	0	0.000	0.000
253	Pump Seal	0	0	0	0.000	0.000
254	Discharge line Flange	0	0	0	0.000	0.000



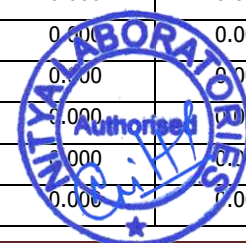
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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255	Meter line I/V Gland	0	0	0	0.000	0.000
256	NRV U/S Flange	0	0	0	0.000	0.000
257	NRV Top Flange	0	0	0	0.000	0.000
258	NRV D/S Flange	0	0	0	0.000	0.000
259	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
260	Discharge line I/V Gland	0	0	0	0.000	0.000
261	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
262	CBD line 1st I/V Gland	0	0	0	0.000	0.000
263	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
264	Stainer Flange	0	0	0	0.000	0.000
265	CBD line 3rd I/V Gland	0	0	0	0.000	0.000
266	Drain line I/V Gland	0	0	0	0.000	0.000
267	OWS Point	0	0	0	0.000	0.000
	14-PACF-006A					
268	Suction line I/V U/S Flange	0	0	0	0.000	0.000
269	Suction line I/V Gland	0	0	0	0.000	0.000
270	Suction line I/V D/S Flange	0	0	0	0.000	0.000
271	Stainer Top Flange	0	0	0	0.000	0.000
272	Suction line Flange	0	0	0	0.000	0.000
273	Pump Seal	0	0	0	0.000	0.000
274	Discharge line Flange	0	0	0	0.000	0.000
275	Meter line I/V Gland	0	0	0	0.000	0.000
276	NRV U/S Flange	0	0	0	0.000	0.000
277	NRV Top Flange	0	0	0	0.000	0.000
278	NRV D/S Flange	0	0	0	0.000	0.000
279	Drain line I/V Gland	0	0	0	0.000	0.000
280	Drain line Safety Flange	0	0	0	0.000	0.000
281	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
282	Discharge line I/V Gland	0	0	0	0.000	0.000
283	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
284	Pump To CBD line 1st I/V U/S Flange	0	0	0	0.000	0.000
285	Pump To CBD line 1st I/V Gland	0	0	0	0.000	0.000
286	Pump To CBD line 1st I/V D/S Flange	0	0	0	0.000	0.000





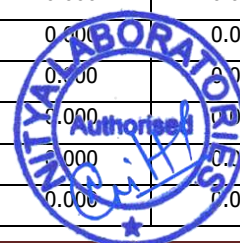
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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287	Pump To CBD line 2nd I/V Gland	0	0	0	0.000	0.000
288	Stainer Flange	0	0	0	0.000	0.000
289	Pump To CBD line 3rd I/V Gland	0	0	0	0.000	0.000
290	OWS Point	0	0	0	0.000	0.000
	14-PACF-006B					
291	Suction line I/V U/S Flange	0	0	0	0.000	0.000
292	Suction line I/V Gland	0	0	0	0.000	0.000
293	Suction line I/V D/S Flange	0	0	0	0.000	0.000
294	Stainer Top Flange	0	0	0	0.000	0.000
295	Suction line Flange	0	0	0	0.000	0.000
296	Pump Seal	0	0	0	0.000	0.000
297	Discharge line Flange	0	0	0	0.000	0.000
298	Meter line I/V Gland	0	0	0	0.000	0.000
299	NRV U/S Flange	0	0	0	0.000	0.000
300	NRV Top Flange	0	0	0	0.000	0.000
301	NRV D/S Flange	0	0	0	0.000	0.000
302	Drain line I/V Gland	0	0	0	0.000	0.000
303	Drain line Safety Flange	0	0	0	0.000	0.000
304	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
305	Discharge line I/V Gland	0	0	0	0.000	0.000
306	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
307	Pump To CBD line 1st I/V U/S Flange	0	0	0	0.000	0.000
308	Pump To CBD line 1st I/V Gland	0	0	0	0.000	0.000
309	Pump To CBD line 1st I/V D/S Flange	0	0	0	0.000	0.000
310	Pump To CBD line 2nd I/V Gland	0	0	0	0.000	0.000
311	Stainer Flange	0	0	0	0.000	0.000
312	Pump To CBD line 3rd I/V Gland	0	0	0	0.000	0.000
313	OWS Point	0	0	0	0.000	0.000
314	14-FV-1103 U/S line I/V U/S Flange	0	0	0	0.000	0.000
315	14-FV-1103 U/S line I/V Gland	0	0	0	0.000	0.000
316	14-FV-1103 U/S line I/V D/S Flange	0	0	0	0.000	0.000
317	Drain line 1st I/V Gland	0	0	0	0.000	0.000
318	Drain line 2nd I/V Gland	0	0	0	0.000	0.000



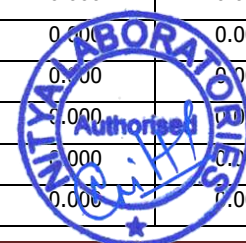
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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319	Stainer Flange	0	0	0	0.000	0.000
320	Drain line 3rd I/V Gland	0	0	0	0.000	0.000
321	14-FV-1103 line C/V U/S Flange	0	0	0	0.000	0.000
322	14-FV-1103 line C/V Gland	0	0	0	0.000	0.000
323	14-IV-1103 line C/V D/S Flange	0	0	0	0.000	0.000
324	14-FV-1103 D/S line I/V U/S Flange	0	0	0	0.000	0.000
325	14-FV-1103 D/S line I/V Gland	0	0	0	0.000	0.000
326	14-FV-1103 D/S line I/V D/S Flange	0	0	0	0.000	0.000
327	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
328	Bypass line I/V Gland	0	0	0	0.000	0.000
329	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
330	14-UV-1101 CV U/S Flange	0	0	0	0.000	0.000
331	14-UV-1101 CV Gland	0	0	0	0.000	0.000
332	14-UV-1101 CV D/S Flange	0	0	0	0.000	0.000
	14-PA-CF-001A					
333	Suction line I/V U/S Flange	0	0	0	0.000	0.000
334	Suction line I/V Gland	0	0	0	0.000	0.000
335	Suction line I/V D/S Flange	0	0	0	0.000	0.000
336	Stainer Top Flange	0	0	0	0.000	0.000
337	Drain line I/V Gland	0	0	0	0.000	0.000
338	Drain line Stainer Flange	0	0	0	0.000	0.000
339	Suction line Flange	0	0	0	0.000	0.000
340	Pump Seal	0	0	0	0.000	0.000
341	Discharge line Flange	0	0	0	0.000	0.000
342	Meter line I/V Gland	0	0	0	0.000	0.000
343	NRV U/S Flange	0	0	0	0.000	0.000
344	NRV Top Flange	0	0	0	0.000	0.000
345	NRV D/S Flange	0	0	0	0.000	0.000
346	Drain line I/V Gland	0	0	0	0.000	0.000
347	Drain line Stainer Flange	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



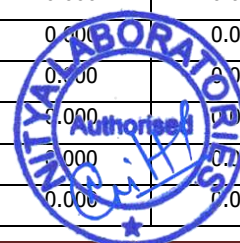
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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351	Pump To CBD line 1st I/V Gland	0	0	0	0.000	0.000
352	Pump To CBD line 2nd I/V Gland	0	0	0	0.000	0.000
353	Stainer Flange	0	0	0	0.000	0.000
354	Pump To CBD line 3rd I/V Gland	0	0	0	0.000	0.000
355	OWS Point	0	0	0	0.000	0.000
	14-PA-CF-001B					
356	Suction line I/V U/S Flange	0	0	0	0.000	0.000
357	Suction line I/V Gland	0	0	0	0.000	0.000
358	Suction line I/V D/S Flange	0	0	0	0.000	0.000
359	Stainer Top Flange	0	0	0	0.000	0.000
360	Drain line I/V Gland	0	0	0	0.000	0.000
361	Drain line Stainer Flange	0	0	0	0.000	0.000
362	Suction line Flange	0	0	0	0.000	0.000
363	Pump Seal	0	0	0	0.000	0.000
364	Discharge line Flange	0	0	0	0.000	0.000
365	Meter line I/V Gland	0	0	0	0.000	0.000
366	NRV U/S Flange	0	0	0	0.000	0.000
367	NRV Top Flange	0	0	0	0.000	0.000
368	NRV D/S Flange	0	0	0	0.000	0.000
369	Drain line I/V Gland	0	0	0	0.000	0.000
370	Drain line Stainer Flange	0	0	0	0.000	0.000
371	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
372	Discharge line I/V Gland	0	0	0	0.000	0.000
373	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
374	Pump To CBD line 1st I/V Gland	0	0	0	0.000	0.000
375	Pump To CBD line 2nd I/V Gland	0	0	0	0.000	0.000
376	Stainer Flange	0	0	0	0.000	0.000
377	Pump To CBD line 3rd I/V Gland	0	0	0	0.000	0.000
378	OWS Point	0	0	0	0.000	0.000
379	NAPTHA to SLOP U/S line I/V U/S Flange	0	0	0	0.000	0.000
380	NAPTHA to SLOP U/S line I/V Gland	0	0	0	0.000	0.000
381	NAPTHA to SLOP U/S line I/V U/S Flange	0	0	0	0.000	0.000
382	NRV U/S Flange	0	0	0	0.000	0.000



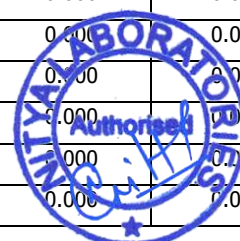
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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383	NRV Top Flange	0	0	0	0.000	0.000
384	NRV D/S Flange	0	0	0	0.000	0.000
385	Drain line I/V Gland	0	0	0	0.000	0.000
386	Drain line Safety Flange	0	0	0	0.000	0.000
387	NAPTHA to SLOP D/S line I/V U/S Flange	0	0	0	0.000	0.000
388	NAPTHA to SLOP D/S line I/V Gland	0	0	0	0.000	0.000
389	NAPTHA to SLOP D/S line I/V U/S Flange	0	0	0	0.000	0.000
390	Splitter Reflux To SLOP U/S line I/V U/S £	0	0	0	0.000	0.000
391	Splitter Reflux To SLOP U/S line I/V Glan	0	0	0	0.000	0.000
392	Splitter Reflux To SLOP U/S line I/V D/S F	0	0	0	0.000	0.000
393	NRV U/S Flange	0	0	0	0.000	0.000
394	NRV Top Flange	0	0	0	0.000	0.000
395	NRV D/S Flange	0	0	0	0.000	0.000
396	Drain line I/V Gland	0	0	0	0.000	0.000
397	Drain line Safety Flange	0	0	0	0.000	0.000
398	Splitter Reflux To SLOP D/S line I/V U/S F	0	0	0	0.000	0.000
399	Splitter Reflux To SLOP D/S line I/V Glan	0	0	0	0.000	0.000
400	Splitter Reflux To SLOP D/S line I/V D/S F	0	0	0	0.000	0.000
401	2nd I/V U/S Flange	0	0	0	0.000	0.000
402	2nd I/V Gland	0	0	0	0.000	0.000
403	2nd I/V D/S Flange	0	0	0	0.000	0.000
404	Stritter Reflux To SLOP U/S line 1st I/V U	0	0	0	0.000	0.000
405	Stritter Reflux To SLOP U/S line 1st I/V G	0	0	0	0.000	0.000
406	Stritter Reflux To SLOP U/S line 1st I/V D	0	0	0	0.000	0.000
407	Stritter Reflux To SLOP U/S line 2nd I/V U	0	0	0	0.000	0.000
408	Stritter Reflux To SLOP U/S line 2nd I/V G	0	0	0	0.000	0.000
409	Stritter Reflux To SLOP U/S line 2nd I/V D	0	0	0	0.000	0.000
410	NRV U/S Flange	0	0	0	0.000	0.000
411	NRV Top Flange	0	0	0	0.000	0.000
412	NRV D/S Flange	0	0	0	0.000	0.000
413	Drain line I/V Gland	0	0	0	0.000	0.000
414	Drain line Safety Flange	0	0	0	0.000	0.000
415	Stritter Reflux To SLOP D/S line I/V U/S F	0	0	0	0.000	0.000



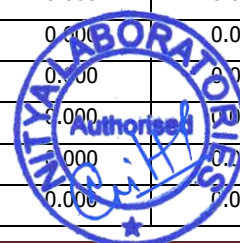
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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416	Stritter Reflux To SLOP D/S line I/V Glanc	0	0	0	0.000	0.000
417	Stritter Reflux To SLOP D/S line I/V D/S F	0	0	0	0.000	0.000
418	Hydrogen Rich gas From unit 15 U/S I/V	0	0	0	0.000	0.000
419	Hydrogen Rich gas From unit 15 U/S I/V	0	0	0	0.000	0.000
420	Hydrogen Rich gas From unit 15 U/S I/V	0	0	0	0.000	0.000
421	NRV U/S Flange	0	0	0	0.000	0.000
422	NRV Top Flange	0	0	0	0.000	0.000
423	NRV D/S Flange	0	0	0	0.000	0.000
424	Drain line I/V Gland	0	0	0	0.000	0.000
425	Drain line Safety Flange	0	0	0	0.000	0.000
426	Hydrogen Rich gas From unit 15 D/S I/V	0	0	0	0.000	0.000
427	Hydrogen Rich gas From unit 15 D/S I/V	0	0	0	0.000	0.000
428	Hydrogen Rich gas From unit 15 D/S I/V	0	0	0	0.000	0.000
429	Hydrogen From PSA To 16-VV-2 U/S I/V	0	0	0	0.000	0.000
430	Hydrogen From PSA To 16-VV-2 U/S I/V	0	0	0	0.000	0.000
431	Hydrogen From PSA To 16-VV-2 U/S I/V	0	0	0	0.000	0.000
432	NRV U/S Flange	0	0	0	0.000	0.000
433	NRV Top Flange	0	0	0	0.000	0.000
434	NRV D/S Flange	0	0	0	0.000	0.000
435	Drain line I/V Gland	0	0	0	0.000	0.000
436	Drain line Safety Flange	0	0	0	0.000	0.000
437	Hydrogen From PSA To 16-VV-2 D/S I/V	0	0	0	0.000	0.000
438	Hydrogen From PSA To 16-VV-2 D/S I/V	0	0	0	0.000	0.000
439	Hydrogen From PSA To 16-VV-2 D/S I/V	0	0	0	0.000	0.000
440	14-FV-1501-CV U/S I/V U/S Flange	0	0	0	0.000	0.000
441	14-FV-1501-CV U/S I/V Gland	0	0	0	0.000	0.000
442	14-FV-1501-CV U/S I/V D/S Flange	0	0	0	0.000	0.000
443	CBD Line 1st I/V Gland	0	0	0	0.000	0.000
444	CBD Line 2nd I/V Gland	0	0	0	0.000	0.000
445	CBD Line 3rd I/V Gland	0	0	0	0.000	0.000
446	Staines Flange	0	0	0	0.000	0.000
447	14-FV-1501-CV U/S Flange	0	0	0	0.000	0.000
448	14-FV-1501-CV Gland	0	0	0	0.000	0.000



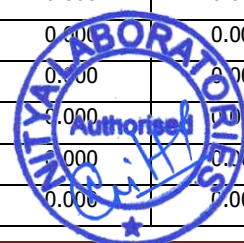
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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449	14-FV-1501-CV D/S Flange	0	0	0	0.000	0.000
450	14-FV-1501 CV D/S I/V U/S Flange	0	0	0	0.000	0.000
451	14-FV-1501-CV D/S I/V Gland	0	0	0	0.000	0.000
452	14-FV-1501-CV D/S I/V D/S Flange	0	0	0	0.000	0.000
453	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
454	Bypass line I/V Gland	0	0	0	0.000	0.000
455	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
456	From 14-PA-4 A/B to SLOP 1st I/V U/S FI	0	0	0	0.000	0.000
457	From 14-PA-4 A/B to SLOP 1st I/V Gland	0	0	0	0.000	0.000
458	From 14-PA-4 A/B to SLOP 1st I/V D/S FI	0	0	0	0.000	0.000
459	From 14-PA-4 A/B to SLOP 2nd I/V Glanc	0	0	0	0.000	0.000
460	From 14-PA-4 A/B to SLOP 2nd I/V D/S F	0	0	0	0.000	0.000
461	14-FV-1701 U/S I/V U/S Flange	0	0	0	0.000	0.000
462	14-FV-1701 U/S I/V Gland	0	0	0	0.000	0.000
463	14-FV-1701 U/S I/V D/S Flange	0	0	0	0.000	0.000
464	CBD Line 1st I/V Gland	0	0	0	0.000	0.000
465	CBD Line 2nd I/V Gland	0	0	0	0.000	0.000
466	CBD Line 3rd I/V Gland	0	0	0	0.000	0.000
467	Stainer Flange	0	0	0	0.000	0.000
468	14-FV-1701 C/V U/S Flange	0	0	0	0.000	0.000
469	14-FV-1701 C/V Gland	0	0	0	0.000	0.000
470	14-FV-1701 C/V D/S Flange	0	0	0	0.000	0.000
471	14-FV-1701 D/S I/V U/S Flange	0	0	0	0.000	0.000
472	14-FV-1701 D/S I/V Gland	0	0	0	0.000	0.000
473	14-FV-1701 D/S I/V D/S Flange	0	0	0	0.000	0.000
474	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
475	14-FV-1401 U/S I/V U/S Flange	0	0	0	0.000	0.000
476	14-FV-1401 U/S I/V Gland	0	0	0	0.000	0.000
477	14-FV-1401 U/S I/V D/S Flange	0	0	0	0.000	0.000
478	CBD Line 1st I/V Gland	0	0	0	0.000	0.000
479	CBD Line 2nd I/V Gland	0	0	0	0.000	0.000
480	CBD Line 3rd I/V Gland	0	0	0	0.000	0.000
481	Stainer Flange	0	0	0	0.000	0.000



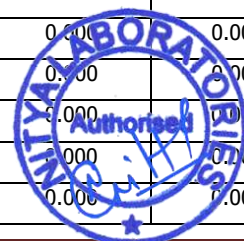
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**Issued To** Numaligarh Refinery Limited  
NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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482	14-FV-1401 C/V U/S Flange	0	0	0	0.000	0.000
483	14-FV-1401 C/V Gland	0	0	0	0.000	0.000
484	14-FV-1401 C/V D/S Flange	0	0	0	0.000	0.000
485	14-FV-1401 D/S I/V U/S Flange	0	0	0	0.000	0.000
486	14-FV-1401 D/S I/V Gland	0	0	0	0.000	0.000
487	14-FV-1401 D/S I/V D/S Flange	0	0	0	0.000	0.000
488	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
489	Bypass line IN Gland	0	0	0	0.000	0.000
490	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
491	From 14-PA-CF-001 Start Up line I/V U/S	0	0	0	0.000	0.000
492	From 14-PA-CF-001 Start Up line I/V Gland	0	0	0	0.000	0.000
493	From 14-PA-CF-001 Start Up line I/V D/S	0	0	0	0.000	0.000
494	Hydrogen From Unit 15 1st I/V Gland	0	0	0	0.000	0.000
495	Stainer Flange	0	0	0	0.000	0.000
496	Top Flange	0	0	0	0.000	0.000
497	Drain line I/V Gland	0	0	0	0.000	0.000
498	Drain line Safety Flange	0	0	0	0.000	0.000
499	Hydrogen From Unit 15 2nd I/V Gland	0	0	0	0.000	0.000
500	14-FV-1402 M/U to 14-vv-03 U/S Line I/	0	0	0	0.000	0.000
501	CBD line I/V Gland	0	0	0	0.000	0.000
502	14-FV-1402 C/V U/S Flange	0	0	0	0.000	0.000
503	14-FV-1402 C/V Gland	0	0	0	0.000	0.000
504	CBD line I/V Gland	0	0	0	0.000	0.000
505	14-FV-1402 D/S I/V Gland	0	0	0	0.000	0.000
506	Bypass line I/V Gland	0	0	0	0.000	0.000
507	Heavy Naptha From Unit-14 line 1st I/V	0	0	0	0.000	0.000
508	Heavy Naptha From Unit-14 line 1st I/V	0	0	0	0.000	0.000
509	Heavy Naptha From Unit-14 line 1st I/V	0	0	0	0.000	0.000
510	Heavy Naptha From Unit-14 line 2nd I/V	0	0	0	0.000	0.000
511	Heavy Naptha From Unit-14 line 2nd I/V	0	0	0	0.000	0.000
512	Feed Naptha To Unit-15 line U/S I/V U/S	0	0	0	0.000	0.000
513	Feed Naptha To Unit-15 line U/S I/V Gland	0	0	0	0.000	0.000
514	Feed Naptha To Unit-15 line U/S I/V D/S	0	0	0	0.000	0.000



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**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
515	NRV U/S Flange	0	0	0	0.000	0.000
516	NRV Top Flange	0	0	0	0.000	0.000
517	NRV 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	Feed Naptha To Unit-15 line D/S I/V U/S	0	0	0	0.000	0.000
521	Feed Naptha To Unit-15 line D/S I/V Gland	0	0	0	0.000	0.000
522	Feed Naptha To Unit-15 line D/S I/V D/S	0	0	0	0.000	0.000
523	S/U line (Reaction Section BP) line U/S I/	0	0	0	0.000	0.000
524	S/u line (Reaction Section BP) line U/S I/	0	0	0	0.000	0.000
525	S/U line (Reaction Section BP) line U/S I/	0	0	0	0.000	0.000
526	S/U line (Reaction Section BP) line D/S I/	0	0	0	0.000	0.000
527	S/U line (Reaction Section BP) line D/S I/	0	0	0	0.000	0.000
528	Hydrogen From PSA To 15-KA-001 Seal U	0	0	0	0.000	0.000
529	Hydrogen From PSA To 15-KA-001 Seal U	0	0	0	0.000	0.000
530	Hydrogen From PSA To 15-KA-001 Seal U	0	0	0	0.000	0.000
558	To-15-KA-001 Seal line D/S I/V D/S Flange	0	0	0	0.000	0.000





### Fugitive Emission Monitoring Survey Report

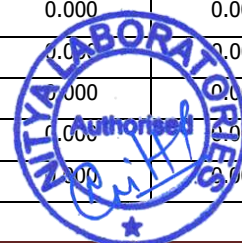
**Issued To** Numaligarh Refinery Limited  
 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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

Area	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
	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



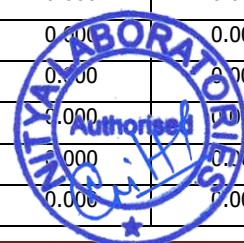
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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31	Pump Seal	0	0	0	0.000	0.000
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



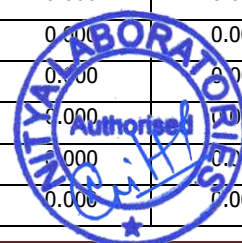
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Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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64	I/V Gland	0	0	0	0.000	0.000
65	I/V D/S Flange	0	0	0	0.000	0.000
66	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



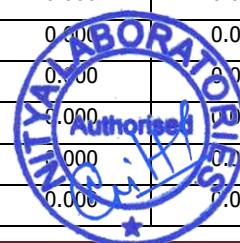
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Distt. Golaghat, Assam-785 699

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



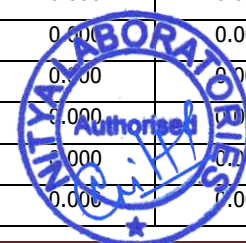
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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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
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	18PA104BSuction 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

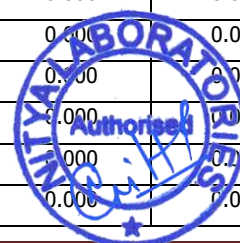


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



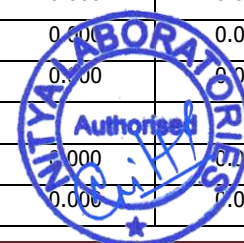
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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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
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
Area	T.No.43TTCR101A (Service MVGO)					
208	Level Indicator connecting 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
Area	T.No.43TTCR101B (Service MVGO)					
216	Level Indicator connecting 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
Area	T.No.43TTCR102 (Service HVGO)					
224	Level Indicator connecting Point	0	0	0	0.000	0.000
225	US line IV Gland	0	0	0	0.000	0.000



### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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
231	Meter line IV Gland	0	0	0	0.000	0.000





### Fugitive Emission Monitoring Survey Report

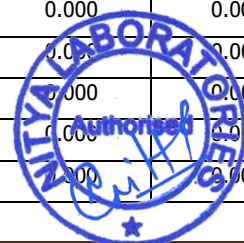
**Issued To** Numaligarh Refinery Limited  
 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



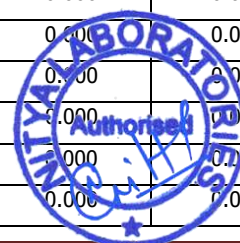
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



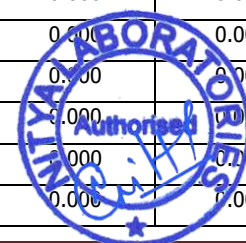
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



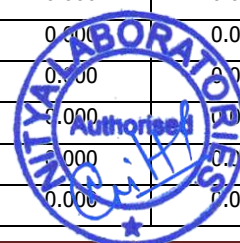
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



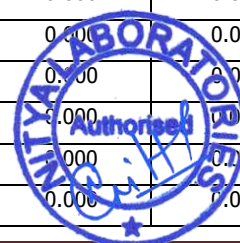
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



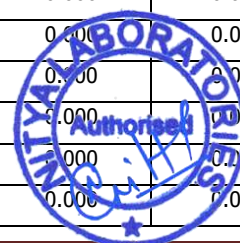
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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



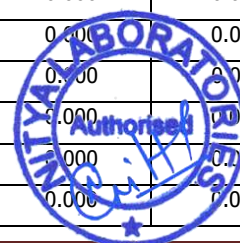
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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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
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
Area	Pump					
1	01-PA-103B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
2	01-PA-103B Suction Line I/V Gland	0	0	0	0.000	0.000
3	01-PA-103B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
4	Stainer Top Flange	0	0	0	0.000	0.000
5	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
6	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
7	Suction Line Flange	0	0	0	0.000	0.000
8	PumpSeal	0	0	0	0.000	0.000
9	Discharge Line Flange	0	0	0	0.000	0.000
10	Meter line 1st I/V Gland	0	0	0	0.000	0.000
11	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
12	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
13	NRV I/V U/S Flange	0	0	0	0.000	0.000
14	NRV Top Flange	0	0	0	0.000	0.000
15	NRV I/V D/S Flange	0	0	0	0.000	0.000
16	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
17	Discharge Line I/V Gland	0	0	0	0.000	0.000
18	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
19	Suction Line to Outside Line 1st I/V U/S	0	0	0	0.000	0.000
20	Suction Line to Outside Line 1st I/V Gland	0	0	0	0.000	0.000
21	Suction Line to Outside Line 1st I/V D/S	0	0	0	0.000	0.000



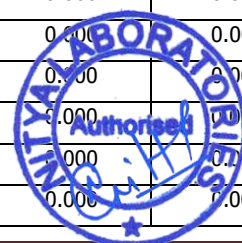
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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22	Suction Line to Outside Line 2nd I/V U/S	0	0	0	0.000	0.000
23	Suction Line to Outside Line 2nd I/V Gland	0	0	0	0.000	0.000
24	Suction Line to Outside Line 2nd I/V D/S	0	0	0	0.000	0.000
25	Suction Line to Outside Line 3rd I/V U/S	0	0	0	0.000	0.000
26	Suction Line to Outside Line 3rd I/V Gland	0	0	0	0.000	0.000
27	Suction Line to Outside Line 3rd I/V D/S	0	0	0	0.000	0.000
28	Stainer Flange	0	0	0	0.000	0.000
29	OWS Point	0	0	0	0.000	0.000
30	01-PA-103A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
31	01-PA-103A Suction Line I/V Gland	0	0	0	0.000	0.000
32	01-PA-103A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
33	Stainer Top Flange	0	0	0	0.000	0.000
34	Stainer Top Flange Drain Line Gland	0	0	0	0.000	0.000
35	Stainer Top Flange Drain Line Safety Flange	0	0	0	0.000	0.000
36	Suction Line Flange	0	0	0	0.000	0.000
37	Pump Seal	0	0	0	0.000	0.000
38	Discharge Line 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	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
42	NRV I/V U/S Flange	0	0	0	0.000	0.000
43	NRV Top Flange	0	0	0	0.000	0.000
44	NRV 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	Discharge Line I/V Gland	0	0	0	0.000	0.000
47	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
48	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
49	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
50	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
51	Stainer Flange	0	0	0	0.000	0.000
52	OWS Point	0	0	0	0.000	0.000
53	01-FV-4003 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
54	01-FV-4003 U/S Line I/V Gland	0	0	0	0.000	0.000





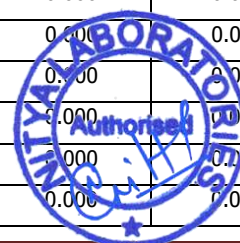
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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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55	01-FV-4003 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
56	Drain Line I/V Gland	0	0	0	0.000	0.000
57	Drain Line Safety Flange	0	0	0	0.000	0.000
58	01-FV-4003 C/V U/S Flange	0	0	0	0.000	0.000
59	01-FV-4003C/V Gland	0	0	0	0.000	0.000
60	01-FV-4003 C/V D/S Flange	0	0	0	0.000	0.000
61	Drain Line I/V Gland	0	0	0	0.000	0.000
62	Drain Line Safety Flange	0	0	0	0.000	0.000
63	01-FV-4003 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
64	01-FV-4003 D/S Line I/V Gland	0	0	0	0.000	0.000
65	01-FV-4003 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
66	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
67	Bypass Line I/V Gland	0	0	0	0.000	0.000
68	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
69	01-FV-3803 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
70	01-FV-3803 U/S Line I/V Gland	0	0	0	0.000	0.000
71	01-FV-3803 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
72	Drain Line I/V Gland	0	0	0	0.000	0.000
73	Drain Line Safety Flange	0	0	0	0.000	0.000
74	01-FV-3803 CI/V U/S Flange	0	0	0	0.000	0.000
75	01-FV-3803 C/V Gland	0	0	0	0.000	0.000
76	01-FV-3803 C/V D/S Flange	0	0	0	0.000	0.000
77	Drain Line I/V Gland	0	0	0	0.000	0.000
78	Drain Line Safety Flange	0	0	0	0.000	0.000
79	01-FV-3803 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
80	01-FV-3803 D/S Line I/V Gland	0	0	0	0.000	0.000
81	01-FV-3803 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
82	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
83	Bypass Line I/V Gland	0	0	0	0.000	0.000
84	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
85	01-FV-3901 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
86	01-FV-3901 U/S Line I/V Gland	0	0	0	0.000	0.000
87	01-FV-3901 U/S Line I/V D/S Flange	0	0	0	0.000	0.000

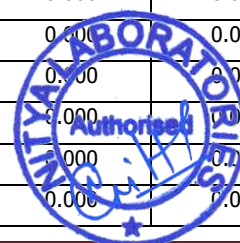


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Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
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Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
88	Drain Line I/V Gland	0	0	0	0.000	0.000
89	Drain Line Safety Flange	0	0	0	0.000	0.000
90	01-FV-3901 C/V U/S Flange	0	0	0	0.000	0.000
91	01-FV-3901 C/V Gland	0	0	0	0.000	0.000
92	01-FV-3901 C/V D/S Flange	0	0	0	0.000	0.000
93	Drain Line I/V Gland	0	0	0	0.000	0.000
94	Drain Line Safety Flange	0	0	0	0.000	0.000
95	01-FV-3901 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
96	01-FV-3901 D/S Line I/V Gland	0	0	0	0.000	0.000
97	01-FV-3901 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
98	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
99	Bypass Line I/V Gland	0	0	0	0.000	0.000
100	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
101	3.P.01.3916.A1A To EE-108Line I/V U/S	0	0	0	0.000	0.000
102	3.P.01.3916.A1A To EE-108Line I/V Gland	0	0	0	0.000	0.000
103	3.P.01.3916.A1A To EE-108Line I/V D/S	0	0	0	0.000	0.000
104	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
105	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
106	3.P.01.3916.A1A To Naptha Pool Line I/V	0	0	0	0.000	0.000
107	01-PR-101B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
108	01-PR-101B Suction Line I/V Gland	0	0	0	0.000	0.000
109	01-PR-101B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
110	Stainer Top Flange	0	0	0	0.000	0.000
111	Stainer Top Flange Drain Line I/V Gland	0	0	0	0.000	0.000
112	Stainer Top Flange Drain Line I/V Safety	0	0	0	0.000	0.000
113	Suction Line Flange	0	0	0	0.000	0.000
114	Pump Seal	0	0	0	0.000	0.000
115	Discharge Line Flange	0	0	0	0.000	0.000
116	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
117	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
118	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
119	NRV I/V U/S Flange	0	0	0	0.000	0.000
120	NRV Top Flange	0	0	0	0.000	0.000



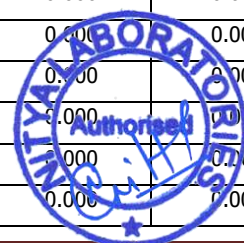
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Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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121	NRV I/V D/S Flange	0	0	0	0.000	0.000
122	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
123	Discharge Line I/V Gland	0	0	0	0.000	0.000
124	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
125	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
126	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
127	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
128	Stainer Flange	0	0	0	0.000	0.000
129	OWS Point	0	0	0	0.000	0.000
130	01-PA-101A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
131	01-PA-101A Suction Line I/V Gland	0	0	0	0.000	0.000
132	01-PA-101A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
133	Stainer Top Flange	0	0	0	0.000	0.000
134	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
135	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
136	Suction Line Flange	0	0	0	0.000	0.000
137	Pump Seal	0	0	0	0.000	0.000
138	Discharge Line Flange	0	0	0	0.000	0.000
139	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
140	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
141	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
142	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
143	Discharge Line I/V Gland	0	0	0	0.000	0.000
144	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
145	Suction Line To Outside Line 1st I/V U/S	0	0	0	0.000	0.000
146	Suction Line To Outside Line 1st I/V Gland	0	0	0	0.000	0.000
147	Suction Line To Outside Line 1st I/V D/S	0	0	0	0.000	0.000
148	Suction Line To Outside Line 2nd I/V U/S	0	0	0	0.000	0.000
149	Suction Line To Outside Line 2nd I/V Gland	0	0	0	0.000	0.000
150	Suction Line To Outside Line 2nd I/V D/S	0	0	0	0.000	0.000
151	Suction Line To Outside Line 3rd I/V U/S	0	0	0	0.000	0.000
152	Suction Line To Outside Line 3rd I/V Gland	0	0	0	0.000	0.000
153	Suction Line To Outside Line 3rd I/V D/S	0	0	0	0.000	0.000



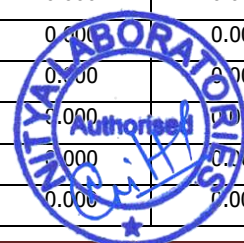
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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154	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
155	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
156	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
157	Stainer Flange	0	0	0	0.000	0.000
158	OWS Point	0	0	0	0.000	0.000
159	01-FV-3701 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
160	01-FV-3701 U/S Line I/V Gland	0	0	0	0.000	0.000
161	01-FV-3701 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
162	Drain Line I/V Gland	0	0	0	0.000	0.000
163	Drain Line Safety Flange	0	0	0	0.000	0.000
164	01-FV-3701 C/V U/S Flange	0	0	0	0.000	0.000
165	01-FV-3701 C/V Gland	0	0	0	0.000	0.000
166	01-FV-3701 C/V D/S Flange	0	0	0	0.000	0.000
167	Drain Line I/V Gland	0	0	0	0.000	0.000
168	Drain Line Safety Flange	0	0	0	0.000	0.000
169	01-FV-3701 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
170	01-FV-3701 D/S Line I/V Gland	0	0	0	0.000	0.000
171	01-FV-3701 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
172	Bypass Line I/V Gland	0	0	0	0.000	0.000
173	To Naptha Pool EX-PA-101 Line I/V U/S	0	0	0	0.000	0.000
174	To Naptha Pool EX-PA-101 Line I/V Gland	0	0	0	0.000	0.000
175	To Naptha Pool EX-PA-101 Line I/V D/S	0	0	0	0.000	0.000
176	Naptha To EE-109 EX-PA-101 Line I/V U/S	0	0	0	0.000	0.000
177	Naptha To EE-109 EX-PA-101 Line I/V Gland	0	0	0	0.000	0.000
178	Naptha To EE-109 EX-PA-101 Line I/V D/S	0	0	0	0.000	0.000
179	01-FV-4005 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
180	01-FV-4005 U/S Line I/V Gland	0	0	0	0.000	0.000
181	01-FV-4005 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
182	Drain Line I/V Gland	0	0	0	0.000	0.000
183	Drain Line Safety Flange	0	0	0	0.000	0.000
184	01-FV-4005 C/V U/S Flange	0	0	0	0.000	0.000
185	01-FV-4005 C/V Gland	0	0	0	0.000	0.000
186	01-FV-4005 C/V D/S Flange	0	0	0	0.000	0.000

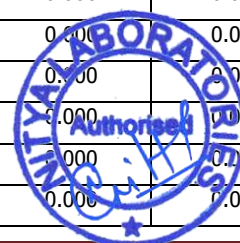


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
187	Drain Line I/V Gland	0	0	0	0.000	0.000
188	Drain Line Safety Flange	0	0	0	0.000	0.000
189	01-FV-4005 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
190	01-FV-4005 D/S Line I/V Gland	0	0	0	0.000	0.000
191	01-FV-4005 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
192	Bypass Line I/V Gland	0	0	0	0.000	0.000
193	01-PA-CF-012A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
194	01-PA-CF-012A Suction Line I/V Gland	0	0	0	0.000	0.000
195	01-PA-CF-012A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
196	Stainer Top Flange	0	0	0	0.000	0.000
197	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
198	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
199	Suction Line Flange	0	0	0	0.000	0.000
200	Pump Seal	0	0	0	0.000	0.000
201	Discharge Line Flange	0	0	0	0.000	0.000
202	NRV I/V U/S Flange	0	0	0	0.000	0.000
203	NRV Top Flange	0	0	0	0.000	0.000
204	NRV I/V D/S Flange	0	0	0	0.000	0.000
205	Meter Line 1st I/V Gland	0	0	0	0.000	0.000
206	Meter Line 2nd I/V Gland	0	0	0	0.000	0.000
207	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
208	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
209	Discharge Line I/V Gland	0	0	0	0.000	0.000
210	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
211	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
212	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
213	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
214	Stainer Flange	0	0	0	0.000	0.000
215	OWS Point	0	0	0	0.000	0.000
216	01-PV-04 Suction Line I/V U/S Flange	0	0	0	0.000	0.000
217	01-PV-04 Suction Line I/V Gland	0	0	0	0.000	0.000
218	01-PV-04 Suction Line I/V D/S Flange	0	0	0	0.000	0.000
219	Stainer Top Flange	0	0	0	0.000	0.000



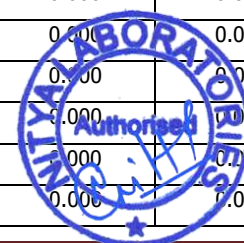
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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220	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
221	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
222	Suction Line Flange	0	0	0	0.000	0.000
223	Discharge Line 1st Flange	0	0	0	0.000	0.000
224	Discharge Line 2nd Flange	0	0	0	0.000	0.000
225	Meter Line I/V Gland	0	0	0	0.000	0.000
226	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
227	NRV I/V U/S Flange	0	0	0	0.000	0.000
228	NRV Top Flange	0	0	0	0.000	0.000
229	NRV I/V D/S Flange	0	0	0	0.000	0.000
230	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
231	Discharge Line I/V Gland	0	0	0	0.000	0.000
232	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
233	Drain Line I/V Gland	0	0	0	0.000	0.000
234	Drain Line Safety Flange	0	0	0	0.000	0.000
235	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
236	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
237	Stainer Flange	0	0	0	0.000	0.000
238	OWS Point	0	0	0	0.000	0.000
239	01-PV-04A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
240	01-PV-04A Suction Line I/V Gland	0	0	0	0.000	0.000
241	01-PV-04A Suction Line I/V D/S Flange	0	0	0	0.000	0.000
242	Stainer Top Flange	0	0	0	0.000	0.000
243	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
244	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
245	Suction Line Flange	0	0	0	0.000	0.000
246	Pump Seal	0	0	0	0.000	0.000
247	Discharge Line 1st Flange	0	0	0	0.000	0.000
248	Discharge Line 2nd Flange	0	0	0	0.000	0.000
249	Meter line I/V Gland	0	0	0	0.000	0.000
250	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
251	NRV I/V U/S Flange	0	0	0	0.000	0.000
252	NRV Top Flange	0	0	0	0.000	0.000



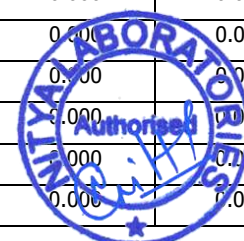
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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253	NRV I/V D/S Flange	0	0	0	0.000	0.000
254	Drain Line I/V Gland	0	0	0	0.000	0.000
255	Drain Line Safety Flange	0	0	0	0.000	0.000
256	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
257	Discharge Line I/V Gland	0	0	0	0.000	0.000
258	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
259	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
260	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
261	Stainer Flange	0	0	0	0.000	0.000
262	OWS Point	0	0	0	0.000	0.000
263	01-PA-CF-013-B Suction Line I/V U/S Flange	0	0	0	0.000	0.000
264	01-PA-CF-013-B Suction Line I/V Gland	0	0	0	0.000	0.000
265	01-PA-CF-013-B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
266	Stainer Top Flange	0	0	0	0.000	0.000
267	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
268	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
269	Suction Line Flange	0	0	0	0.000	0.000
270	Pump Seal	0	0	0	0.000	0.000
271	Discharge Line 1st Flange	0	0	0	0.000	0.000
272	Discharge Line 2nd Flange	0	0	0	0.000	0.000
273	Meter line I/V Gland	0	0	0	0.000	0.000
274	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
275	NRV I/V U/S Flange	0	0	0	0.000	0.000
276	NRV Top Flange	0	0	0	0.000	0.000
277	NRV I/V D/S Flange	0	0	0	0.000	0.000
278	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
279	Discharge Line I/V Gland	0	0	0	0.000	0.000
280	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
281	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
282	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
283	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
284	Stainer Flange	0	0	0	0.000	0.000
285	OWS Point	0	0	0	0.000	0.000



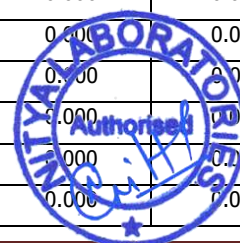
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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286	01-PA-CF-013-A Suction Line I/V U/S Flange	0	0	0	0.000	0.000
287	01-PA-CF-013-B Suction Line I/V Gland	0	0	0	0.000	0.000
288	01-PA-CF-013-B Suction Line I/V D/S Flange	0	0	0	0.000	0.000
289	Stainer Top Flange	0	0	0	0.000	0.000
290	Stainer Top Flange I/V Gland	0	0	0	0.000	0.000
291	Stainer Top Flange Safety Flange	0	0	0	0.000	0.000
292	Suction Line Flange	0	0	0	0.000	0.000
293	Pump Seal	0	0	0	0.000	0.000
294	Discharge Line 1st Flange	0	0	0	0.000	0.000
295	Discharge Line 2nd Flange	0	0	0	0.000	0.000
296	Meter line I/V Gland	0	0	0	0.000	0.000
297	Meter line Sampling Point I/V Gland	0	0	0	0.000	0.000
298	NRV I/V U/S Flange	0	0	0	0.000	0.000
299	NRV Top Flange	0	0	0	0.000	0.000
300	NRV I/V D/S Flange	0	0	0	0.000	0.000
301	Discharge Line I/V U/S Flange	0	0	0	0.000	0.000
302	Discharge Line I/V Gland	0	0	0	0.000	0.000
303	Discharge Line I/V D/S Flange	0	0	0	0.000	0.000
304	Pump to Drain Line 1st I/V Gland	0	0	0	0.000	0.000
305	Pump to Drain Line 2nd I/V Gland	0	0	0	0.000	0.000
306	Pump to Drain Line 3rd I/V Gland	0	0	0	0.000	0.000
307	Stainer Flange	0	0	0	0.000	0.000
308	OWS Point	0	0	0	0.000	0.000
309	01-FV-1505 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
310	01-FV-1505 U/S Line I/V Gland	0	0	0	0.000	0.000
311	01-FV-1505 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
312	Drain Line I/V Gland	0	0	0	0.000	0.000
313	Drain Line Safety Flange	0	0	0	0.000	0.000
314	01-FV-1505 C/V U/S Flange	0	0	0	0.000	0.000
315	01-FV-1505 C/V Gland	0	0	0	0.000	0.000
316	01-FV-1505 C/V D/S Flange	0	0	0	0.000	0.000
317	01-FV-1505 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
318	01-FV-1505 D/S Line I/V Gland	0	0	0	0.000	0.000





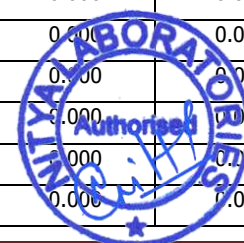
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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319	01-FV-1505 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
320	Bypass Line I/V U/S Flange	0	0	0	0.000	0.000
321	Bypass Line I/V U/S Gland	0	0	0	0.000	0.000
322	Bypass Line I/V D/S Flange	0	0	0	0.000	0.000
323	01-PV-2002 U/S line I/V Gland	0	0	0	0.000	0.000
324	Drain Line I/V Gland	0	0	0	0.000	0.000
325	Drain Line Safety Flange	0	0	0	0.000	0.000
326	01-PV-2002 D/S line I/V Gland	0	0	0	0.000	0.000
327	Drain Line I/V Gland	0	0	0	0.000	0.000
328	Drain Line Safety Flange	0	0	0	0.000	0.000
329	Bypass Line I/V Gland	0	0	0	0.000	0.000
330	01-PV-1402 U/S line I/V Gland	0	0	0	0.000	0.000
331	Drain Line I/V Gland	0	0	0	0.000	0.000
332	Drain Line Safety Flange	0	0	0	0.000	0.000
333	01-PV-1402 C/V Gland	0	0	0	0.000	0.000
334	01-PV-1402 D/S Line I/V Gland	0	0	0	0.000	0.000
335	Drain Line I/V Gland	0	0	0	0.000	0.000
336	Drain Line Safety Flange	0	0	0	0.000	0.000
337	Bypass Line I/V Gland	0	0	0	0.000	0.000
338	01-PV-1401 U/S Line I/V Gland	0	0	0	0.000	0.000
339	Drain Line I/V Gland	0	0	0	0.000	0.000
340	Drain Line Safety Flange	0	0	0	0.000	0.000
341	01-PV-1401 C/V U/S Flange	0	0	0	0.000	0.000
342	01-PV-1401 C/V Gland	0	0	0	0.000	0.000
343	01-PV-1401 C/V D/S Flange	0	0	0	0.000	0.000
344	01-PV-1401 D/S Line I/V Gland	0	0	0	0.000	0.000
345	Drain Line I/V Gland	0	0	0	0.000	0.000
346	Drain Line Safety Flange	0	0	0	0.000	0.000
347	Bypass Line I/V Gland	0	0	0	0.000	0.000
348	01-SDV-1401 C/V U/S Flange	0	0	0	0.000	0.000
349	01-SDV-1401 C/V Gland	0	0	0	0.000	0.000
350	01-SDV-1401 C/V D/S Flange	0	0	0	0.000	0.000
351	Drain Line I/V Gland	0	0	0	0.000	0.000



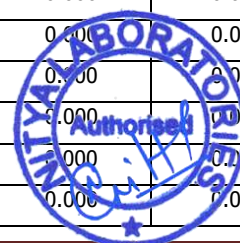
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**Issued To** Numaligarh Refinery Limited  
NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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352	Drain Line Safety Flange	0	0	0	0.000	0.000
353	01-FV-3804 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
354	01-FV-3804 D/S Line I/V Gland	0	0	0	0.000	0.000
355	01-FV-3804 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
356	01-FV-3804 C/V U/S Flange	0	0	0	0.000	0.000
357	01-FV-3804 C/V Gland	0	0	0	0.000	0.000
358	01-FV-3804 C/V D/S Flange	0	0	0	0.000	0.000
359	01-FV-2702 C/V U/S Flange	0	0	0	0.000	0.000
360	01-FV-2702 C/V Gland	0	0	0	0.000	0.000
361	01-FV-2702 C/V D/S Flange	0	0	0	0.000	0.000
362	01-FV-1702 C/V U/S Flange	0	0	0	0.000	0.000
363	01-FV-1702 C/V Gland	0	0	0	0.000	0.000
364	01-FV-1702 C/V D/S Flange	0	0	0	0.000	0.000
365	Drain Line I/V Gland	0	0	0	0.000	0.000
366	Drain Line Safety Flange	0	0	0	0.000	0.000
Area	Furnace					
1	B.No. - 1 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
2	B.No. - 1 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
3	B.No. - 1 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
4	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
5	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
6	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
7	B.No. - 2 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
8	B.No. - 2 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
9	B.No. - 2 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
10	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
11	B.No. - 3 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
12	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
13	B.No. - 4 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
14	B.No. - 4 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
15	B.No. - 4 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
16	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
17	Pilot Gas line I/V Gland	0	0	0	0.000	0.000



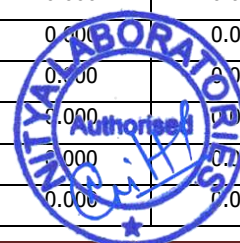
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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18	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
19	B.No. - 5 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
20	B.No. - 5 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
21	B.No. - 5 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
22	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
23	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
24	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
25	B.No. - 6 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
26	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
27	B.No. - 7 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
28	B.No. - 7 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
29	B.No. - 7 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
30	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
31	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
32	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
33	B.No. - 8 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
34	B.No. - 8 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
35	B.No. - 8 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
36	Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
37	Pilot Gas line I/V Gland	0	0	0	0.000	0.000
38	Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
39	B.No. - 1 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
40	B.No. - 1 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
41	B.No. - 1 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
42	B.No. - 1 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
43	B.No. - 1 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
44	B.No. - 1 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
45	B.No. - 2 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
46	B.No. - 2 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
47	B.No. - 2 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
48	B.No. - 2 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
49	B.No. - 3 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
50	B.No. - 3 Pilot Gas line I/V Gland	0	0	0	0.000	0.000



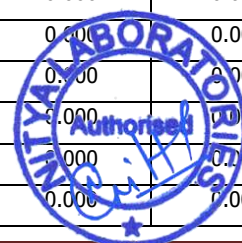
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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51	B.No. - 3 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
52	B.No. - 3 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
53	B.No. - 4 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
54	B.No. - 4 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
55	B.No. - 5 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
56	B.No. - 5 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
57	B.No. - 5 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
58	B.No. - 5 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
59	B.No. - 6 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
60	B.No. - 6 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
61	B.No. - 6 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
62	B.No. - 6 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
63	B.No. - 6 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
64	B.No. - 6 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
65	B.No. - 7 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
66	B.No. - 7 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
67	B.No. - 7 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
68	B.No. - 7 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
69	B.No. - 7 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
70	B.No. - 7 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
71	B.No. - 8 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
72	B.No. - 8 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
73	B.No. - 8 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
74	B.No. - 8 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
75	B.No. - 8 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
76	B.No. - 8 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
77	B.No. - 9 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
78	B.No. - 9 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
79	B.No. - 9 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
80	B.No. - 9 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
81	B.No. - 9 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
82	B.No. - 9 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
83	B.No. - 10 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000



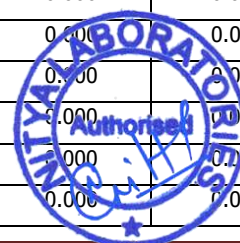
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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84	B.No. - 10 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
85	B.No. - 10 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
86	B.No. - 10 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
87	B.No. - 10 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
88	B.No. - 10 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
89	B.No. - 11 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
90	B.No. - 11 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
91	B.No. - 11 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
92	B.No. - 11 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
93	B.No. - 11 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
94	B.No. - 11 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
95	B.No. - 12 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
96	B.No. - 12 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
97	B.No. - 12 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
98	B.No. - 12 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
99	B.No. - 12 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
100	B.No. - 12 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
101	B.No. - 13 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
102	B.No. - 13 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
103	B.No. - 13 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
104	B.No. - 13 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
105	B.No. - 13 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
106	B.No. - 13 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
107	B.No. - 14 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
108	B.No. - 14 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
109	B.No. - 14 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
110	B.No. - 14 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
111	B.No. - 14 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
112	B.No. - 14 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
113	B.No. - 15 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
114	B.No. - 15 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
115	B.No. - 15 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
116	B.No. - 15 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000



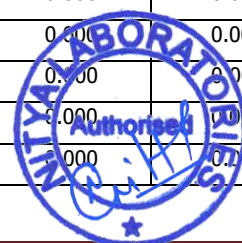
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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117	B.No. - 15 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
118	B.No. - 15 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
119	B.No. - 16 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
120	B.No. - 16 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
121	B.No. - 16 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
122	B.No. - 16 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
123	B.No. - 16 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
124	B.No. - 16 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
125	B.No. - 17 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
126	B.No. - 17 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
127	B.No. - 17 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
128	B.No. - 17 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
129	B.No. - 17 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
130	B.No. - 17 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
131	B.No. - 18 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
132	B.No. - 18 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
133	B.No. - 18 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
134	B.No. - 18 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
135	B.No. - 18 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
136	B.No. - 18 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
137	B.No. - 19 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
138	B.No. - 19 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
139	B.No. - 19 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
140	B.No. - 19 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
141	B.No. - 19 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
142	B.No. - 19 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
143	B.No. - 20 Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
144	B.No. - 20 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
145	B.No. - 20 Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
146	B.No. - 20 Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
147	B.No. - 20 Fuel Gas line I/V Gland	0	0	0	0.000	0.000
148	B.No. - 20 Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000



### Fugitive Emission Monitoring Survey Report

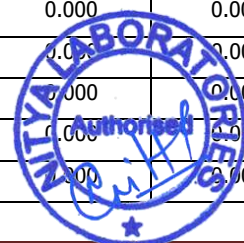
**Issued To**    **Numaligarh Refinery Limited**  
 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:**                    August 2022  
**Customer Reference No.:**    4600008282-NIR/26.08.2021

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

Area	B/L					
1	LPG Inlet line U/S I/V Gland	0	0	0	0.000	0.000
2	Stealer Flange	0	0	0	0.000	0.000
3	Drain line I/V Gland	0	0	0	0.000	0.000
4	Drain line Safety Flange	0	0	0	0.000	0.000
5	Top Flange	0	0	0	0.000	0.000
6	LPG Inlet line D/S I/V Gland	0	0	0	0.000	0.000
7	P.G. Meter line Gland	0	0	0	0.000	0.000
8	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
9	Vent line I/V Gland	0	0	0	0.000	0.000
10	Vent line Safety Flange	0	0	0	0.000	0.000
11	Naptha to Offsite line 1st I/V U/S Flange	0	0	0	0.000	0.000
12	Naptha to Offsite line 1st I/V Gland	0	0	0	0.000	0.000
13	Naptha to Offsite line 1st I/V D/S Flange	0	0	0	0.000	0.000
14	Stealer Flange	0	0	0	0.000	0.000
15	Naptha to Offsite line 2nd I/V U/S Flange	0	0	0	0.000	0.000
16	Naptha to Offsite line 2nd I/V Gland	0	0	0	0.000	0.000
17	Naptha to Offsite line 2nd I/V D/S Flange	0	0	0	0.000	0.000
18	Vent line I/V Gland	0	0	0	0.000	0.000
19	Vent line Safety Flange	0	0	0	0.000	0.000
20	Inter gas Inlet line U/S I/V U/S Flange	0	0	0	0.000	0.000
21	Inter gas inlet line U/S I/V Gland	0	0	0	0.000	0.000
22	Inter gas Inlet line U/S I/V D/S Flange	0	0	0	0.000	0.000
23	Drain line I/V Gland	0	0	0	0.000	0.000
24	Drain line Safety Flange	0	0	0	0.000	0.000
25	Inter gas Inlet line D/S I/V U/S Flange	0	0	0	0.000	0.000
26	Inter gas Inlet line D/S I/V Gland	0	0	0	0.000	0.000
27	Inter gas Inlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
28	Vent line I/V Gland	0	0	0	0.000	0.000
29	Vent line Safety Flange	0	0	0	0.000	0.000
30	FG to Unit Inlet line D/S I/V U/S Flange	0	0	0	0.000	0.000



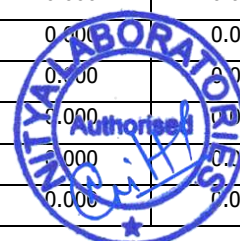
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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31	FG to Unit Inlet line D/S I/V Gland	0	0	0	0.000	0.000
32	FG to Unit Inlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
33	FG to Unit Inlet line U/S I/V Gland	0	0	0	0.000	0.000
34	Vent line I/V Gland	0	0	0	0.000	0.000
35	Vent line Safety Flange	0	0	0	0.000	0.000
36	VV-9 DISCH HDR Outlet line I/V U/S Flange	0	0	0	0.000	0.000
37	VV-9 DISCH HDR Outlet line I/V Gland	0	0	0	0.000	0.000
38	VV-9 DISCH HDR Outlet line I/V D/S Flange	0	0	0	0.000	0.000
39	Drain line I/V Gland	0	0	0	0.000	0.000
40	Drain line Safety Flange	0	0	0	0.000	0.000
41	NRV U/S Flange	0	0	0	0.000	0.000
42	NRV Top Flange	0	0	0	0.000	0.000
43	NRV D/S Flange	0	0	0	0.000	0.000
44	Drain line I/V Gland	0	0	0	0.000	0.000
45	Drain line Safety Flange	0	0	0	0.000	0.000
46	GO TO IFO HDR line 1st I/V Gland	0	0	0	0.000	0.000
47	Drain line I/V Gland	0	0	0	0.000	0.000
48	Drain line Safety Flange	0	0	0	0.000	0.000
49	Stealer Flange	0	0	0	0.000	0.000
50	GO TO IFO HDR line 2nd I/V Gland	0	0	0	0.000	0.000
	03-PA-48A					
51	Suction line I/V U/S Flange	0	0	0	0.000	0.000
52	Suction line I/V Gland	0	0	0	0.000	0.000
53	Suction line I/V D/S Flange	0	0	0	0.000	0.000
54	Stainer Top Flange	0	0	0	0.000	0.000
55	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
56	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
57	Suction line Flange	0	0	0	0.000	0.000
58	Pump Seal	0	0	0	0.000	0.000
59	Discharge line Flange	0	0	0	0.000	0.000
60	Vent line I/V Gland	0	0	0	0.000	0.000
61	Vent line Safety Flange	0	0	0	0.000	0.000
62	1st Stainer Flange	0	0	0	0.000	0.000





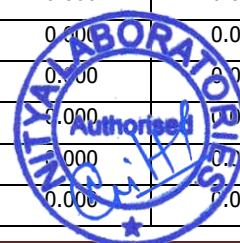
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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63	2nd Stainer Flange	0	0	0	0.000	0.000
64	Drain line I/V Gland	0	0	0	0.000	0.000
65	Drain line Safety Flange	0	0	0	0.000	0.000
66	Discharge line Flange	0	0	0	0.000	0.000
67	03-SDV-1704-U/S I/V Gland	0	0	0	0.000	0.000
68	Stainer Flange	0	0	0	0.000	0.000
69	OWS point	0	0	0	0.000	0.000
70	03-SDV-1704-C/V I/V Gland	0	0	0	0.000	0.000
71	03-SDV-1704-C/V Gland	0	0	0	0.000	0.000
72	03-SDV-1704-C/V D/S Flange	0	0	0	0.000	0.000
73	03-SDV-1704-D/S I/V Gland	0	0	0	0.000	0.000
74	03-PV-1706-U/S I/V Gland	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	03-PV-1706- C/V U/S Flange	0	0	0	0.000	0.000
78	03-PV-1706- C/V Gland	0	0	0	0.000	0.000
79	03-PV-1706- C/V D/S Flange	0	0	0	0.000	0.000
80	Drain line I/V Gland	0	0	0	0.000	0.000
81	03-PV-1706- C/V D/S Flange	0	0	0	0.000	0.000
82	Bypass line 1st I/V Gland	0	0	0	0.000	0.000
83	Sampling line 1st I/V Gland	0	0	0	0.000	0.000
84	Sampling line 2nd I/V Gland	0	0	0	0.000	0.000
85	LPG to Coaleser line U/S I/V Gland	0	0	0	0.000	0.000
86	Sampling line I/V Gland	0	0	0	0.000	0.000
87	LPG to Coaleser line D/S I/V Gland	0	0	0	0.000	0.000
88	LPG to Coaleser line I/V Gland	0	0	0	0.000	0.000
89	Sampling line 1st I/V Gland	0	0	0	0.000	0.000
90	Sampling line 2nd I/V Gland	0	0	0	0.000	0.000
91	Sampling line 3rd I/V Gland	0	0	0	0.000	0.000
92	Bypass line 1st I/V Gland	0	0	0	0.000	0.000
93	03-HV-I701 U/S I/V Gland	0	0	0	0.000	0.000
94	Drain line I/V Gland	0	0	0	0.000	0.000
95	Drain line Safety Flange	0	0	0	0.000	0.000

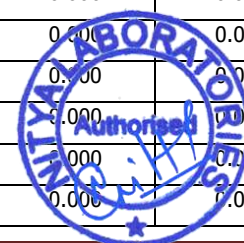


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
96	03-HV-1701 C/V U/S Flange	0	0	0	0.000	0.000
97	03-HV-1701 C/V Gland	0	0	0	0.000	0.000
98	03-HV-1701 C/V D/S Flange	0	0	0	0.000	0.000
99	Drain line I/V Gland	0	0	0	0.000	0.000
100	Drain line Safety Flange	0	0	0	0.000	0.000
101	03-HV-1701 D/S I/V Gland	0	0	0	0.000	0.000
102	Bypass line 1st I/V Gland	0	0	0	0.000	0.000
103	03-PA-0016-A-Suction line I/V U/S Flange	0	0	0	0.000	0.000
104	03-PA-0016-A-Suction line I/V Gland	0	0	0	0.000	0.000
105	03-PA-0016-A-Suction line I/V D/S Flange	0	0	0	0.000	0.000
106	Stainer Top Flange	0	0	0	0.000	0.000
107	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
108	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
109	Suction line Flange	0	0	0	0.000	0.000
110	Pump Seal	0	0	0	0.000	0.000
111	Discharge line Flange	0	0	0	0.000	0.000
112	P.G. Meter I/V Gland	0	0	0	0.000	0.000
113	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
114	NRV U/S Flange	0	0	0	0.000	0.000
115	NRV Top Flange	0	0	0	0.000	0.000
116	NRV D/S Flange	0	0	0	0.000	0.000
117	Drain line I/V Gland	0	0	0	0.000	0.000
118	Drain line Safety Flange	0	0	0	0.000	0.000
119	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
120	Discharge line I/V Gland	50	2.5	25000	0.101	884.760
121	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
122	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
123	Stainer Flange	0	0	0	0.000	0.000
124	Drain line I/V Gland	0	0	0	0.000	0.000
125	OWS point	0	0	0	0.000	0.000
126	03-PA-00-16-B-Suction line I/V U/S Flange	0	0	0	0.000	0.000
127	03-PA-00-16-B-Suction line I/V Gland	0	0	0	0.000	0.000
128	03-PA-00-16-B-Suction line I/V D/S Flange	0	0	0	0.000	0.000



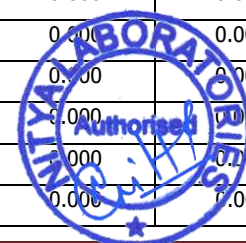
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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129	Stainer Top Flange	0	0	0	0.000	0.000
130	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
131	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
132	Suction line Flange	0	0	0	0.000	0.000
133	Pump Seal	0	0	0	0.000	0.000
134	Discharge line Flange	0	0	0	0.000	0.000
135	P.G. Meter I/V Gland	0	0	0	0.000	0.000
136	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
137	NRV U/S Flange	0	0	0	0.000	0.000
138	NRV Top Flange	0	0	0	0.000	0.000
139	NRV D/S Flange	0	0	0	0.000	0.000
140	Drain line I/V Gland	0	0	0	0.000	0.000
141	Drain line Safety Flange	0	0	0	0.000	0.000
142	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
143	Discharge line I/V Gland	0	0	0	0.000	0.000
144	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
145	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
146	Stainer Flange	0	0	0	0.000	0.000
147	Drain line I/V Gland	0	0	0	0.000	0.000
148	Drain line Safety Flange	0	0	0	0.000	0.000
149	OWS Point	0	0	0	0.000	0.000
	03-PA-00-018A					
150	Suction line I/V U/S Flange	0	0	0	0.000	0.000
151	Suction line I/V Gland	0	0	0	0.000	0.000
152	Suction line I/V D/S Flange	0	0	0	0.000	0.000
153	Stainer Top Flange	0	0	0	0.000	0.000
154	Drain line I/V Gland	0	0	0	0.000	0.000
155	Drain line Safety Flange	0	0	0	0.000	0.000
156	Suction line Flange	0	0	0	0.000	0.000
157	Pump Seal	0	0	0	0.000	0.000
158	Discharge line Flange	0	0	0	0.000	0.000
159	P.G. Meter I/V Gland	0	0	0	0.000	0.000
160	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000



### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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161	NRV U/S Flange	0	0	0	0.000	0.000
162	NRV Top Flange	0	0	0	0.000	0.000
163	NRV D/S Flange	0	0	0	0.000	0.000
164	Drain line I/V Gland	0	0	0	0.000	0.000
165	Drain line Safety Flange	0	0	0	0.000	0.000
166	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
167	Discharge line I/V Gland	0	0	0	0.000	0.000
168	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
169	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
170	Stainer Flange	0	0	0	0.000	0.000
171	Pump to CBD line 2nd I/V Gland	0	0	0	0.000	0.000
172	Stainer Flange	0	0	0	0.000	0.000
173	Pump to CBD line 3rd I/V Gland	0	0	0	0.000	0.000
174	Pump to Drain line Stainer Flange	0	0	0	0.000	0.000
175	OWS Point	0	0	0	0.000	0.000
176	To Flare HDR line U/S I/V Gland	0	0	0	0.000	0.000
177	Stainer Flange	0	0	0	0.000	0.000
178	To Flare HDR line D/S I/V Gland	0	0	0	0.000	0.000
179	03-PA-00-18-B Suction line I/V U/S Flange	0	0	0	0.000	0.000
180	03-PA-00-18-B Suction line I/V Gland	0	0	0	0.000	0.000
181	03-PA-00-18-B Suction line I/V D/S Flange	0	0	0	0.000	0.000
182	Stainer Top Flange	0	0	0	0.000	0.000
183	Drain line I/V Gland	0	0	0	0.000	0.000
184	Drain line Safety Flange	0	0	0	0.000	0.000
185	Suction line Flange	0	0	0	0.000	0.000
186	Pump Seal	0	0	0	0.000	0.000
187	Discharge line Flange	0	0	0	0.000	0.000
188	P. G. Meter I/V Gland	0	0	0	0.000	0.000
189	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
190	NRV U/S Flange	0	0	0	0.000	0.000
191	NRV Top Flange	0	0	0	0.000	0.000
192	NRV D/S Flange	0	0	0	0.000	0.000
193	Drain line I/V Gland	0	0	0	0.000	0.000



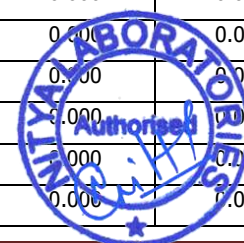
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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194	Drain line Safety Flange	0	0	0	0.000	0.000
195	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
196	Discharge line I/V Gland	0	0	0	0.000	0.000
197	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
198	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
199	Stainer Flange	0	0	0	0.000	0.000
200	Pump to CBD line 2nd I/V Gland	0	0	0	0.000	0.000
201	Stainer Flange	0	0	0	0.000	0.000
202	Pump to drain line Stainer Flange	0	0	0	0.000	0.000
203	OWS Point	0	0	0	0.000	0.000
Area	Pump					
1	03-FV-1601-West Side line I/V U/S Flange	0	0	0	0.000	0.000
2	03-FV-1601-West Side line I/V Gland	0	0	0	0.000	0.000
3	03-FV-1601-West Side line 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	03-FV-1601-West Side line C/V U/S Flange	0	0	0	0.000	0.000
7	03-FV-1601-West Side line C/V Gland	0	0	0	0.000	0.000
8	03-FV-1601-West Side line C/V D/S Flange	0	0	0	0.000	0.000
9	Drain line I/V Gland	0	0	0	0.000	0.000
10	Drain line Safety Flange	0	0	0	0.000	0.000
11	03-FV-1601-East Side line I/V U/S Flange	0	0	0	0.000	0.000
12	03-FV-1601-East Side line I/V Gland	0	0	0	0.000	0.000
13	03-FV-1601-East Side line I/V D/S Flange	0	0	0	0.000	0.000
14	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
15	Bypass line I/V Gland	0	0	0	0.000	0.000
16	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
17	CBD line Stainer Flange	0	0	0	0.000	0.000
18	CBD line I/V Gland	0	0	0	0.000	0.000
19	03-FV-1605- U/S I/V U/S Flange	0	0	0	0.000	0.000
20	03-FV-1605- U/S I/V Gland	0	0	0	0.000	0.000
21	03-FV-1605- U/S I/V D/S Flange	0	0	0	0.000	0.000
22	Drain line I/V Gland	0	0	0	0.000	0.000



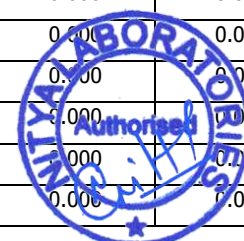
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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23	Drain line Safety Flange	0	0	0	0.000	0.000
24	03-FV-1605- C/V U/S Flange	0	0	0	0.000	0.000
25	03-FV-1605- C/V Gland	0	0	0	0.000	0.000
26	03-FV-1605- C/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	03-FV-1605- D/S I/V U/S Flange	0	0	0	0.000	0.000
30	03-FV-1605- D/S I/V Gland	0	0	0	0.000	0.000
31	03-FV-1605- D/S I/V D/S Flange	0	0	0	0.000	0.000
32	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
33	Bypass line I/V Gland	0	0	0	0.000	0.000
34	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
35	03-FV-1602- U/S I/V Gland	0	0	0	0.000	0.000
36	Drain line I/V Gland	0	0	0	0.000	0.000
37	Drain line Safety Flange	0	0	0	0.000	0.000
38	03-FV-1602- C/V U/S Flange	0	0	0	0.000	0.000
39	03-FV-1602- C/V Gland	30	1.5	15000	0.057	499.320
40	03-FV-1602- C/V D/S Flange	0	0	0	0.000	0.000
41	Drain line I/V Gland	0	0	0	0.000	0.000
42	Drain line Safety Flange	0	0	0	0.000	0.000
43	03-FV-1602- D/S I/V Gland	0	0	0	0.000	0.000
44	Bypass line I/V Flange	0	0	0	0.000	0.000
45	Bypass line I/V Gland	0	0	0	0.000	0.000
46	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	03-PA-00-021 A					
47	Suction line I/V U/S Flange	0	0	0	0.000	0.000
48	Suction line I/V Gland	0	0	0	0.000	0.000
49	Suction line I/V D/S Flange	0	0	0	0.000	0.000
50	Stainer Top Flange	0	0	0	0.000	0.000
51	Drain line I/V Gland	0	0	0	0.000	0.000
52	Drain line Safety Flange	0	0	0	0.000	0.000
53	Suction line Flange	0	0	0	0.000	0.000
54	Pump Seal	0	0	0	0.000	0.000



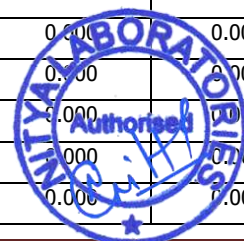
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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55	Discharge line Flange	0	0	0	0.000	0.000
56	P.G. Meter I/V Gland	0	0	0	0.000	0.000
57	P.G. Meter 2nd I/V Gland	0	0	0	0.000	0.000
58	NRV U/S Flange	0	0	0	0.000	0.000
59	NRV Top Flange	0	0	0	0.000	0.000
60	NRV D/S Flange	0	0	0	0.000	0.000
61	Drain line I/V Gland	0	0	0	0.000	0.000
62	Drain line Safety Flange	0	0	0	0.000	0.000
63	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
64	Discharge line I/V Gland	0	0	0	0.000	0.000
65	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
66	CBD line I/V Gland	0	0	0	0.000	0.000
67	Stainer Flange	0	0	0	0.000	0.000
68	Drain line I/V Gland	0	0	0	0.000	0.000
69	Drain line Safety Flange	0	0	0	0.000	0.000
70	OWS Point	0	0	0	0.000	0.000
	03-PA-00-021B					
71	Suction line I/V U/S Flange	0	0	0	0.000	0.000
72	Suction line I/V Gland	0	0	0	0.000	0.000
73	Suction line I/V D/S Flange	0	0	0	0.000	0.000
74	Stainer 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	Suction line Flange	0	0	0	0.000	0.000
78	Pump Seal	0	0	0	0.000	0.000
79	Discharge line Flange	0	0	0	0.000	0.000
80	P.G. Meter I/V Gland	0	0	0	0.000	0.000
81	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
82	NRV U/S Flange	0	0	0	0.000	0.000
83	NRV Top Flange	0	0	0	0.000	0.000
84	NRV D/S Flange	0	0	0	0.000	0.000
85	Drain line I/V Gland	0	0	0	0.000	0.000
86	Drain line Safety Flange	0	0	0	0.000	0.000

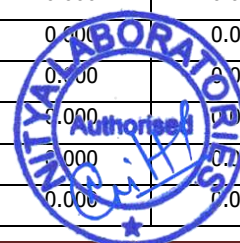


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
87	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
88	Discharge line I/V Gland	0	0	0	0.000	0.000
89	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
90	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
91	Stainer Flange	0	0	0	0.000	0.000
92	Drain line I/V Gland	0	0	0	0.000	0.000
93	Drain line Safety Flange	0	0	0	0.000	0.000
94	OWS Point	0	0	0	0.000	0.000
95	03-FV-1503-U/S I/V U/S Flange	0	0	0	0.000	0.000
96	03-FV-1503-U/S I/V Gland	0	0	0	0.000	0.000
97	03-FV-1503-U/S 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	03-FV-1503-C/V U/S Flange	0	0	0	0.000	0.000
101	03-FV-1503-C/V Gland	0	0	0	0.000	0.000
102	03-FV-1503-C/V D/S Flange	0	0	0	0.000	0.000
103	Drain line I/V Gland	0	0	0	0.000	0.000
104	Drain line Safety Flange	0	0	0	0.000	0.000
105	03-FV-1503-D/S I/V U/S Flange	0	0	0	0.000	0.000
106	03-FV-1503-D/S I/V Gland	0	0	0	0.000	0.000
107	03-FV-1503-D/S I/V D/S Flange	0	0	0	0.000	0.000
108	03-FV-1503- Bypass line I/V U/S Flange	0	0	0	0.000	0.000
109	03-FV-1503- Bypass line I/V Gland	0	0	0	0.000	0.000
110	03-FV-1503- Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	03-PA-00-00-020A					
111	Suction line I/V U/S Flange	0	0	0	0.000	0.000
112	Suction line I/V Gland	0	0	0	0.000	0.000
113	Suction line I/V D/S Flange	0	0	0	0.000	0.000
114	Stainer Top Flange	0	0	0	0.000	0.000
115	Drain line I/V Gland	0	0	0	0.000	0.000
116	Drain line Safety Flange	0	0	0	0.000	0.000
117	Suction line Flange	0	0	0	0.000	0.000
118	Pump Seal	0	0	0	0.000	0.000





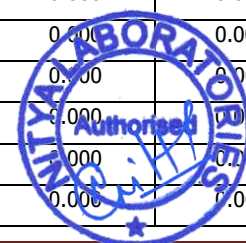
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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119	Discharge line Flange	0	0	0	0.000	0.000
120	P.G. Meter I/V Gland	0	0	0	0.000	0.000
121	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
122	NRV U/S Flange	0	0	0	0.000	0.000
123	NRV Top Flange	0	0	0	0.000	0.000
124	NRV D/S Flange	0	0	0	0.000	0.000
125	Drain line I/V Gland	0	0	0	0.000	0.000
126	Drain line Safety Flange	0	0	0	0.000	0.000
127	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
128	Discharge line I/V Gland	0	0	0	0.000	0.000
129	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
130	Pump to CBD line 1st Stainer Flange	0	0	0	0.000	0.000
131	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
132	Pump to CBD line 2nd Stainer Flange	0	0	0	0.000	0.000
133	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
134	Pump to CBD line 3rd Stainer Flange	0	0	0	0.000	0.000
135	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
136	Drain line I/V Gland	0	0	0	0.000	0.000
137	OWS Point	0	0	0	0.000	0.000
	03-PA-00-00-020B					
138	Suction line I/V U/S Flange	0	0	0	0.000	0.000
139	Suction line I/V Gland	0	0	0	0.000	0.000
140	Suction line I/V D/S Flange	0	0	0	0.000	0.000
141	Stainer Top Flange	0	0	0	0.000	0.000
142	Drain line I/V Gland	0	0	0	0.000	0.000
143	Drain line Safety Flange	0	0	0	0.000	0.000
144	Suction line Flange	0	0	0	0.000	0.000
145	Pump Seal	0	0	0	0.000	0.000
146	Discharge line Flange	0	0	0	0.000	0.000
147	P.G. Meter I/V Gland	0	0	0	0.000	0.000
148	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
149	NRV U/S Flange	0	0	0	0.000	0.000
150	NRV Top Flange	0	0	0	0.000	0.000



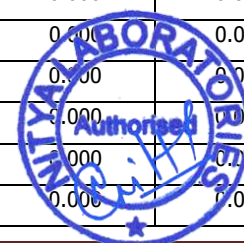
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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151	NRV D/S Flange	0	0	0	0.000	0.000
152	Drain line I/V Gland	0	0	0	0.000	0.000
153	Drain line Safety Flange	0	0	0	0.000	0.000
154	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
155	Discharge line I/V Gland	0	0	0	0.000	0.000
156	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
157	CBD line I/V U/S Flange	0	0	0	0.000	0.000
158	CBD line I/V Gland	0	0	0	0.000	0.000
159	CBD line I/V D/S Flange	0	0	0	0.000	0.000
160	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
161	Stainer Flange	0	0	0	0.000	0.000
162	CBD line 3rd I/V Gland	0	0	0	0.000	0.000
163	Drain line I/V Gland	0	0	0	0.000	0.000
164	OWS Point	0	0	0	0.000	0.000
165	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
166	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
167	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
168	Drain line I/V Gland	0	0	0	0.000	0.000
169	Drain line Safety Flange	0	0	0	0.000	0.000
170	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
171	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
172	PA-001-A/B Pump out to storage line	0	0	0	0.000	0.000
173	Naptha to CD Inlet line I/V U/S Flange	0	0	0	0.000	0.000
174	Naptha to CD Inlet line I/V Gland	0	0	0	0.000	0.000
175	Naptha to CD Inlet line I/V D/S Flange	0	0	0	0.000	0.000
176	Drain line I/V Gland	0	0	0	0.000	0.000
177	Drain line Safety Flange	0	0	0	0.000	0.000
178	STAB Naptha to Run Down Line I/V U/S Flange	0	0	0	0.000	0.000
179	STAB Naptha to Run Down Line I/V Gland	0	0	0	0.000	0.000
180	STAB Naptha to Run Down Line I/V D/S Flange	0	0	0	0.000	0.000
181	STAB Naptha to Slope HDR U/S line I/V	0	0	0	0.000	0.000
182	STAB Naptha to Slope HDR U/S line I/V	0	0	0	0.000	0.000
183	STAB Naptha to Slope HDR U/S line I/V	0	0	0	0.000	0.000



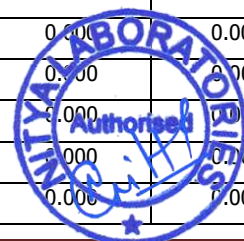
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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184	Drain line I/V Gland	0	0	0	0.000	0.000
185	Drain line Safety Flange	0	0	0	0.000	0.000
186	STAB Naptha to Slope HDR D/S line I/V	0	0	0	0.000	0.000
187	STAB Naptha to Slope HDR D/S line I/V	0	0	0	0.000	0.000
188	STAB Naptha to Slope HDR D/S line I/V	0	0	0	0.000	0.000
189	03-PV-1406-line C/V U/S Flange	0	0	0	0.000	0.000
190	03-PV-1406-line C/V Gland	0	0	0	0.000	0.000
191	03-PV-1406-line C/V D/S Flange	0	0	0	0.000	0.000
192	DRR-5699-East Site line I/V U/S Flange	0	0	0	0.000	0.000
193	DRR-5699-East Site line I/V Gland	0	0	0	0.000	0.000
194	ORR-5699-East Site line I/V D/S Flange	0	0	0	0.000	0.000
195	Stainer Flange	0	0	0	0.000	0.000
196	DRR-5699-West Site line I/V U/S Flange	0	0	0	0.000	0.000
197	DRR-5699-West Site line I/V Gland	0	0	0	0.000	0.000
198	DRR-5699-West Site line I/V U/S Flange	0	0	0	0.000	0.000
199	Stainer Flange	0	0	0	0.000	0.000
200	WG-9 to WG-10 line 1st I/V U/S Flange	0	0	0	0.000	0.000
201	WG-9 to WG-10 line 1st I/V Gland	0	0	0	0.000	0.000
202	WG-9 to WG-10 line 1st I/V D/S Flange	0	0	0	0.000	0.000
203	WG-9 to WG-10 line 2nd I/V U/S Flange	0	0	0	0.000	0.000
204	WG-9 to WG-10 line 2nd I/V Gland	0	0	0	0.000	0.000
205	WG-9 to WG-10 line 2nd I/V D/S Flange	0	0	0	0.000	0.000
206	WG-10 - line - East Site line I/V U/S Flange	0	0	0	0.000	0.000
207	WG-10 - line - East Site line I/V Gland	0	0	0	0.000	0.000
208	WG-10 - line - East Site line I/V D/S Flange	0	0	0	0.000	0.000
209	Stainer Flange	0	0	0	0.000	0.000
210	WG-10 - line - West Site line I/V U/S Flange	0	0	0	0.000	0.000
211	WG-10 - line - West Site line I/V Gland	0	0	0	0.000	0.000
212	WG-10 - line - West Site line I/V D/S Flange	0	0	0	0.000	0.000
213	Stainer Flange	0	0	0	0.000	0.000
214	WG-10 to WG-9 line 1st I/V U/S Flange	0	0	0	0.000	0.000
215	WG-10 to WG-9 line 1st I/V Gland	0	0	0	0.000	0.000
216	WG-10 to WG-9 line 1st I/V D/S Flange	0	0	0	0.000	0.000

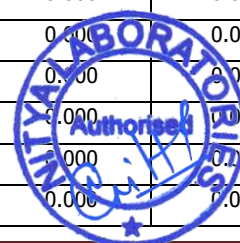


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
217	WG-10 to WG-9 line 2nd I/V U/S Flange	0	0	0	0.000	0.000
218	WG-10 to WG-9 line 2nd I/V Gland	0	0	0	0.000	0.000
219	WG-10 to WG-9 line 2nd I/V D/S Flange	0	0	0	0.000	0.000
220	FRACT-OFF Gas From VV-2 line I/V U/S Flange	0	0	0	0.000	0.000
221	FRACT-OFF Gas From VV-2 line I/V Gland	0	0	0	0.000	0.000
222	FRACT-OFF Gas From VV-2 line I/V D/S Flange	0	0	0	0.000	0.000
	03-PM-00-003B WILD Naptha					
223	Suction line I/V U/S Flange	0	0	0	0.000	0.000
224	Suction line I/V Gland	0	0	0	0.000	0.000
225	Suction line I/V D/S Flange	0	0	0	0.000	0.000
226	Stainer Top Flange	0	0	0	0.000	0.000
227	Drain line I/V Gland	0	0	0	0.000	0.000
228	Drain line Safety Flange	0	0	0	0.000	0.000
229	Suction line Flange	0	0	0	0.000	0.000
230	Discharge line Flange	0	0	0	0.000	0.000
231	Top Flange	0	0	0	0.000	0.000
232	P.G. Meter I/V Gland	0	0	0	0.000	0.000
233	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
234	Discharge line I/V Gland	0	0	0	0.000	0.000
	03-PM-00-003A WILD Naptha					
235	Suction line I/V U/S Flange	0	0	0	0.000	0.000
236	Suction line I/V Gland	0	0	0	0.000	0.000
237	Suction line I/V D/S Flange	0	0	0	0.000	0.000
238	Stainer Top Flange	0	0	0	0.000	0.000
239	Drain line I/V Gland	0	0	0	0.000	0.000
240	Drain line Safety Flange	0	0	0	0.000	0.000
241	Suction line Flange	0	0	0	0.000	0.000
242	Discharge line Flange	0	0	0	0.000	0.000
243	Top Flange	0	0	0	0.000	0.000
244	P.G. Meter I/V Gland	0	0	0	0.000	0.000
245	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
246	Discharge line I/V Gland	0	0	0	0.000	0.000
247	Drain Point	0	0	0	0.000	0.000

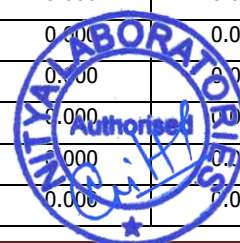


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
248	Slope From Off site line U/S I/V Gland	0	0	0	0.000	0.000
249	Drain line I/V Gland	0	0	0	0.000	0.000
250	Drain line Safety Flange	0	0	0	0.000	0.000
251	Stainer Top Flange	0	0	0	0.000	0.000
252	D/S line I/V U/S Flange	0	0	0	0.000	0.000
253	From PA-17-A/B line Top Flange	0	0	0	0.000	0.000
254	From PA-17-A/B line I/V Gland	0	0	0	0.000	0.000
	03-PA-00-003 A					
255	Suction line I/V U/S Flange	0	0	0	0.000	0.000
256	Suction line I/V Gland	0	0	0	0.000	0.000
257	Suction line I/V D/S Flange	0	0	0	0.000	0.000
258	Stainer Top Flange	0	0	0	0.000	0.000
259	Drain line I/V Gland	0	0	0	0.000	0.000
260	Drain line Safety Flange	0	0	0	0.000	0.000
261	Suction line Flange	0	0	0	0.000	0.000
262	Discharge line Flange	0	0	0	0.000	0.000
263	Vent line Safety Flange	0	0	0	0.000	0.000
264	P.G. Meter I/V Gland	0	0	0	0.000	0.000
265	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
266	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
267	Discharge line I/V Gland	0	0	0	0.000	0.000
268	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
269	Suction line I/V U/S Flange	0	0	0	0.000	0.000
270	Suction line I/V D/S Flange	0	0	0	0.000	0.000
271	Stainer Top Flange	0	0	0	0.000	0.000
272	Drain line I/V Gland	0	0	0	0.000	0.000
273	Drain line Safety Flange	0	0	0	0.000	0.000
274	Suction line Flange	0	0	0	0.000	0.000
275	Discharge line Flange	0	0	0	0.000	0.000
276	P.G. Meter I/V Gland	0	0	0	0.000	0.000
277	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
278	NRV U/S Flange	0	0	0	0.000	0.000
279	NRV Top Flange	0	0	0	0.000	0.000



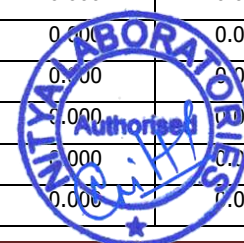
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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280	NRV D/S Flange	0	0	0	0.000	0.000
281	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
282	Discharge line I/V Gland	0	0	0	0.000	0.000
283	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
Area	Pump					
1	03-PV-2301-line U/S I/V Gland	0	0	0	0.000	0.000
2	Drain line I/V Gland	0	0	0	0.000	0.000
3	03-PV-2301-line C/V U/S Flange	0	0	0	0.000	0.000
4	03-PV-2301-line C/V Gland	0	0	0	0.000	0.000
5	03-PV-2301-line C/V D/S Flange	0	0	0	0.000	0.000
6	Drain line I/V Gland	0	0	0	0.000	0.000
7	03-PV-2301-line D/S I/V Gland	0	0	0	0.000	0.000
8	03-LV-1101-B line U/S I/V U/S Flange	0	0	0	0.000	0.000
9	Drain line I/V Gland	0	0	0	0.000	0.000
10	Drain line Safety Flange	0	0	0	0.000	0.000
11	03-LV-1101-B line C/V U/S Flange	0	0	0	0.000	0.000
12	03-LV-1101-B line C/V Gland	0	0	0	0.000	0.000
13	03-LV-1101-B line C/V D/S Flange	0	0	0	0.000	0.000
14	Drain line I/V Gland	0	0	0	0.000	0.000
15	Drain line Safety Flange	0	0	0	0.000	0.000
16	02-LV-1101 D/S I/V U/S Flange	0	0	0	0.000	0.000
17	02-LV-1101 D/S I/V Gland	0	0	0	0.000	0.000
18	02-LV-1101 D/S I/V D/S Flange	0	0	0	0.000	0.000
19	Bypass line I/V Gland	0	0	0	0.000	0.000
	03-PA-00-0017A					
20	Suction line I/V U/S Flange	0	0	0	0.000	0.000
21	Suction line I/V Gland	0	0	0	0.000	0.000
22	Suction line I/V D/S Flange	0	0	0	0.000	0.000
23	Stainer Top Flange	0	0	0	0.000	0.000
24	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
25	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
26	Suction line Flange	0	0	0	0.000	0.000
27	Pump Seal	0	0	0	0.000	0.000



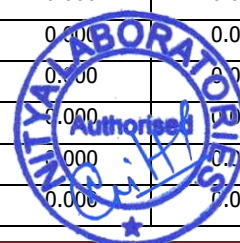
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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28	Discharge line Flange	0	0	0	0.000	0.000
29	P.G. Meter I/V Gland	0	0	0	0.000	0.000
30	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
31	NRV U/S Flange	0	0	0	0.000	0.000
32	NRV Top Flange	0	0	0	0.000	0.000
33	NRV D/S Flange	0	0	0	0.000	0.000
34	Drain line I/V Gland	0	0	0	0.000	0.000
35	Drain line Safety Flange	0	0	0	0.000	0.000
36	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
37	Discharge line I/V Gland	0	0	0	0.000	0.000
38	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
39	CBD line I/V Gland	0	0	0	0.000	0.000
40	Stainer Flange	0	0	0	0.000	0.000
41	Drain line I/V Gland	0	0	0	0.000	0.000
42	OWS Point	0	0	0	0.000	0.000
	03-PA-00-017B					
43	Suction line I/V U/S Flange	0	0	0	0.000	0.000
44	Suction line I/V Gland	0	0	0	0.000	0.000
45	Suction line I/V D/S Flange	0	0	0	0.000	0.000
46	Stainer Top Flange	0	0	0	0.000	0.000
47	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
48	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
49	Suction line Flange	0	0	0	0.000	0.000
50	Pump Seal	0	0	0	0.000	0.000
51	Discharge line Flange	0	0	0	0.000	0.000
52	P.G. Meter I/V Gland	0	0	0	0.000	0.000
53	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
54	NRV U/S Flange	0	0	0	0.000	0.000
55	NRV Top Flange	0	0	0	0.000	0.000
56	NRV D/S Flange	0	0	0	0.000	0.000
57	Drain line I/V Gland	0	0	0	0.000	0.000
58	Drain line Safety Flange	0	0	0	0.000	0.000
59	Discharge line I/V U/S Flange	0	0	0	0.000	0.000



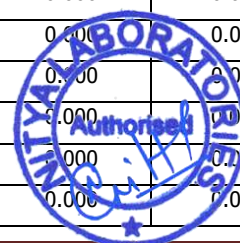
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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60	Discharge line I/V Gland	0	0	0	0.000	0.000
61	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
62	CBD line I/V Gland	0	0	0	0.000	0.000
63	Stainer Flange	0	0	0	0.000	0.000
64	OWS Point	0	0	0	0.000	0.000
65	Stainer Flange	0	0	0	0.000	0.000
66	OWS Point	0	0	0	0.000	0.000
67	03-PV-1104 line U/S I/V Gland	0	0	0	0.000	0.000
68	Drain line I/V Gland	0	0	0	0.000	0.000
69	Drain line Safety Flange	0	0	0	0.000	0.000
70	03-PV-1104 line C/V U/S Flange	0	0	0	0.000	0.000
71	03-PV-1104 line C/V Gland	0	0	0	0.000	0.000
72	03-PV-1104 line C/V D/S Flange	0	0	0	0.000	0.000
73	Drain line I/V Gland	0	0	0	0.000	0.000
74	Drain line Safety Flange	0	0	0	0.000	0.000
75	03-PV-1104 line D/S I/V Gland	0	0	0	0.000	0.000
76	Bypass line I/V Gland	0	0	0	0.000	0.000
77	P.G. Meter I/V Gland	0	0	0	0.000	0.000
78	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
79	Drain & Sampling line 1st I/V Gland	0	0	0	0.000	0.000
80	Drain & Sampling line 2nd I/V Gland	0	0	0	0.000	0.000
81	Go To SLDF HDR line U/S I/V Gland	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	Stainer Flange	0	0	0	0.000	0.000
85	D/S line I/V U/S Flange	0	0	0	0.000	0.000
86	Go To CH HDR line U/S I/V Gland	0	0	0	0.000	0.000
87	Drain line I/V Gland	0	0	0	0.000	0.000
88	Drain line Safety Flange	0	0	0	0.000	0.000
89	D/S line I/V U/S Flange	0	0	0	0.000	0.000
90	03-FV-1107 line U/S I/V Gland	0	0	0	0.000	0.000
91	Drain line I/V Gland	0	0	0	0.000	0.000
92	Drain line Safety Flange	0	0	0	0.000	0.000



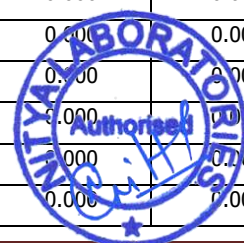


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
93	03-FV-1107 line C/V I/V Gland	0	0	0	0.000	0.000
94	03-FV-1107 line C/V Gland	0	0	0	0.000	0.000
95	03-FV-1107 line C/V D/S Flange	0	0	0	0.000	0.000
96	Drain line I/V Gland	0	0	0	0.000	0.000
97	Drain line Safety Flange	0	0	0	0.000	0.000
98	03-FV-1107 line U/S I/V Gland	0	0	0	0.000	0.000
99	Bypass line I/V Gland	0	0	0	0.000	0.000
100	Bypass line P. G. meter I/V Gland	0	0	0	0.000	0.000
101	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
102	Drain line Sampling line Ist I/V Gland	0	0	0	0.000	0.000
103	Drain line Sampling line 2nd I/V Gland	0	0	0	0.000	0.000
104	KERO II TO SLOP line Stainer Flange	0	0	0	0.000	0.000
105	Drain line I/V Gland	0	0	0	0.000	0.000
106	Drain line Safety Flange	0	0	0	0.000	0.000
107	Stainer Flange	0	0	0	0.000	0.000
108	2nd I/V Gland	0	0	0	0.000	0.000
109	KERO II TO CD HDR line Stainer Flange	0	0	0	0.000	0.000
110	KERO II TO CD HDR line Stainer I/V Gland	0	0	0	0.000	0.000
111	Drain line I/V Gland	0	0	0	0.000	0.000
112	Drain line Safety Flange	0	0	0	0.000	0.000
113	03-FV-1108 line U/S I/V Gland	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	03-FV-1106 line U/S I/V Gland	0	0	0	0.000	0.000
117	03-FV-1106 line C/V Gland	0	0	0	0.000	0.000
118	03-FV-1106 line C/V D/S Flange	0	0	0	0.000	0.000
119	Drain line I/V Gland	0	0	0	0.000	0.000
120	Drain line Safety Flange	0	0	0	0.000	0.000
121	03-FV-1108 line D/S I/V Gland	0	0	0	0.000	0.000
122	Bypass line I/V Gland	0	0	0	0.000	0.000
123	P.G. Meter I/V Gland	0	0	0	0.000	0.000
124	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
125	Drain line 1st I/V Gland	0	0	0	0.000	0.000



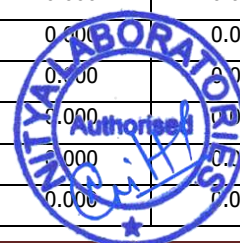
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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126	Drain line 2nd I/V Gland	0	0	0	0.000	0.000
127	KRRO-1 TO SLOP HEADER line U/S I/V	0	0	0	0.000	0.000
128	Stainer Flange	0	0	0	0.000	0.000
129	Drain line I/V Gland	0	0	0	0.000	0.000
130	Drain line Safety Flange	0	0	0	0.000	0.000
131	D/S I/V Gland	0	0	0	0.000	0.000
Area	Pump & Furnace					
1	03-FV-1402 line U/S I/V Gland	0	0	0	0.000	0.000
2	Drain line I/V Gland	0	0	0	0.000	0.000
3	Drain line Safety Flange	0	0	0	0.000	0.000
4	03-FV-1402 line C/V U/S Flange	0	0	0	0.000	0.000
5	03-FV-1402 line C/V Gland	0	0	0	0.000	0.000
6	03-FV-1402 line C/V D/S Flange	0	0	0	0.000	0.000
7	Drain line I/V Gland	0	0	0	0.000	0.000
8	Drain line Safety Flange	0	0	0	0.000	0.000
9	03-FV-1402 line D/S I/V Gland	0	0	0	0.000	0.000
10	Bypass line I/V Gland	0	0	0	0.000	0.000
11	03-FV-1402 line U/S I/V U/S Flange	0	0	0	0.000	0.000
12	03-FV-1402 line U/S I/V Gland	0	0	0	0.000	0.000
13	03-FV-1402 line U/S I/V D/S Flange	0	0	0	0.000	0.000
14	Drain line I/V Gland	0	0	0	0.000	0.000
15	Drain line Safety Flange	0	0	0	0.000	0.000
16	03-FV-1402 line C/V U/S Flange	0	0	0	0.000	0.000
17	03-FV-1402 line C/V Gland	0	0	0	0.000	0.000
18	03-FV-1402 line C/V D/S Flange	0	0	0	0.000	0.000
19	Drain line I/V Gland	0	0	0	0.000	0.000
20	Drain line Safety Flange	0	0	0	0.000	0.000
21	03-FV-1402 line D/S I/V U/S Flange	0	0	0	0.000	0.000
22	03-FV-1402 line D/S I/V Gland	0	0	0	0.000	0.000
23	03-FV-1402 line D/S I/V D/S Flange	0	0	0	0.000	0.000
24	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
25	Bypass line I/V Gland	0	0	0	0.000	0.000
26	Bypass line I/V D/S Flange	0	0	0	0.000	0.000



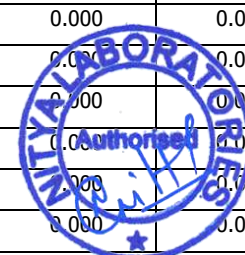
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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Area	03-EE-24(NAP) COOLER SHELL STAB NAP TUBE-CW					
27	South Side line Stainer Flange	0	0	0	0.000	0.000
28	CBD line 1st I/V U/S Flange	0	0	0	0.000	0.000
29	CBD line 1st I/V Gland	0	0	0	0.000	0.000
30	CBD line 1st I/V D/S Flange	0	0	0	0.000	0.000
31	CBD line 2nd I/V U/S Flange	0	0	0	0.000	0.000
32	CBD line 2nd I/V Gland	0	0	0	0.000	0.000
33	CBD line 2nd I/V D/S Flange	0	0	0	0.000	0.000
34	Drain line I/V Gland	0	0	0	0.000	0.000
35	OWS Point	0	0	0	0.000	0.000
Area	03-PM-00-019A					
36	Suction line I/V U/S Flange	0	0	0	0.000	0.000
37	Suction line I/V Gland	0	0	0	0.000	0.000
38	Suction line I/V D/S Flange	0	0	0	0.000	0.000
39	Stainer Top Flange	0	0	0	0.000	0.000
40	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
41	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
42	Suction line Flange	0	0	0	0.000	0.000
43	Discharge line Flange	0	0	0	0.000	0.000
44	P.G. Meter I/V Gland	0	0	0	0.000	0.000
45	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
46	Top Flange	0	0	0	0.000	0.000
47	Drain line I/V Gland	0	0	0	0.000	0.000
48	Drain line Safety Flange	0	0	0	0.000	0.000
49	Discharge line Flange	0	0	0	0.000	0.000
Area	03-PM-00-019B					
50	Suction line I/V U/S Flange	0	0	0	0.000	0.000
51	Suction line I/V Gland	0	0	0	0.000	0.000
52	Suction line I/V D/S Flange	0	0	0	0.000	0.000
53	Stainer Top Flange	0	0	0	0.000	0.000
54	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
55	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
56	Suction line Flange	0	0	0	0.000	0.000

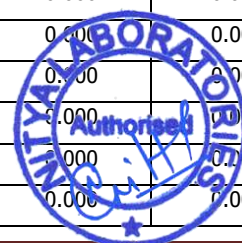


### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
57	Discharge line Flange	0	0	0	0.000	0.000
58	P.G. Meter I/V Gland	0	0	0	0.000	0.000
59	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
60	Top Flange	0	0	0	0.000	0.000
61	Drain line I/V Gland	0	0	0	0.000	0.000
62	Drain line Safety Flange	0	0	0	0.000	0.000
63	Discharge line Flange	0	0	0	0.000	0.000
64	03-FV-1401 line U/S I/V U/S Flange	0	0	0	0.000	0.000
65	03-FV-1401 line U/S I/V Gland	0	0	0	0.000	0.000
66	03-FV-1401 line U/S I/V D/S Flange	0	0	0	0.000	0.000
67	Drain line I/V Gland	0	0	0	0.000	0.000
68	Drain line Safety Flange	0	0	0	0.000	0.000
69	03-FV-1401 line C/V U/S Flange	0	0	0	0.000	0.000
70	03-FV-1401 line C/V Gland	0	0	0	0.000	0.000
71	03-FV-1401 line C/V D/S Flange	0	0	0	0.000	0.000
72	03-FV-1401 line D/S I/V U/S Flange	0	0	0	0.000	0.000
73	03-FV-1401 line D/S I/V Gland	0	0	0	0.000	0.000
74	03-FV-1401 line D/S 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	03-FV-1401 Bypass line I/V U/S Flange	0	0	0	0.000	0.000
78	03-FV-1401 Bypass line I/V Gland	0	0	0	0.000	0.000
79	03-FV-1401 Bypass line I/V D/S Flange	0	0	0	0.000	0.000
Area	03-PA-00-002A					
80	Suction line I/V U/S Flange	0	0	0	0.000	0.000
81	Suction line I/V Gland	0	0	0	0.000	0.000
82	Suction line I/V D/S Flange	0	0	0	0.000	0.000
83	Stainer Top Flange	0	0	0	0.000	0.000
84	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
85	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
86	Suction line Flange	0	0	0	0.000	0.000
87	Pump Seal	0	0	0	0.000	0.000
88	Discharge line Flange	0	0	0	0.000	0.000



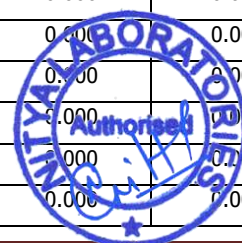
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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89	P.G. Meter I/V Gland	0	0	0	0.000	0.000
90	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
91	NRV U/S Flange	0	0	0	0.000	0.000
92	NRV Top Flange	0	0	0	0.000	0.000
93	NRV D/S Flange	0	0	0	0.000	0.000
94	Drain line I/V Gland	0	0	0	0.000	0.000
95	Drain line Safety Flange	0	0	0	0.000	0.000
96	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
97	Discharge line I/V Gland	0	0	0	0.000	0.000
98	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
99	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
100	Stainer Flange	0	0	0	0.000	0.000
101	2nd I/V Gland	0	0	0	0.000	0.000
102	Drain line I/V Gland	0	0	0	0.000	0.000
103	Stainer Flange	0	0	0	0.000	0.000
104	Drain line OWS Point	0	0	0	0.000	0.000
Area	03-PA-00-002B					
105	Suction line I/V U/S Flange	0	0	0	0.000	0.000
106	Suction line I/V Gland	0	0	0	0.000	0.000
107	Suction line I/V D/S Flange	0	0	0	0.000	0.000
108	Stainer Top Flange	0	0	0	0.000	0.000
109	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
110	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
111	Suction line Flange	0	0	0	0.000	0.000
112	Pump Seal	0	0	0	0.000	0.000
113	Discharge line Flange	0	0	0	0.000	0.000
114	P.G. Meter I/V Gland	0	0	0	0.000	0.000
115	P.G. Meter Sampling line I/V Gland	0	0	0	0.000	0.000
116	NRV U/S Flange	0	0	0	0.000	0.000
117	NRV Top Flange	0	0	0	0.000	0.000
118	NRV D/S Flange	0	0	0	0.000	0.000
119	Drain line I/V Gland	0	0	0	0.000	0.000
120	Drain line Safety Flange	0	0	0	0.000	0.000



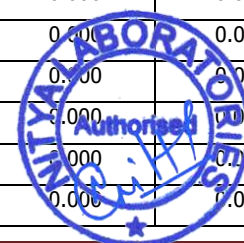
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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121	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
122	Discharge line I/V Gland	0	0	0	0.000	0.000
123	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
124	Pump to CBD line I/V Gland	0	0	0	0.000	0.000
125	Stainer Flange	0	0	0	0.000	0.000
126	2nd I/V Gland	0	0	0	0.000	0.000
127	Stainer Flange	0	0	0	0.000	0.000
128	Drain line I/V Gland	0	0	0	0.000	0.000
129	Drain line Safety Flange	0	0	0	0.000	0.000
130	03-PV-1203 line U/S I/V Gland	0	0	0	0.000	0.000
131	Drain line I/V Gland	0	0	0	0.000	0.000
132	Drain line Safety Flange	0	0	0	0.000	0.000
133	03-PV-1203 line C/V Gland	0	0	0	0.000	0.000
134	03-PV-1203 line D/S I/V Gland	0	0	0	0.000	0.000
135	Drain Line I/V Gland	0	0	0	0.000	0.000
136	Drain Line Safety Flange	0	0	0	0.000	0.000
137	Bypass line I/V Gland	0	0	0	0.000	0.000
138	03-PV-1206 U/S line I/V Gland	0	0	0	0.000	0.000
139	Drain Line I/V Gland	0	0	0	0.000	0.000
140	Drain Line Safety Flange	0	0	0	0.000	0.000
141	03-PV-1206 C/V Gland	0	0	0	0.000	0.000
142	Drain Line I/V Gland	0	0	0	0.000	0.000
143	Drain Line Safety Flange	0	0	0	0.000	0.000
144	03-PV-1206 D/S line I/V Gland	0	0	0	0.000	0.000
145	Bypass line I/V Gland	0	0	0	0.000	0.000
146	03-PV-1204 U/S line I/V Gland	0	0	0	0.000	0.000
147	Drain Line I/V Gland	0	0	0	0.000	0.000
148	Drain Line Safety Flange	0	0	0	0.000	0.000
149	03-PV-1204 C/V Gland	0	0	0	0.000	0.000
150	Drain Line I/V Gland	0	0	0	0.000	0.000
151	Drain Line Safety Flange	0	0	0	0.000	0.000
152	03-PV-1204 D/S line I/V Gland	0	0	0	0.000	0.000
153	Bypass line I/V Gland	0	0	0	0.000	0.000



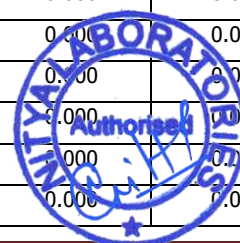
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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154	03-PV-1207 U/S line I/V Gland	0	0	0	0.000	0.000
155	Drain Line I/V Gland	0	0	0	0.000	0.000
156	Drain Line Safety Flange	0	0	0	0.000	0.000
157	03-PV-1207 C/V Gland	0	0	0	0.000	0.000
158	Drain Line I/V Gland	0	0	0	0.000	0.000
159	Drain Line Safety Flange	0	0	0	0.000	0.000
160	03-PV-1207 D/S line I/V Gland	0	0	0	0.000	0.000
161	Bypass line I/V Gland	0	0	0	0.000	0.000
Area	Furnace West Side					
162	B.No. -1- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
163	B.No. -1- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
164	B.No. -1- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
165	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
166	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
167	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
168	B.No. -2- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
169	B.No. -2- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
170	B.No. -2- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
171	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
172	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
173	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
174	B.No. -3- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
175	B.No. -3- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
176	B.No. -3- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
177	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
178	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
179	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
180	B.No. -4- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
181	B.No. -4- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
182	B.No. -4- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
183	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
184	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
185	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000



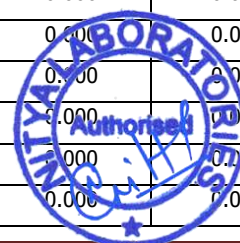
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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186	B.No. -5- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
187	B.No. -5- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
188	B.No. -5- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
189	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
190	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
191	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
192	B.No. -6- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
193	B.No. -6- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
194	B.No. -6- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
195	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
196	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
197	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
198	B.No. -7- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
199	B.No. -7- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
200	B.No. -7- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
201	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
202	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
203	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
204	B.No. -8- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
205	B.No. -8- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
206	B.No. -8- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
207	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
208	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
209	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
210	B.No. -9- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
211	B.No. -9- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
212	B.No. -9- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
213	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
214	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
215	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
216	B.No. -10- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
217	B.No. -10- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
218	B.No. -10- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000





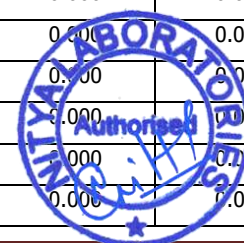
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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219	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
220	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
221	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
222	B.No. -11- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
223	B.No. -11- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
224	B.No. -11- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
225	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
226	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
227	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
228	B.No. -12- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
229	B.No. -12- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
230	B.No. -12- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
231	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
232	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
233	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
234	B.No. -13- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
235	B.No. -13- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
236	B.No. -13- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
237	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
238	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
239	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
240	B.No. -14- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
241	B.No. -14- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
242	B.No. -14- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
243	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
244	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
245	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
246	B.No. -15- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
247	B.No. -15 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
248	B.No. -15- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
249	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
250	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
251	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000



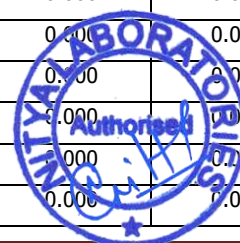
### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:** August 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
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252	B.No. -16- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
253	B.No. -16 Pilot Gas line I/V Gland	0	0	0	0.000	0.000
254	B.No. -16- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
255	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
256	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
257	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
Area	East Side DCU					
258	B.No. -1- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
259	B.No. -1- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
260	B.No. -1- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
261	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
262	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
263	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
264	B.No. -2- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
265	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
266	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
267	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
268	B.No. -3- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
269	B.No. -3- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
270	B.No. -3- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
271	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
272	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
273	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
274	B.No. -4- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
275	B.No. -4- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
276	B.No. -4- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
277	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
278	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
279	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
280	B.No. -5- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
281	B.No. -5- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
282	B.No. -5- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
283	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000



### Fugitive Emission Monitoring Survey Report

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

**Monitoring Period:**                    August 2022  
**Customer Reference No.:**    4600008282-NIR/26.08.2021

Sr. No.	Component ID	Average LEL Reading %	Reading % Gas	Reading (ppm)	EPA Correlation Kg/Hour/Source	Total Emission Kg/annum
284	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
285	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
286	B.No. -6- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
287	B.No. -6- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
288	B.No. -6- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
289	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
290	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
291	Fuel Gas Line I/V D/S Flange	0	0	0	0.000	0.000
292	B.No. -7- Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
293	B.No. -7- Pilot Gas line I/V Gland	0	0	0	0.000	0.000
294	B.No. -7- Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
295	Fuel Gas Line I/V U/S Flange	0	0	0	0.000	0.000
296	Fuel Gas line I/V Gland	0	0	0	0.000	0.000



### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission			
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr

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

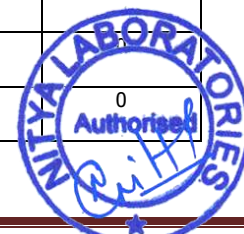


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

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	0
49	NRV Top Flange	49	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:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
50	NRV D/S Flange	50	0	0	0	0	8760	0
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	0

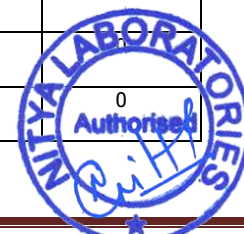


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
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

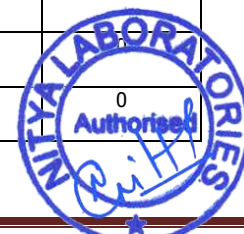


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



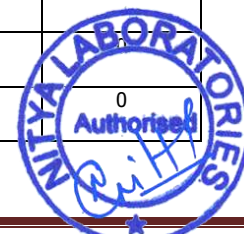


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

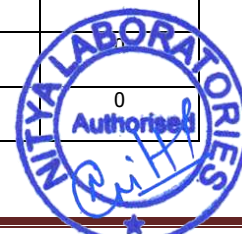


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**Issued To** Numaligarh Refinery Limited  
NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

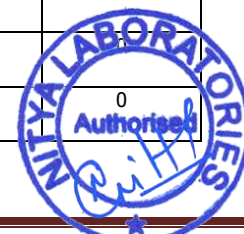


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



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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
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
<b>Area</b>	<b>Pump</b>							
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

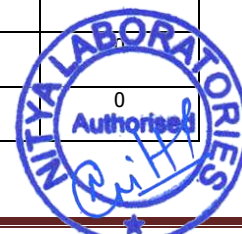


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NRL Complex, Numaligarh  
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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

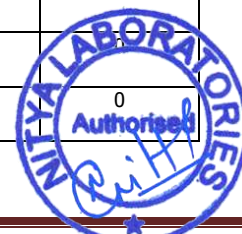


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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

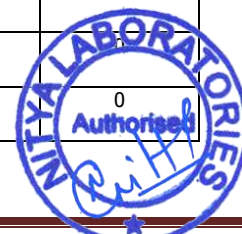


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

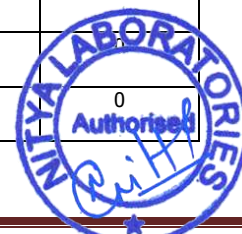


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**Issued To** Numaligarh Refinery Limited  
NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



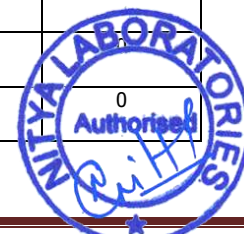


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
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	0
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

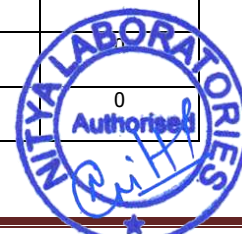


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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

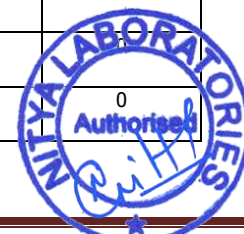


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 Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
386	Stainer Flange	386	0	0	0	0	8760	0
387	Pump To CBD line 3rd I/V Gland	387	0	0	0	0	8760	0
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

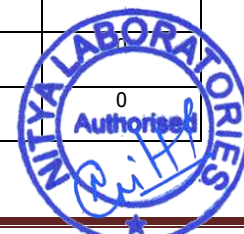


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 Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

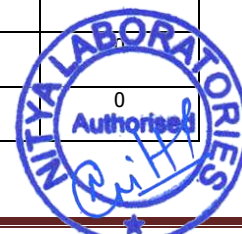


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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

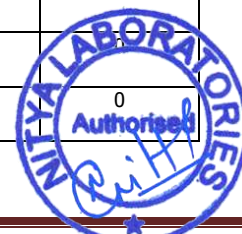


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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

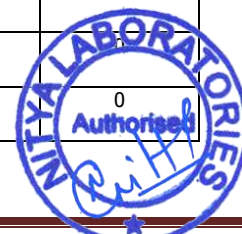


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

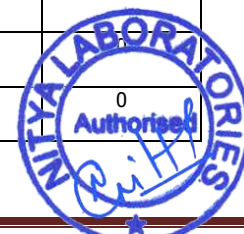


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
516	Bypass line I/V Gland	516	0	0	0	0	8760	0
517	Heavy Naptha From Unit-14 line 1st I/V U/S Flange	517	0	0	0	0	8760	0
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



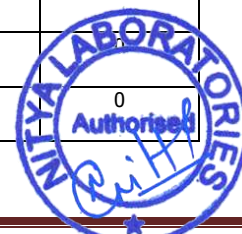


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

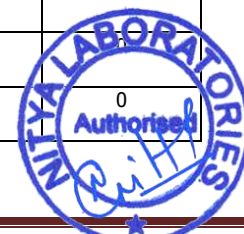


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
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	0
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

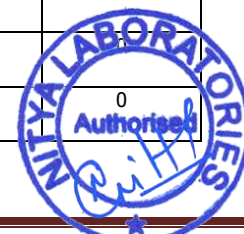


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

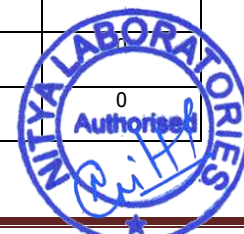


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
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	0
674	16-FV-2201 U/S line I/V D/S Flange	674	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:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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

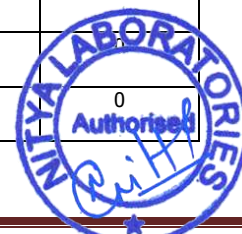


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			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



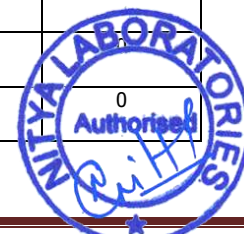


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
725	Suction line to Outlet line 3rd I/V U/S Flange	725	0	0	0	0	8760	0
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

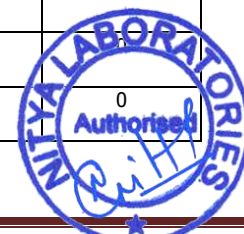


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**Issued To** Numaligarh Refinery Limited  
 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
750	Drain Line 1st I/V Gland	750	0	0	0	0	8760	0
751	Steamer Flange	751	0	0	0	0	8760	0
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



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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

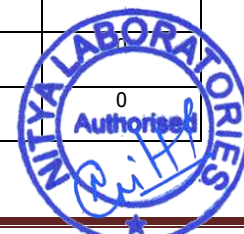


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 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
800	Stainer Flange	800	0	0	0	0	8760	0
801	Drain Line 2nd I/V Gland	801	0	0	0	0	8760	0
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	0
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

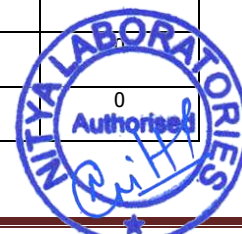


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

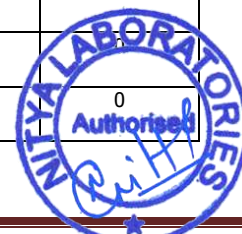


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



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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
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
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

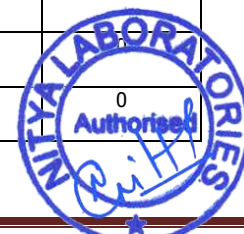


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



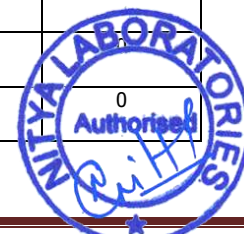


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

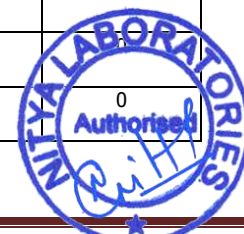


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

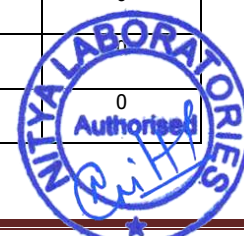


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**Issued To** Numaligarh Refinery Limited  
NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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



### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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	0
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	0
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 Glan	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

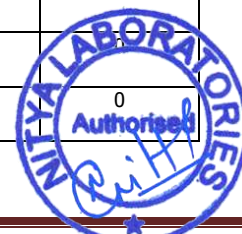


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

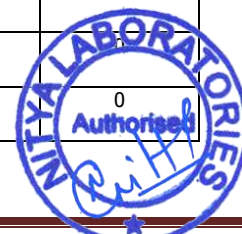


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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

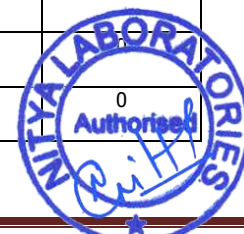


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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
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





### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
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



### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission				Total Operational Hours	Emission Kg/year
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr		

UNIT: CDU/VDU								
Area	B/L							
1	Intergas Inlet Line U/S I/V U/S Flange	1	0	0	0	0	8760	0
2	Intergas Inlet Line U/S I/V U/S Gland	2	0	0	0	0	8760	0
3	Intergas Inlet Line U/S I/V D/S Flange	3	0	0	0	0	8760	0
4	Intergas Inlet Line D/S I/V U/S Flange	4	0	0	0	0	8760	0
5	Intergas Inlet Line D/S I/V U/S Gland	5	0	0	0	0	8760	0
6	Intergas Inlet Line D/S I/V D/S Flange	6	0	0	0	0	8760	0
7	UNSTAB Naptha Outlet Line U/S I/V U/S	7	0	0	0	0	8760	0
8	UNSTAB Naptha Outlet Line U/S I/V U/S	8	0	0	0	0	8760	0
9	UNSTAB Naptha Outlet Line U/S I/V D/S	9	0	0	0	0	8760	0
10	UNSTAB Naptha Outlet Line D/S I/V U/S	10	0	0	0	0	8760	0
11	UNSTAB Naptha Outlet Line D/S I/V U/S	11	0	0	0	0	8760	0
12	UNSTAB Naptha Outlet Line D/S I/V D/S	12	0	0	0	0	8760	0
13	STAB Naptha to Storage Outlet Line I/V	13	0	0	0	0	8760	0
14	STAB Naptha to Storage Outlet Line I/V	14	0	0	0	0	8760	0
15	STAB Naptha to Storage Outlet Line I/V	15	0	0	0	0	8760	0
16	Meter line 1st I/V Gland	16	0	0	0	0	8760	0
17	Meter line 2nd I/V Gland	17	0	0	0	0	8760	0
18	Drain line 1st I/V Gland	18	0	0	0	0	8760	0
19	Drain line 2nd I/V Gland	19	0	0	0	0	8760	0
20	Vrain Line I/V Gland	20	0	0	0	0	8760	0
21	Vrain Line Safty Flange	21	0	0	0	0	8760	0
22	LPG Bullet Outlet U/S Line I/V U/S Flange	22	0	0	0	0	8760	0
23	LPG Bullet Outlet U/S Line I/V U/S Gland	23	0	0	0	0	8760	0
24	LPG Bullet Outlet U/S Line I/V D/S Flange	24	0	0	0	0	8760	0

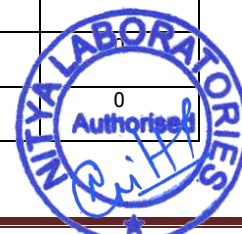


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
25	LPG Bullet Outlet D/S Line I/V U/S Flange	25	0	0	0	0	8760	0
26	LPG Bullet Outlet D/S Line I/V U/S Gland	26	0	0	0	0	8760	0
27	LPG Bullet Outlet D/S Line I/V D/S Flange	27	0	0	0	0	8760	0
28	LPG to Inlet Vrain Line I/V Gland	28	0	0	0	0	8760	0
29	LPG to Inlet Vrain Line I/V Safety Flange	29	0	0	0	0	8760	0
30	LPG to Intlet U/S Line I/V U/S Flange	30	0	0	0	0	8760	0
31	LPG to Intlet U/S Line I/V U/S Gland	31	0	0	0	0	8760	0
32	LPG to Intlet U/S Line I/V D/S Flange	32	0	0	0	0	8760	0
33	LPG to Intlet D/S Line I/V U/S Flange	33	0	0	0	0	8760	0
34	LPG to Intlet D/S Line I/V U/S Gland	34	0	0	0	0	8760	0
35	LPG to Intlet D/S Line I/V D/S Flange	35	0	0	0	0	8760	0
36	LPG Ex SPHERE Inlet U/S Line I/V U/S Flange	36	0	0	0	0	8760	0
37	LPG Ex SPHERE Inlet U/S Line I/V U/S Gland	37	0	0	0	0	8760	0
38	LPG Ex SPHERE Inlet U/S Line I/V D/S Flange	38	0	0	0	0	8760	0
39	LPG Ex SPHERE Inlet D/S Line I/V U/S Flange	39	0	0	0	0	8760	0
40	LPG Ex SPHERE Inlet D/S Line I/V U/S Gland	40	0	0	0	0	8760	0
41	LPG Ex SPHERE Inlet D/S Line I/V D/S Flange	41	0	0	0	0	8760	0
42	Fuel Gas Inlet U/S Line I/V U/S Flange	42	0	0	0	0	8760	0
43	Fuel Gas Inlet U/S Line I/V U/S Gland	43	0	0	0	0	8760	0
44	Fuel Gas Inlet U/S Line I/V D/S Flange	44	0	0	0	0	8760	0
45	Fuel Gas Inlet D/S Line I/V U/S Flange	45	0	0	0	0	8760	0
46	Fuel Gas Inlet 0/S Line I/V U/S Gland	46	0	0	0	0	8760	0
47	Fuel Gas Inlet D/S Line I/V D/S Flange	47	0	0	0	0	8760	0
48	Vrain Line I/V Gland	48	0	0	0	0	8760	0
49	Vrain Line safety Flange	49	0	0	0	0	8760	0

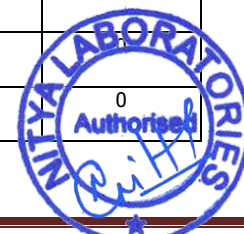


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
50	LPG to SPHERE Inlet U/S Line I/V U/S Flange	50	0	0	0	0	8760	0
51	LPG to SPHERE Inlet U/S Line I/V U/S Gland	51	0	0	0	0	8760	0
52	LPG to SPHERE Inlet U/S Line I/V D/S Flange	52	0	0	0	0	8760	0
53	LPG to SPHERE Inlet D/S Line I/V U/S Flange	53	0	0	0	0	8760	0
54	LPG to SPHERE Inlet D/S Line I/V U/S Gland	54	0	0	0	0	8760	0
55	LPG to SPHERE Inlet D/S Line I/V D/S Flange	55	0	0	0	0	8760	0
56	Meter Line Flange	56	0	0	0	0	8760	0
57	01-FV-1905 U/S Line I/V U/S Flange	57	0	0	0	0	8760	0
58	01-FV-1905 U/S Line I/V U/S Gland	58	0	0	0	0	8760	0
59	01-FV-1905 U/S Line I/V D/S Flange	59	0	0	0	0	8760	0
60	Drain Line I/V Gland	60	0	0	0	0	8760	0
61	Drain Line I/V Safety Flange	61	0	0	0	0	8760	0
62	01-FV-1905 C/V Line I/V U/S Flange	62	0	0	0	0	8760	0
63	02-FV-1905 C/V Line I/V U/S Gland	63	0	0	0	0	8760	0
64	01-FV-1905 C/V Line I/V D/S Flange	64	0	0	0	0	8760	0
65	01-FV-1905 D/S Line I/V U/S	65	0	0	0	0	8760	0
66	01-FV-1905 D/S Line I/V U/S Gland	66	0	0	0	0	8760	0
67	01-FV-1905 D/S Line I/V D/S Flange	67	0	0	0	0	8760	0
68	Bypass Line I/V U/S Flange	68	0	0	0	0	8760	0
69	Bypass Line I/V U/S Gland	69	0	0	0	0	8760	0
70	Bypass Line I/V D/S Flange	70	0	0	0	0	8760	0
71	01-FV-1921 U/S Line I/V U/S Flange	71	0	0	0	0	8760	0
72	01-FV-1921 U/S Line I/V U/S Gland	72	0	0	0	0	8760	0
73	01-FV-1921 U/S Line I/V D/S Flange	73	0	0	0	0	8760	0
74	Drain Line I/V Gland	74	0	0	0	0	8760	0

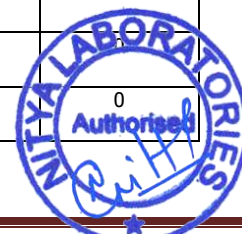


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
75	Drain Line Safety Flange	75	0	0	0	0	8760	0
76	01-FV-1921 C/V U/S Flange	76	0	0	0	0	8760	0
77	01-FV-1921 C/V U/S Gland	77	0	0	0	0	8760	0
78	01-FV-1921 C/V D/S Flange	78	0	0	0	0	8760	0
79	01-FV-1921 D/S Line I/V U/S Flange	79	0	0	0	0	8760	0
80	01-FV-1921 D/S Line I/V U/S Flange	80	0	0	0	0	8760	0
81	01-FV-1921 D/S Line I/V D/S Flange	81	0	0	0	0	8760	0
82	Drain Line I/V Gland	82	0	0	0	0	8760	0
83	Drain Line Safety Flange	83	0	0	0	0	8760	0
84	Bypass Line I/V U/S Flange	84	0	0	0	0	8760	0
85	Bypass Line I/V U/S Gland	85	0	0	0	0	8760	0
86	Bypass Line I/V D/S Flange	86	0	0	0	0	8760	0
87	01-LV-1701 U/S Line I/V U/S Flange	87	0	0	0	0	8760	0
88	01-LV 1701 U/S Line I/V U/S Gland	88	0	0	0	0	8760	0
89	01-LV-1701 U/S Line I/V D/S Flange	89	0	0	0	0	8760	0
90	Drain Line I/V Gland	90	0	0	0	0	8760	0
91	Drain Line Safety Flange	91	0	0	0	0	8760	0
92	01-LV-1701 C/S Line I/V U/S Flange	92	0	0	0	0	8760	0
93	01-LV-1701 C/S Line I/V U/S Gland	93	0	0	0	0	8760	0
94	01-LV-1701 C/S Line I/V D/S Flange	94	0	0	0	0	8760	0
95	01-LV-1701 D/S Line I/V U/S Flange	95	0	0	0	0	8760	0
96	01-LV-1701 D/S Line I/V U/S Gland	96	0	0	0	0	8760	0
97	01-LV-1701 D/S Line I/V D/S Flange	97	0	0	0	0	8760	0
98	Drain Line I/V Gland	98	0	0	0	0	8760	0
99	Drain Line Safety Flange	99	0	0	0	0	8760	0

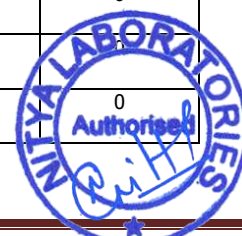


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
100	Bypass Line I/V U/S Flange	100	0	0	0	0	8760	0
101	Bypass Line I/V U/S Gland	101	0	0	0	0	8760	0
102	Bypass Line I/V D/S Flange	102	0	0	0	0	8760	0
103	01-FV-1901 U/S Line I/V U/S Flange	103	0	0	0	0	8760	0
104	01-FV-1901 U/S Line I/V U/S Gland	104	0	0	0	0	8760	0
105	01-FV-1901 U/S Line I/V D/S Flange	105	0	0	0	0	8760	0
106	Drain Line I/V Gland	106	0	0	0	0	8760	0
107	Drain Line Safety Flange	107	0	0	0	0	8760	0
108	01-FV-1901 C/V U/S Flange	108	0	0	0	0	8760	0
109	01-FV-1901 C/V U/S Gland	109	0	0	0	0	8760	0
110	01-FV-1901 C/V D/S Flange	110	0	0	0	0	8760	0
111	01-FV-1901 D/S Line I/V U/S Flange	111	0	0	0	0	8760	0
112	01-FV-1901 D/S Line I/V U/S Gland	112	0	0	0	0	8760	0
113	01-FV-1901 D/S Line I/V 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	Bypass Line I/V U/S Flange	116	0	0	0	0	8760	0
117	Bypass Line I/V U/S Gland	117	0	0	0	0	8760	0
118	Pump Seal	118	0	0	0	0	8760	0
119	01-FV-1904 U/S Line I/V U/S Flange	119	0	0	0	0	8760	0
120	01-FV-1904 U/S Line I/V U/S Gland	120	0	0	0	0	8760	0
121	01-FV-1904 U/S Line I/V D/S Flange	121	0	0	0	0	8760	0
122	Drain Line I/V Gland	122	0	0	0	0	8760	0
123	Drain Line Safety Flange	123	0	0	0	0	8760	0
124	01-FV-1904 C/V U/S Flange	124	0	0	0	0	8760	0

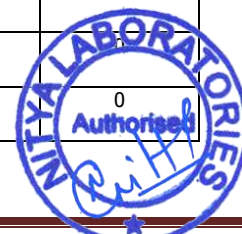


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
125	01-FV-1904 C/V U/S Gland	125	0	0	0	0	8760	0
126	01-FV-1904 C/V D/S Flange	126	0	0	0	0	8760	0
127	01-FV-1904 D/S Line I/V U/S Flange	127	0	0	0	0	8760	0
128	01-FV-1904 D/S Line I/V U/S Gland	128	0	0	0	0	8760	0
129	01-FV-1904 D/S Line I/V D/S Flange	129	0	0	0	0	8760	0
130	Bypass Line I/V U/S Flange	130	0	0	0	0	8760	0
131	Bypass Line I/V U/S Gland	131	0	0	0	0	8760	0
132	Bypass Line I/V D/S Flange	132	0	0	0	0	8760	0
133	01-FV-1903 U/S Line I/V U/S Flange	133	0	0	0	0	8760	0
134	01-FV-1903 U/S Line I/V U/S Gland	134	0	0	0	0	8760	0
135	01-FV-1903 U/S Line I/V D/S Flange	135	0	0	0	0	8760	0
136	Drain Line I/V Gland	136	0	0	0	0	8760	0
137	Drain Line Safety Flange	137	0	0	0	0	8760	0
138	01-FV-1903 C/V U/S Flange	138	0	0	0	0	8760	0
139	01-FV-1903 C/V U/S Gland	139	0	0	0	0	8760	0
140	01-FV-1903 C/V D/S Flange	140	0	0	0	0	8760	0
141	01-FV-1903 D/S Line I/V U/S Flange	141	0	0	0	0	8760	0
142	01-FV-1903 D/S Line I/V U/S Gland	142	0	0	0	0	8760	0
143	01-FV-1903 D/S Line I/V D/S Flange	143	0	0	0	0	8760	0
144	Drain Line I/V Gland	144	0	0	0	0	8760	0
145	Drain Line Safety Flange	145	0	0	0	0	8760	0
146	Bypass Line I/V U/S Flange	146	0	0	0	0	8760	0
147	Bypass Line I/V U/S Gland	147	0	0	0	0	8760	0
148	Bypass Line I/V U/S Flange	148	0	0	0	0	8760	0
149	01-PA-106A Suction Line I/V Gland	149	0	0	0	0	8760	0

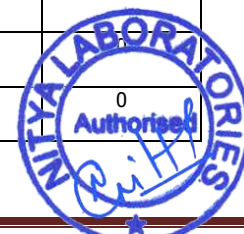


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
150	Stainer Top Flange	150	0	0	0	0	8760	0
151	Stainer Top Flange Drain Line I/V Gland	151	0	0	0	0	8760	0
152	Stainer Top Flange Drain Line Safety Flange	152	0	0	0	0	8760	0
153	Suction Line Flange	153	0	0	0	0	8760	0
154	Pump Seal	154	0	0	0	0	8760	0
155	Discharge Line Flange	155	0	0	0	0	8760	0
156	Meter line 1st I/V Gland	156	0	0	0	0	8760	0
157	Meter line 2nd I/V Gland	157	0	0	0	0	8760	0
158	Meter line Sampling I/V Gland	158	0	0	0	0	8760	0
159	Discharge Line Gland	159	0	0	0	0	8760	0
160	01-PA-106B Suction Line I/V Gland	160	0	0	0	0	8760	0
161	Stainer Top Flange	161	0	0	0	0	8760	0
162	Stainer Top Flange Drain Line I/V Gland	162	0	0	0	0	8760	0
163	Stainer Top Flange Drain Line Safety Flange	163	0	0	0	0	8760	0
164	Suction Line Flange	164	0	0	0	0	8760	0
165	Pump Seal	165	0	0	0	0	8760	0
166	Discharge Line Flange	166	0	0	0	0	8760	0
167	Meter line 1st I/V Gland	167	0	0	0	0	8760	0
168	Meter line 2nd I/V Gland	168	0	0	0	0	8760	0
169	Meter line Sampling I/V Gland	169	0	0	0	0	8760	0
170	Discharge Line Gland	170	0	0	0	0	8760	0
171	01-PA-105 A Suction Line I/V U/S Flange	171	0	0	0	0	8760	0
172	01-PA-105A Suction Line I/V U/S Gland	172	0	0	0	0	8760	0
173	01-PA-105A Suction Line I/V D/S Flange	173	0	0	0	0	8760	0
174	Stainer Top Flange	174	0	0	0	0	8760	0



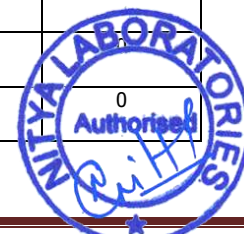


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
175	Stainer Top Flange Drain Line I/V Gland	175	0	0	0	0	8760	0
176	Stainer Top Flange Drain Line Safety Flange	176	0	0	0	0	8760	0
177	Suction Line Flange	177	0	0	0	0	8760	0
178	Pump Seal	178	0	0	0	0	8760	0
179	Discharge Line Flange	179	0	0	0	0	8760	0
180	Meter line 1st I/V Gland	180	0	0	0	0	8760	0
181	Meter line 2nd I/V Gland	181	0	0	0	0	8760	0
182	Meter line Sampling I/V Gland	182	0	0	0	0	8760	0
183	NRV U/S Flange	183	0	0	0	0	8760	0
184	NRV Top Flange	184	0	0	0	0	8760	0
185	NRV D/S Flange	185	0	0	0	0	8760	0
186	Discharge Line I/V U/S Flange	186	0	0	0	0	8760	0
187	Discharge Line I/V U/S Gland	187	0	0	0	0	8760	0
188	Discharge Line I/V D/S Flange	188	0	0	0	0	8760	0
189	01 PA-105B Suction Line I/V U/S Flange	189	0	0	0	0	8760	0
190	01-PA-105B Suction Line I/V U/S Gland	190	0	0	0	0	8760	0
191	01-PA-105B Suction Line I/V D/S Flange	191	0	0	0	0	8760	0
192	Stainer Top Flange	192	0	0	0	0	8760	0
193	Stainer Top Flange Drain Line I/V Gland	193	0	0	0	0	8760	0
194	Stainer Top Flange Drain Line Safety Flange	194	0	0	0	0	8760	0
195	Suction Line Flange	195	0	0	0	0	8760	0
196	Pump Seal	196	0	0	0	0	8760	0
197	Discharge Line Flange	197	0	0	0	0	8760	0
198	Meter line 1st I/V Gland	198	0	0	0	0	8760	0
199	Meter line 2nd I/V Gland	199	0	0	0	0	8760	0



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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
200	Meter line Sampling I/V Gland	200	0	0	0	0	8760	0
201	NRV I/V U/S Flange	201	0	0	0	0	8760	0
202	NRV Top Flange	202	0	0	0	0	8760	0
203	NRV I/V D/S Flange	203	0	0	0	0	8760	0
204	Discharge Line I/V U/S Flange	204	0	0	0	0	8760	0
205	Discharge Line I/V U/S Gland	205	0	0	0	0	8760	0
206	Discharge Line I/V D/S Flange	206	0	0	0	0	8760	0
<b>Area</b>	<b>Pump</b>		0	0	0	0	8760	0
207	01-PA-103B Suction Line I/V U/S Flange	207	0	0	0	0	8760	0
208	01-PA-1038 Suction Line I/V Gland	208	0	0	0	0	8760	0
209	01-PA-103B Suction Line I/V D/S Flange	209	0	0	0	0	8760	0
210	Steamer Top Flange	210	0	0	0	0	8760	0
211	Steamer Top Flange Drain Line I/V Gland	211	0	0	0	0	8760	0
212	Steamer Top Flange Drain Line Safety Flange	212	0	0	0	0	8760	0
213	Suction Line Flange	213	0	0	0	0	8760	0
214	Pump Seal	214	0	0	0	0	8760	0
215	Discharge Line Flange	215	0	0	0	0	8760	0
216	Meter line 1st I/V Gland	216	0	0	0	0	8760	0
217	Meter line 2nd I/V Gland	217	0	0	0	0	8760	0
218	Meter line Sampling I/V Gland	218	0	0	0	0	8760	0
219	NRV I/V U/S Flange	219	0	0	0	0	8760	0
220	NRV Top Flange	220	0	0	0	0	8760	0
221	NRV I/V D/S Flange	221	0	0	0	0	8760	0
222	Discharge Line I/V U/S Flange	222	0	0	0	0	8760	0
223	Discharge Line I/V Gland	223	0	0	0	0	8760	0

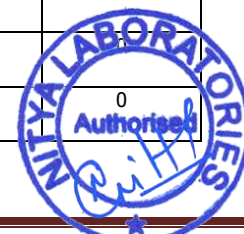


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
224	Discharge Line I/V D/S Flange	224	0	0	0	0	8760	0
225	Suction Line to Outside Line 1st I/V U/S	225	0	0	0	0	8760	0
226	Suction Line to Outside Line 1st I/V Gland	226	0	0	0	0	8760	0
227	Suction Line to Outside Line 1st I/V D/S	227	0	0	0	0	8760	0
228	Suction Line to Outside Line 2nd I/V U/S	228	0	0	0	0	8760	0
229	Suction Line to Outside Line 2nd I/V Gland	229	0	0	0	0	8760	0
230	Suction Line to Outside Line 2nd I/V D/S	230	0	0	0	0	8760	0
231	Suction Line to Outside Line 3rd I/V U/S	231	0	0	0	0	8760	0
232	Suction Line to Outside Line 3rd I/Vgland	232	0	0	0	0	8760	0
233	Suction Line to Outside Line 3rd I/V D/S	233	0	0	0	0	8760	0
234	Stainer Flange	234	0	0	0	0	8760	0
235	OWS Point	235	0	0	0	0	8760	0
236	01-PA-103A Suction Line I/V U/S Flange	236	0	0	0	0	8760	0
237	01-PA-103A Suction Line I/V Gland	237	0	0	0	0	8760	0
238	01-PA-103A Suction Line I/V D/S Flange	238	0	0	0	0	8760	0
239	Stainer Top Flange	239	0	0	0	0	8760	0
240	Stainer Top Flange Drain Line Gland	240	0	0	0	0	8760	0
241	Stainer Top Flange Drain Line Safety Flange	241	0	0	0	0	8760	0
242	Suction Line Flange	242	0	0	0	0	8760	0
243	Pump Seal	243	0	0	0	0	8760	0
244	Discharge Line Flange	244	0	0	0	0	8760	0
245	Meter line 1st I/VGland	245	0	0	0	0	8760	0
246	Meter line 2nd I/V Gland	246	0	0	0	0	8760	0
247	Meter line Sampling Point I/V Gland	247	0	0	0	0	8760	0
248	NRV I/V U/S Flange	248	0	0	0	0	8760	0

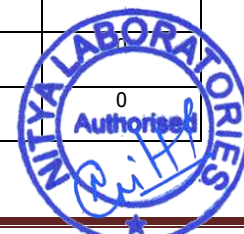


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 NRL Complex, Numaligarh  
 Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
249	NRV Top Flange	249	0	0	0	0	8760	0
250	NRV I/V D/S Flange	250	0	0	0	0	8760	0
251	Discharge Line I/V U/S Flange	251	0	0	0	0	8760	0
252	Discharge Line I/V Gland	252	0	0	0	0	8760	0
253	Discharge Line I/V D/S Flange	253	0	0	0	0	8760	0
254	Pump to Drain Line 1st I/V Gland	254	0	0	0	0	8760	0
255	Pump to Drain Line 2nd I/V Gland	255	0	0	0	0	8760	0
256	Pump to Drain Line 3rd I/V Gland	256	0	0	0	0	8760	0
257	Stainer Flange	257	0	0	0	0	8760	0
258	OWS Point	258	0	0	0	0	8760	0
259	01-FV-4003 U/S Line I/V U/S Flange	259	0	0	0	0	8760	0
260	01-FV-4003 U/S Line I/V Gland	260	0	0	0	0	8760	0
261	01-FV-4003 U/S Line I/V D/S Flange	261	0	0	0	0	8760	0
262	Drain Line I/V Gland	262	0	0	0	0	8760	0
263	Drain Line Safety Flange	263	0	0	0	0	8760	0
264	01-FV-4003 C/V U/S Flange	264	0	0	0	0	8760	0
265	01-FV-4003 C/V Gland	265	0	0	0	0	8760	0
266	01-FV-4003 C/V D/S Flange	266	0	0	0	0	8760	0
267	Drain Line I/V Gland	267	0	0	0	0	8760	0
268	Drain Line Safety Flange	268	0	0	0	0	8760	0
269	01-FV-4003 D/S Line I/V U/S Flange	269	0	0	0	0	8760	0
270	01-FV-4003 D/S Line I/V Gland	270	0	0	0	0	8760	0
271	01-FV-4003 D/S Line I/V D/S Flange	271	0	0	0	0	8760	0
272	Bypass Line I/V U/S Flange	272	0	0	0	0	8760	0
273	Bypass Line I/V Gland	273	0	0	0	0	8760	0



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**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
274	Bypass Line I/V D/S Flange	274	0	0	0	0	8760	0
275	01-FV-3803 U/S Line I/V U/S Flange	275	0	0	0	0	8760	0
276	01-FV-3803 U/S Line I/V Gland	276	0	0	0	0	8760	0
277	01-FV-3803 U/S Line I/V D/S Flange	277	0	0	0	0	8760	0
278	Drain Line I/V Gland	278	0	0	0	0	8760	0
279	Drain Line Safety Flange	279	0	0	0	0	8760	0
280	01-FV-3803 C/V U/S Flange	280	0	0	0	0	8760	0
281	01-FV-3803 C/V Gland	281	0	0	0	0	8760	0
282	01-FV-3803 C/V D/S Flange	282	0	0	0	0	8760	0
283	Drain Line I/V Gland	283	0	0	0	0	8760	0
284	Drain Line Safety Flange	284	0	0	0	0	8760	0
285	01-FV-3803 D/S Line I/V U/S Flange	285	0	0	0	0	8760	0
286	01-FV-3803 D/S Line I/V Gland	286	0	0	0	0	8760	0
287	01-FV-3803 D/S Line I/V D/S Flange	287	0	0	0	0	8760	0
288	Bypass Line I/V U/S Flange	288	0	0	0	0	8760	0
289	Bypass Line I/V Gland	289	0	0	0	0	8760	0
290	Bypass Line I/V D/S Flange	290	0	0	0	0	8760	0
291	01-FV-3901 U/S Line I/V U/S Flange	291	0	0	0	0	8760	0
292	01-FV-3901 U/S Line I/V Gland	292	0	0	0	0	8760	0
293	01-FV-3901 U/S Line I/V D/S Flange	293	0	0	0	0	8760	0
294	Drain Line I/V Gland	294	0	0	0	0	8760	0
295	Drain Line Safety Flange	295	0	0	0	0	8760	0
296	01-FV-3901 C/V U/S Flange	296	0	0	0	0	8760	0
297	01-FV-3901 C/V Gland	297	0	0	0	0	8760	0
298	01-FV-3901 C/V D/S Flange	298	0	0	0	0	8760	0

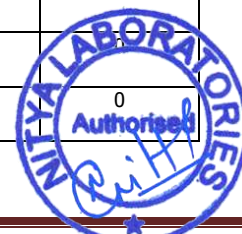


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
299	Drain Line I/V Gland	299	0	0	0	0	8760	0
300	Drain Line Safety Flange	300	0	0	0	0	8760	0
301	01-FV-3901 D/S Line I/V U/S Flange	301	0	0	0	0	8760	0
302	01-FV-3901 D/S Line I/V Gland	302	0	0	0	0	8760	0
303	01-FV-3901 D/S Line I/V D/S Flange	303	0	0	0	0	8760	0
304	Bypass line I/V U/S Flange	304	0	0	0	0	8760	0
305	Bypass Line I/V Gland	305	0	0	0	0	8760	0
306	Bypass line I/V D/S Flange	306	0	0	0	0	8760	0
307	3.P.01.3916.A1A To EE-108 Line I/V	307	0	0	0	0	8760	0
308	3.P.01.3916.A1A To EE-108 Line I/V	308	0	0	0	0	8760	0
309	3.P.01.3916.A1A To EE-108 Line I/V	309	0	0	0	0	8760	0
310	3.P.01.3916.A1A To Naptha Pool	310	0	0	0	0	8760	0
311	3.P.01.3916.A1A To Naptha Pool	311	0	0	0	0	8760	0
312	3.P.01.3916.A1A To Naptha Pool	312	0	0	0	0	8760	0
313	01-PR-101B Suction Line I/V U/S Flange	313	0	0	0	0	8760	0
314	01-PR-101B Suction Line I/V Gland	314	0	0	0	0	8760	0
315	01-PR-101B Suction Line I/V D/S Flange	315	0	0	0	0	8760	0
316	Steamer Top Flange	316	0	0	0	0	8760	0
317	Steamer Top Flange Drain Line I/V	317	0	0	0	0	8760	0
318	Steamer Top Flange Drain Line I/V	318	0	0	0	0	8760	0
319	Suction Line Flange	319	0	0	0	0	8760	0
320	Pump Seal	320	0	0	0	0	8760	0
321	Discharge Line Flange	321	0	0	0	0	8760	0
322	Meter line 1st I/V Gland	322	0	0	0	0	8760	0
323	Meter line 2nd I/V Gland	323	0	0	0	0	8760	0

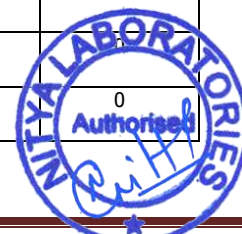


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NRL Complex, Numaligarh  
Distt. Golaghat, Assam-785 699

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
324	Meter line Sampling Point I/V Gland	324	0	0	0	0	8760	0
325	NRV I/V U/S Flange	325	0	0	0	0	8760	0
326	NRV Top Flange	326	0	0	0	0	8760	0
327	NRV I/V D/S Flange	327	0	0	0	0	8760	0
328	Discharge Line I/V U/S Flange	328	0	0	0	0	8760	0
329	Discharge Line I/V Gland	329	0	0	0	0	8760	0
330	Discharge Line I/V D/S Flange	330	0	0	0	0	8760	0
331	Pump to Drain Line 1st I/V Gland	331	0	0	0	0	8760	0
332	Pump to Drain Line 2nd I/V Gland	332	0	0	0	0	8760	0
333	Pump to Drain Line 3rd I/V Gland	333	0	0	0	0	8760	0
334	Steamer Flange	334	0	0	0	0	8760	0
335	OWS Point	335	0	0	0	0	8760	0
336	01-PA-101A Suction Line I/V U/S Flange	336	0	0	0	0	8760	0
337	01-PA-101A Suction Line I/V Gland	337	0	0	0	0	8760	0
338	01-PA-101A Suction Line I/V D/S Flange	338	0	0	0	0	8760	0
339	Steamer Top Flange	339	0	0	0	0	8760	0
340	Steamer Top Flange I/V Gland	340	0	0	0	0	8760	0
341	Steamer Top Flange Safety Flange	341	0	0	0	0	8760	0
342	Suction Line Flange	342	0	0	0	0	8760	0
343	Pump Seal	343	0	0	0	0	8760	0
344	Discharge Line Flange	344	0	0	0	0	8760	0
345	Meter line 1st I/V Gland	345	0	0	0	0	8760	0
346	Meter line 2nd I/V Gland	346	0	0	0	0	8760	0
347	Meter line Sampling Point I/V Gland	347	0	0	0	0	8760	0
348	Discharge Line I/V U/S Flange	348	0	0	0	0	8760	0

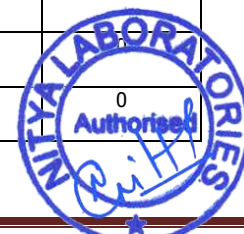


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**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
349	Discharge Line I/V Gland	349	0	0	0	0	8760	0
350	Discharge Line I/V D/S Flange	350	0	0	0	0	8760	0
351	Suction Line to Outside Line 1st I/V	351	0	0	0	0	8760	0
352	Suction Line to Outside Line 1st I/V	352	0	0	0	0	8760	0
353	Suction Line to Outside Line 1st I/V	353	0	0	0	0	8760	0
354	Suction Line to Outside Line 2nd I/V	354	0	0	0	0	8760	0
355	Suction Line to Outside Line 2nd I/V	355	0	0	0	0	8760	0
356	Suction Line to Outside Line 2nd I/V	356	0	0	0	0	8760	0
357	Suction Line to Outside Line 3rd I/V	357	0	0	0	0	8760	0
358	Suction Line to Outside Line 3rd I/V	358	0	0	0	0	8760	0
359	Suction Line to Outside Line 3rd I/V	359	0	0	0	0	8760	0
360	Pump to Drain Line 1st I/V Gland	360	0	0	0	0	8760	0
361	Pump to Drain Line 2nd I/V Gland	361	0	0	0	0	8760	0
362	Pump to Drain Line 3rd I/V Gland	362	0	0	0	0	8760	0
363	Steamer Flange	363	0	0	0	0	8760	0
364	OWS Point	364	0	0	0	0	8760	0
365	01-FV-3701 U/S Line I/V U/S Flange	365	0	0	0	0	8760	0
366	01-FV-3701 U/S Line I/V Gland	366	0	0	0	0	8760	0
367	01-FV-3701 U/S Line I/V D/S Flange	367	0	0	0	0	8760	0
368	Drain Line I/V Gland	368	0	0	0	0	8760	0
369	Drain Line Safety Flange	369	0	0	0	0	8760	0
370	01-FV-3701 C/V U/S Flange	370	0	0	0	0	8760	0
371	01-FV-3701 C/V Gland	371	0	0	0	0	8760	0
372	01-FV-3701 C/V D/S Flange	372	0	0	0	0	8760	0
373	Drain Line I/V Gland	373	0	0	0	0	8760	0



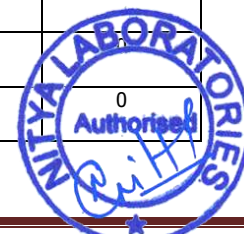


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
374	Drain Line Safety Flange	374	0	0	0	0	8760	0
375	01-FV-3701 D/S Line I/V U/S Flange	375	0	0	0	0	8760	0
376	01-FV-3701 D/S Line I/V Gland	376	0	0	0	0	8760	0
377	01-FV-3701 D/S Line I/V D/S Flange	377	0	0	0	0	8760	0
378	Bypass Line I/V Gland	378	0	0	0	0	8760	0
379	To Naptha Pool EX-PA-101 Line I/V	379	0	0	0	0	8760	0
380	To Naptha Pool EX-PA-101 Line I/V	380	0	0	0	0	8760	0
381	To Naptha Pool EX-PA-101 Line I/V	381	0	0	0	0	8760	0
382	Naptha To EE-109 EX-PA-101 Line	382	0	0	0	0	8760	0
383	Naptha To EE-109 EX-PA-101 Line	383	0	0	0	0	8760	0
384	Naptha To EE-109 EX-PA-101 Line	384	0	0	0	0	8760	0
385	01-FV-4005 U/S Line I/V U/S Flange	385	0	0	0	0	8760	0
386	01-FV-4005 U/S Line I/V Gland	386	0	0	0	0	8760	0
387	01-FV-4005 U/S Line I/V D/S Flange	387	0	0	0	0	8760	0
388	Drain Line I/V Gland	388	0	0	0	0	8760	0
389	Drain Line Safety Flange	389	0	0	0	0	8760	0
390	01-FV-4005 C/V U/S Flange	390	0	0	0	0	8760	0
391	01-FV-4005 C/V Gland	391	0	0	0	0	8760	0
392	01-FV-4005 C/V D/S Flange	392	0	0	0	0	8760	0
393	Drain Line I/V Gland	393	0	0	0	0	8760	0
394	Drain Line Safety Flange	394	0	0	0	0	8760	0
395	01-FV-4005 D/S Line I/V U/S Flange	395	0	0	0	0	8760	0
396	01-FV-4005 D/S Line I/V Gland	396	0	0	0	0	8760	0
397	01-FV-4005 D/S Line I/V D/S Flange	397	0	0	0	0	8760	0
398	Bypass Line I/V Gland	398	0	0	0	0	8760	0

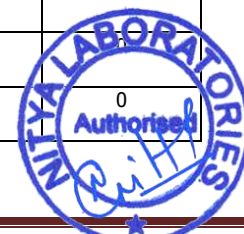


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
399	01-PA-CF-012A Suction Line I/V U/S Flange	399	0	0	0	0	8760	0
400	01-PA-CF-012A Suction Line I/V Gland	400	0	0	0	0	8760	0
401	01-PA-CF-012A Suction Line I/V D/S Flange	401	0	0	0	0	8760	0
402	Steamer Top Flange	402	0	0	0	0	8760	0
403	Steamer Top Flange I/V Gland	403	0	0	0	0	8760	0
404	Steamer Top Flange Safety Flange	404	0	0	0	0	8760	0
405	Suction Line Flange	405	0	0	0	0	8760	0
406	Pump Seal	406	0	0	0	0	8760	0
407	Discharge Line Flange	407	0	0	0	0	8760	0
408	NRV I/V U/S Flange	408	0	0	0	0	8760	0
409	NRV Top Flange	409	0	0	0	0	8760	0
410	NRV I/V D/S Flange	410	0	0	0	0	8760	0
411	Meter line 1st I/V Gland	411	0	0	0	0	8760	0
412	Meter line 2nd I/V Gland	412	0	0	0	0	8760	0
413	Meter line Sampling Point I/V Gland	413	0	0	0	0	8760	0
414	Discharge Line I/V U/S Flange	414	0	0	0	0	8760	0
415	Discharge Line I/V Gland	415	0	0	0	0	8760	0
416	Discharge Line I/V D/S Flange	416	0	0	0	0	8760	0
417	Pump to Drain Line 1st I/V Gland	417	0	0	0	0	8760	0
418	Pump to Drain Line 2nd I/V Gland	418	0	0	0	0	8760	0
419	Pump to Drain Line 3rd I/V Gland	419	0	0	0	0	8760	0
420	Steamer Flange	420	0	0	0	0	8760	0
421	OWS Point	421	0	0	0	0	8760	0
422	01-PV-04 Suction Line I/V U/S Flange	422	0	0	0	0	8760	0
423	01-PV-04 Suction Line I/V Gland	423	0	0	0	0	8760	0

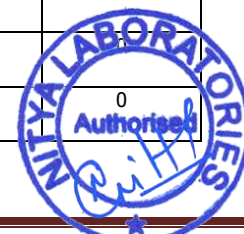


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
424	01-PV-04 Suction Line I/V D/S Flange	424	0	0	0	0	8760	0
425	Steamer Top Flange	425	0	0	0	0	8760	0
426	Steamer Top Flange I/V Gland	426	0	0	0	0	8760	0
427	Steamer Top Flange Safety Flange	427	0	0	0	0	8760	0
428	Suction Line Flange	428	0	0	0	0	8760	0
429	Discharge Line 1st Flange	429	0	0	0	0	8760	0
430	Discharge Line 2nd Flange	430	0	0	0	0	8760	0
431	Meter Line I/V Gland	431	0	0	0	0	8760	0
432	Meter Line Sampling Point I/V Gland	432	0	0	0	0	8760	0
433	NRV I/V U/S Flange	433	0	0	0	0	8760	0
434	NRV Top Flange	434	0	0	0	0	8760	0
435	NRV I/V D/S Flange	435	0	0	0	0	8760	0
436	Discharge Line I/V U/S Flange	436	0	0	0	0	8760	0
437	Discharge Line I/V Gland	437	0	0	0	0	8760	0
438	Discharge Line I/V D/S Flange	438	0	0	0	0	8760	0
439	Drain Line I/V Gland	439	0	0	0	0	8760	0
440	Drain Line Safety Flange	440	0	0	0	0	8760	0
441	Pump to Drain Line 1st I/V Gland	441	0	0	0	0	8760	0
442	Pump to Drain Line 2nd I/V Gland	442	0	0	0	0	8760	0
443	Stainer Flange	443	0	0	0	0	8760	0
444	OWS Point	444	0	0	0	0	8760	0
445	01-PV-04A Suction Line I/V U/S Flange	445	0	0	0	0	8760	0
446	01-PV-04A Suction Line I/V Gland	446	0	0	0	0	8760	0
447	01-PV-04A Suction Line I/V D/S Flange	447	0	0	0	0	8760	0
448	Stainer Top Flange	448	0	0	0	0	8760	0

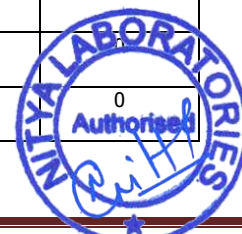


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
449	Stainer Top Flange I/V Gland	449	0	0	0	0	8760	0
450	Stainer Top Flange Safety Flange	450	0	0	0	0	8760	0
451	Suction Line Flange	451	0	0	0	0	8760	0
452	Pump Seal	452	0	0	0	0	8760	0
453	Discharge Line 1st Flange	453	0	0	0	0	8760	0
454	Discharge Line 2nd Flange	454	0	0	0	0	8760	0
455	Meter line I/V Gland	455	0	0	0	0	8760	0
456	Meter line Sampling Point I/V Gland	456	0	0	0	0	8760	0
457	NRV I/V U/S Flange	457	0	0	0	0	8760	0
458	NRV Top Flange	458	0	0	0	0	8760	0
459	NRV I/V D/S Flange	459	0	0	0	0	8760	0
460	Drain Line I/V Gland	460	0	0	0	0	8760	0
461	Drain Line Safety Flange	461	0	0	0	0	8760	0
462	Discharge Line I/V U/S Flange	462	0	0	0	0	8760	0
463	Discharge Line I/V Gland	463	0	0	0	0	8760	0
464	Discharge Line I/V D/S Flange	464	0	0	0	0	8760	0
465	Pump to Drain Line 1st I/V Gland	465	0	0	0	0	8760	0
466	Pump to Drain Line 2nd I/V Gland	466	0	0	0	0	8760	0
467	Stainer Flange	467	0	0	0	0	8760	0
468	OWS Point	468	0	0	0	0	8760	0
469	01-PA-CF-013-B Suction Line I/V U/S Flange	469	0	0	0	0	8760	0
470	01-PA-CF-013-B Suction Line I/V Gland	470	0	0	0	0	8760	0
471	01-PA-CF-013-B Suction Line I/V D/S Flange	471	0	0	0	0	8760	0
472	Stainer Top Flange	472	0	0	0	0	8760	0
473	Stainer Top Flange I/V Gland	473	0	0	0	0	8760	0

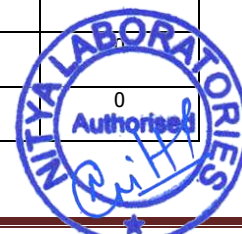


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
474	Stainer Top flange Safety Flange	474	0	0	0	0	8760	0
475	Suction Line Flange	475	0	0	0	0	8760	0
476	Pump Seal	476	0	0	0	0	8760	0
477	Discharge Line 1st Flange	477	0	0	0	0	8760	0
478	Discharge Line 2nd Flange	478	0	0	0	0	8760	0
479	Meter line I/V Gland	479	0	0	0	0	8760	0
480	Meter line Sampling Point I/V Gland	480	0	0	0	0	8760	0
481	NRV I/V U/S Flange	481	0	0	0	0	8760	0
482	NRV Top Flange	482	0	0	0	0	8760	0
483	NRV I/V D/S Flange	483	0	0	0	0	8760	0
484	Discharge Line I/V U/S Flange	484	0	0	0	0	8760	0
485	Discharge Line I/V Gland	485	0	0	0	0	8760	0
486	Discharge Line I/V D/S Flange	486	0	0	0	0	8760	0
487	Pump to Drain Line 1st I/V Gland	487	0	0	0	0	8760	0
488	Pump to Drain Line 2nd I/V Gland	488	0	0	0	0	8760	0
489	Pump to Drain Line 3rd I/V Gland	489	0	0	0	0	8760	0
490	Stainer Flange	490	0	0	0	0	8760	0
491	OWS Point	491	0	0	0	0	8760	0
492	01-PA-CF-013-A Suction Line I/V U/S Flange	492	0	0	0	0	8760	0
493	01-PA-CF-013-B Suction Line I/V Gland	493	0	0	0	0	8760	0
494	01-PA-CF-013-B Suction Line I/V D/S Flange	494	0	0	0	0	8760	0
495	Stainer Top Flange	495	0	0	0	0	8760	0
496	Stainer Top Flange I/V Gland	496	0	0	0	0	8760	0
497	Stainer Top Flange Safety Flange	497	0	0	0	0	8760	0
498	Suction Line Flange	498	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
499	Pump Seal	499	0	0	0	0	8760	0
500	Discharge Line 1st Flange	500	0	0	0	0	8760	0
501	Discharge Line 2nd Flange	501	0	0	0	0	8760	0
502	Meter line I/V Gland	502	0	0	0	0	8760	0
503	Meter line Sampling Point I/V Gland	503	0	0	0	0	8760	0
504	NRV I/V U/S Flange	504	0	0	0	0	8760	0
505	NRV Top Flange	505	0	0	0	0	8760	0
506	NRV I/V D/S Flange	506	0	0	0	0	8760	0
507	Discharge Line I/V U/S Flange	507	0	0	0	0	8760	0
508	Discharge Line I/V Gland	508	0	0	0	0	8760	0
509	Discharge Line I/V D/S Flange	509	0	0	0	0	8760	0
510	Pump to Drain Line 1st I/V Gland	510	0	0	0	0	8760	0
511	Pump to Drain Line 2nd I/V Gland	511	0	0	0	0	8760	0
512	Pump to Drain Line 3rd I/V Gland	512	0	0	0	0	8760	0
513	Stainer Flange	513	0	0	0	0	8760	0
514	OWS Point	514	0	0	0	0	8760	0
515	01-FV-1505 U/S Line I/V U/S Flange	515	0	0	0	0	8760	0
516	01-FV-1505 U/S Line I/V Gland	516	0	0	0	0	8760	0
517	01-FV-1505 U/S Line I/V D/S Flange	517	0	0	0	0	8760	0
518	Drain Line I/V Gland	518	0	0	0	0	8760	0
519	Drain Line Safety Flange	519	0	0	0	0	8760	0
520	01-FV-1505 C/V U/S Flange	520	0	0	0	0	8760	0
521	01-FV-1505 C/V Gland	521	0	0	0	0	8760	0
522	01-FV-1505 C/V D/S Flange	522	0	0	0	0	8760	0
523	01-FV-1505 D/S Line I/V U/S Flange	523	0	0	0	0	8760	0

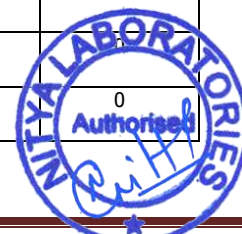


### VOC Emission Monitoring Survey Report

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

**Monitoring Period:** April 2022  
**Customer Reference No.:** 4600008282-NIR/26.08.2021

Sr. No.	Locations	Tag	VOC Emission					
			Min (PPM)	Avg (PPM)	Max (PPM)	Emission Kg/hr	Total Operational Hours	Emission Kg/year
524	01-FV-1505 D/S Line I/V Gland	524	0	0	0	0	8760	0
525	01-FV-1505 D/S Line I/V D/S Flange	525	0	0	0	0	8760	0
526	Bypass Line I/V U/S Flange	526	0	0	0	0	8760	0
527	Bypass Line I/V U/S Gland	527	0	0	0	0	8760	0
528	Bypass Line I/V D/S Flange	528	0	0	0	0	8760	0
529	01-PV-2002 U/S Line I/V Gland	529	0	0	0	0	8760	0
530	Drain Line I/V Gland	530	0	0	0	0	8760	0
531	Drain Line Safety Flange	531	0	0	0	0	8760	0
532	01-PV-2002 D/S line I/V Gland	532	0	0	0	0	8760	0
533	Drain Line I/V Gland	533	0	0	0	0	8760	0
534	Drain Line Safety Flange	534	0	0	0	0	8760	0
535	Bypass Line I/V Gland	535	0	0	0	0	8760	0
536	01-PV-1402 U/S line I/V Gland	536	0	0	0	0	8760	0
537	Drain Line I/V Gland	537	0	0	0	0	8760	0
538	Drain Line Safety Flange	538	0	0	0	0	8760	0
539	01-PV-1402 C/V Gland	539	0	0	0	0	8760	0
540	01-PV-1402 D/S line I/V Gland	540	0	0	0	0	8760	0
541	Drain Line I/V Gland	541	0	0	0	0	8760	0
542	Drain Line Safety Flange	542	0	0	0	0	8760	0
543	Bypass Line I/V Gland	543	0	0	0	0	8760	0
544	01-PV-1401 U/S line I/V Gland	544	0	0	0	0	8760	0
545	Drain Line I/V Gland	545	0	0	0	0	8760	0
546	Drain Line Safety Flange	546	0	0	0	0	8760	0
547	01-PV-1401 C/V U/S Flange	547	0	0	0	0	8760	0
548	01-PV-1401 C/V Gland	548	0	0	0	0	8760	0



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**Monitoring Period:** April 2022  
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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
549	01-PV-1401 C/V D/S Flange	549	0	0	0	0	8760	0
550	01-PV-1401 D/S line I/V Gland	550	0	0	0	0	8760	0
551	Drain Line I/V Gland	551	0	0	0	0	8760	0
552	Drain Line Safety Flange	552	0	0	0	0	8760	0
553	Bypass Line I/V Gland	553	0	0	0	0	8760	0
554	01-SDV-1401 C/V U/S Flange	554	0	0	0	0	8760	0
555	01-SDV-1401 C/V Gland	555	0	0	0	0	8760	0
556	01-SDV-1401 C/V D/S Flange	556	0	0	0	0	8760	0
557	Drain Line I/V Gland	557	0	0	0	0	8760	0
558	Drain Line Safety Flange	558	0	0	0	0	8760	0
559	01-FV-3804 D/S Line I/V U/S Flange	559	0	0	0	0	8760	0
560	01-FV-3804 D/S Line I/V Gland	560	0	0	0	0	8760	0
561	01-FV-3804 D/S Line I/V D/S Flange	561	0	0	0	0	8760	0
562	01-FV-3804 C/V U/S Flange	562	0	0	0	0	8760	0
563	01-FV-3804 C/V Gland	563	0	0	0	0	8760	0
564	01-FV-3804 C/V D/S Flange	564	0	0	0	0	8760	0
565	01-FV-2702 C/V U/S Flange	565	0	0	0	0	8760	0
566	01-FV-2702 C/V Gland	566	0	0	0	0	8760	0
567	01-FV-2702 C/V U/S Flange	567	0	0	0	0	8760	0
568	01-FV-1702 C/V U/S Flange	568	0	0	0	0	8760	0
569	01-FV-1702 C/V Gland	569	0	0	0	0	8760	0
570	01-FV-1702 C/V D/S Flange	570	0	0	0	0	8760	0
571	Drain Line I/V Gland	571	0	0	0	0	8760	0
572	Drain Line Safety Flange	572	0	0	0	0	8760	0

