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ISO 9001:2000
ISO 14001:1996
OHSAS 18001 :1999

NUMALIGARH REFINERY LIMITED

A GOVERNMENT OF INDIA ENTERPRISE

NRL

To,

Date: 26th Sept, 2020

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

Ref: NRL/TS/ENV/34.1/

CIN- U11202AS19993GOI003893

Sub: Environmental Statement of NRL for the financial year 2019-2020.

Dear Sir,

We are enclosing herewith the duly filled in "**Environmental Statement**" of Numaligarh Refinery Ltd for the year 2019 -20 for your kind perusal.

Hope, the same shall find in order.

Yours' faithfully

(A. N. Nath)
Chief Manager, TS(Env))

CC : i)Regional Office , MoEF&CC, Shillong
ii)Regional Executive Engineer, PCBA, Golaghat.

Please reply to :

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[FORM – V]

(See rule 14)

Environmental Statement of NUMALIGARH REFINERY LIMITED for the financial year – 2019-2020

PART – A

(i)	Name and address of the owner/occupier: of the industry operation or process.	Numaligarh Refinery Limited P.O. Numaligarh Refinery Project Golaghat -785699, Assam
	Co-ordination Office:	Tolstoy House, 6th Floor 15-17 Tolstoy Marg New Delhi-110001
	Registered Office :	122A , G.S.Road Christianbasti Guwahati-781005
(ii)	Industry category Primary ----(STC code) Secondary-----(SIC Code)	: Primary
(iii)	Production capacity (Crude T'put)	: 3.0 MMTPA
(iv)	Year of establishment	: 22nd April ,1993
(v)	Date of the last environmental statement submitted	: 28th Sept ,2019

PART – B

Water and River Material Consumption

(1) Water consumption m3/d:

Process	:	2718.32
Cooling	:	3893.85
Domestic	:	3107.06

Name of Products : Process water consumption in m3 per MT of raw material

Crude Oil

2018-2019	2019-2020
0.296	0.416

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.

NB: *During 2019-20 NRL throughput was limited due to shutdown taken for scheduled Refinery Turnaround (RTA) maintenance which is done once in 3/4 years. Maintenance activities were also adversely impacted because of large scale disturbances during CAB/CAA protests in Assam. Because of mentioned factors /reasons Crude Oil processing during 2019-2020 was less, so, process water consumption in m3 per MT of raw material i.e. - Crude Oil is little higher than that of previous year (2018-19)*

ii) Raw Material Consumption
Raw material: Crude Oil

	2018-19	2019-2020
T'put during the year (in MT) (Design Capacity: 3.0 MMTPA)	2900385	2383338

PART - C

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

a) a) Effluent Water: 2019-20

Pollutants	CPCB Standard (mg/l	Concen. of pollutants in discharges(av.) (mg/l)	Quantity of pollutants discharged (kg/yr, exc. pH)	Qnty of pollutants in kg/1000 MT of Crude		Percentage of variation from STD. with reasons
				STD(mg/l)	Actual(mg/l)	
pH	6-85	6.9	-	-		All parameters are within prescribed limit/stds
Oil & G	5.0	3.6	3571.9	2.0	1.49	
TSS	20	12.55	12451.97	8.0	5.2	
Phenol	0.35	0.2	198.43	0.14	0.083	
Sulphide	0.5	<0.1	99.21	0.2	0.041	
COD	125	73.0	72429.79	50	30.39	
BOD3	15	9.8	9723.45	6.0	4.079	
CN	<0.02	<0.02	19.84	0.08	0.0078	
Ammonia as N	15	7.54	7481.1	6.0	3.13	
TKN	40	11.43	11340.72	16.0	4.758	
P	3.0	0.25	248.04	1.2	0.104	
Cr (Hext.)	0.1	Nil	00.0	0.04	0.00	
Cr (Total)	2.0	0.01	9.921	0.8	0.004	
Pb	0.1	0.01	9.921	0.04	0.004	
Hg	0.01	0.00	0.00	0.004	0.000	
Zn	5.0	0.24	238.12	2.0	0.099	
Ni	1.0	0.04	39.687	0.4	0.0166	
Cu	1.0	0.04	39.687	0.4	0.0166	
V	0.2	0.02	19.84	0.8	0.008	
Benzene	0.1	0.03	29.765	0.04	0.0124	
Benzo(a)-Pyrene	0.2	0.01	9.921	0.08	0.004	

(b) AIR

Average Sulphur Dioxide emission from the refinery during - 2019-20 :

SO2 Emission , Kg/hr	During April , 2019 to Mar,2020
As per NOC of PCB, Assam max. allowable limit is 256 kg/hr as SO2	79.84 kg/hr

AMBIENT AIR QUALITY MONITORING DATA				During April, 2019 to Mar,2020		
STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS		
				MAX	MIN	AVG.
REFINERY (WATCH TOWER NO. 6)	SO2	80 (24 hr avg.)	µg/m3	21.20	4.20	15.18
	NO2	80 (24 hr avg.)	µg/m3	27.40	12.20	19.05
	O3	100(8 hr avg.)	µg/m3	36.10	10.00	24.78
	CO	2(8 hr.avg.)	mg/m3	1.200	0.300	0.96
	NH3	400(24 hr.avg.)	µg/m3	34.2	10.0	24.17
	PM 10	100(24 hr.avg.)	µg/m3	76.8	38.0	69.95
	PM 2.5	60(24 hr.avg.)	µg/m3	54.6	21.0	46.05
	Benzene	5.0(Annual)	µg/m3	2.60	2.00	2.20
	BaP	1.0(Annual)	ng/m3	0.40	0.40	0.40
	Pb	1.0(24 hr.avg.)	µg/m3	0.40	0.02	0.14
	As	6.0(Annual)	ng/m3	1.00	1.00	1.000
	Ni	20(Annual)	ng/m3	5.68	2.10	3.30
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	18.10	4.30	11.23
	NO2	80 (24 hr avg.)	µg/m3	32.20	9.40	14.85
	O3	100(8 hr avg.)	µg/m3	27.4	10.0	14.9
	CO	2(8 hr.avg.)	mg/m3	0.480	0.100	0.300
	NH3	400(24 hr.avg.)	µg/m3	18.6	9.20	12.83
	PM 10	100(24 hr.avg.)	µg/m3	71.6	48.0	65.78

	PM 2.5	60(24 hr.avg.)	µg/m3	48.1	18.8	30.43
	Benzene	5.0(Annual)	µg/m3	2.08	2.08	2.080
	HC	x.0(Annual)	ng/m3	1.55	0.70	0.675
	BaP	1.0(Annual)	ng/m3	0.40	0.40	0.40
	Pb	1.0(24 hr.avg.)	µg/m3	0.30	0.02	0.19
	As	6.0(.0Annual)	ng/m3	1.00	1.00	1.00
	Ni	20(Annual)	ng/m3	5.32	2.00	2.558
RAW WATER INTAKE	SO2	80 (24 hr avg.)	µg/m3	12.80	4.10	9.83
	NO2	80 (24 hr avg.)	µg/m3	28.10	8.70	12.70
	O3	100(8 hr avg.)	µg/m3	24.5	10.0	10.08
	CO	2(8 hr.avg.)	mg/m3	0.160	0.100	0.103
	NH3	400(24 hr.avg.)	µg/m3	12.8	9.80	10.45
	PM 10	100(24 hr.avg.)	µg/m3	66.1	36.0	54.95
	PM 2.5	60(24 hr.avg.)	µg/m3	48.2	15.0	31.35
	Benzene	5.0(Annual)	µg/m3	2.08	2.08	2.08
	BaP	1.0(Annual)	ng/m3	0.40	0.40	0.40
	Pb	1.0(24 hr.avg.)	µg/m3	0.30	0.02	0.02
	As	6.0(Annual)	ng/m3	1.00	1.00	1.00
	Ni	20(Annual)	ng/m3	2.00	2.00	2.00
NH-39 BYPASS	SO2	80 (24 hr. avg.)	µg/m3	20.8	4.2	19.8
	NO2	80 (24 hr avg.)	µg/m3	31.4	12.8	17.90

	O3	100(8 hr avg.)	µg/m3	31.2	10.0	20.75
	CO	2(8 hr.avg.)	mg/m3	1.20	0.40	0.90
	NH3	400(24 hr.avg.)	µg/m3	21.5	10.0	20.30
	PM 10	100(24 hr.avg.)	µg/m3	76.8	48.0	68.90
	PM 2.5	60(24 hr.avg.)	µg/m3	56.4	22.0	45.2
	Benzene	5.0(Annual)	µg/m3	2.80	2.10	2.25
	HC	x.0(Annual)	µg/m3	1.42	0.70	0.780
	BaP	1.0(Annual)	ng/m3	0.40	0.40	0.40
	Pb	1.0(24 hr.avg.)	µg/m3	0.40	0.02	0.28
	As	6.0(Annual)	ng/m3	1.00	1.00	1.00
	Ni	20(Annual)	ng/m3	4.80	2.20	3.17
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	SO2	80 (24 hr avg.)	µg/m3	11.1	4.00	8.3
	NO2	80 (24 hr avg.)	µg/m3	30.4	7.4	10.44
	O3	100(8 hr avg.)	µg/m3	10.00	10.00	10.0
	CO	2 (8 hr.avg.)	mg/m3	0.450	0.100	0.10
	NH3	400(24 hr.avg.)	µg/m3	10.00	10.00	10.00
	PM 10	100(24 hr.avg.)	µg/m3	62.6	26.0	53.93
	PM 2.5	60(24 hr.avg.)	µg/m3	36.2	12.0	24.0
	Benzene	5.0(Annual)	µg/m3	2.08	2.08	2.08
	HC	x.0(Annual)	µg/m3	2.74	0.10	0.148
	BaP	1.0(Annual)	ng/m3	0.40	0.40	0.40

Pb	1.0(24 hr.avg.)	µg/m3	0.02	0.02	0.02
As	6.0(Annual)	ng/m3	1.00	1.00	1.00
Ni	20(Annual)	ng/m3	4.00	2.00	2.18

(All the parameters are found to be within limit)

PART – D
Hazardous Wastes

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

Hazardous Wastes(Generated/disposed)	Total Quantity (In MT)	
	During the previous Financial Year (18-19)	During the current Financial year -2019-2020
a) From Process		
i) Spent Catalyst	Nil	Generated: 380 MT (under process of selling)
ii) Spent Adsorbents	Nil	Nil
iii) Tank Bottom (oily Sludge/waste)	Generated : 700 MT (kept in sealed drum for bioremediation)	Nil
b) From Pollution Control Facilities Chemical & Oily Sludge	11.55 MT (disposed off in the SLF)	23.66 MT (disposed off in the SLF)

Part – E

Solid Wastes

Solid Wastes generated /disposed	Total Quantity (in M3)	
	During the previous financial year(2018-19)	During the current financial Year 2019-20
(a) From Process Generation of Incinerable substances -	1598m3	1955m3
(b) From pollution control facilities Generation at ETP Bio sludge -	158.60MT	230.15MT
(C) (1) Quantity recycled or reutilized within the unit	Nil	Nil
(2) Sold	Nil	Nil
(3) Disposal - Incinerable substances -	Entire quantity disposed through incineration	Entire quantity disposed through incineration
Bio sludge -	Entire Quantity disposed off into SLF	Entire Quantity disposed off into SLF

Part – F

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

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

Date of result	SAMPLE SOURCE	PARAMETERS	RESULTS %,wt
20.02.2020	ETP (Ex Chemical & Oily sludge Centrifuge)	Moisture Content	87.90
		Oil Content	3.60
		Organic & Volatile Matter	6.20
		Iron	0.17
		Sodium	0.14
		Sulphide	0.20
		Phenol	0.002
		SiO2 & Trace metals	0.016
		Chloride	0.90
		Calcium	0.29
		Magnesium	0.09
		Manganese	0.010
		Nickel	0.0010
		Sulphate	0.42
		Zinc	0.0572
		Lead	0.0002
		Copper	0.0011
		Co	0.0003

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 objective -

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 new Secured Land Fill with a capacity of 6000m3 has been constructed inside the Refinery Premises now 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 future requirement, construction of an anther new Bioremediation facility for bioremediation of Crude Tank cleaning sludge is under progress.

Spent catalysts are generally generated after a gap of 5/6 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 guide lines/procedures. Spent catalyst are sold to CPCB/SPOCB 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 Ltd , 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, 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 waste water for centralized treatment has been provided to meet the stringent standards laid down in MoEF notification, 2008.

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 environmental 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 is blinded and the discharge from township STP is 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 and under operation continuously.

Green Belt Development:-

An ambitious plan of green belt has been development 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 60 He of land had been developed. Massive plantation are being carried out every year in the Green Belt to increase the density of trees. Around 15000 saplings have been planted in thinly planted places the Green Belt during 2015-17. Plantation activity for another 15000 saplings are in progress since April, 2018 onwards inside as wells outside the refinery. The meticulously planned and developed green belt all around the refinery has now grown in to 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.

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.

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 with sulphur recovery of 99.9% has commissioned recently .

High Stack Height & Strict Emissions Monitoring:-

To reduce the ground level concentration of pollutants, height of stacks at different plants in the refinery is kept at 60 meters. Further, the height of stack at Coke Calcination Unit is kept at 77 meters. Facilities for continuous monitoring of SOx, NOx etc. have been provided for all the furnace stacks and low NOx burners have been used in all the furnaces.

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.

Solid Waste Management: -

Chemical and Oily sludge generated at different section of Effluent Treatment plant, the same is centrifuged in the highly efficient Centrifuge to remove the oil content further. 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 process which is a close loop process and by which nearly 100% recovery of hydrocarbon could be achieved.

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 generated due to cleaning of

the tanks either sold to CPCB/SPCB recognized recycler or bioremediated inside Refinery premises itself.

Implementation of Hydrogen Peroxide Treatment:-

In pursuance of latest development, H2O2 treatment process has been introduced for the chemical treatment of wastewater in the ETP by replacing the conventional Fecl3 process. Introduction of this technique has reduced the solid waste generation drastically.

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..

Estimation of Carbon Foot Print: -

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.

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.

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:-

VOC Recovery System and modernization of ETP:-

NRL engaged M/s Nicco as a consultant to carry out a detailed study on the requirement VOC recovery system including modernization study for ETP to incorporate latest technologies in the field of effluent treatment. Based on the study, M/s UEM, Noida has been engaged to execute the job on turnkey basis. Installation of all parts , accessories, components have been completed on time and VOC Recovery System has been commissioned and now working successfully.

NEW SECURED LAND FILL:-

As per CPCB recommendations & by following latest scientific design, a new Secured Land Fill of higher capacity of around 6000 m3 has been constructed in the Refinery premises to cater the needs of future requirement for disposal of Chemical & Oil Sludge and now under operation.

Bioremediation facility:-

Construction of a new bioremediation facility is under progress to facilitate bioremediation of tank bottom oily sludge (calorific value >2500kcal/kg) in future.

Installation of double mechanical seals in IFRT (Internal Floating Roof Tanks) and EFRT (External Floating Roof Tanks) :-

In line with latest MoEF notification, 2008, relating to Oil Refinery Industry, installation of double mechanical seals in IFRT and EFRT tanks have been completed.

Transmission of online real time data:-

Transmission of online real time data with remote alert facility for Sox , NOx, CO , PM and Ambient Air quality to CPCB Server 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 .

Installation of CAAQMS and PM &CO analyzers:

As per recommendation of MoEF and CPCB – installation of one another Continuous Ambient Air Quality Monitoring Station (CAAQMS) has been completed and commissioning is under progress. PM and CO analyzers have been fixed in all the stacks.

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 0.005% sulphur conforming to the Euro-IV Specifications. This contributes in reducing pollution from diesel and petrol vehicle due to the reduction in emission of Sulphur di-oxide in the atmosphere.

NRL has already implemented Diesel Quality Up-gradation Project which has enabled NRL to produce HSD meeting BS-III specification as well as to produce limited quantity of HSD meeting BS-IV specification. To cater to the future needs of high quality environment friendly fuel, NRL is further exploring suitable technology for production of HSD conforming BS-IV specification along with limited quantity of Euro-V HSD at 100% refinery throughput and as an advance step towards environment protection. NRL has commissioned an Wax Plant for producing Micro Cristal Wax and Parafin Wax . The Wax plant was dedicated to the Nation by Prime Mister Narendra Modi on 5th Feb, 2016 .

NRL has already commissioned Diesel Hydrotreater (DHDT) Plant for producing Euro IV HSD. 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 a LPG mounded Bullet which is more environment friendly and safe .

Installation of Bio Refinery -

NRL has already on the process to install one Bio refinery for which EC already obtained. A Joint venture has be formed as 'Assam Bio Refinery Pvt Ltd. Preliminary and construction works has already been started . M/s EIL has been awarded the EPCM consultancy work for the Bio-Refinery.

As Govt of India has proposed a indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel by 2030 , the alternatives / systems need special attention to make our energy roadmap sustainable. Biofuels like Ethanol, Bio-ethanol, Bio-Butanol, HVO, Bio CNG, etc. are in highest priority in that context. Government has a plan to increase ethanol blending in gasoline from 4.3% now to 8-10 % by 2020-21. In that line, Numaligarh Refinery has embarked into an ambitious project for setting up a bamboo-based bioethanol project as a joint venture project with M/s Chempolis Oy, Finland. Primary products of the bio refinery would be cellulosic Ethanol and platform chemicals namely acetic acid and furfural alcohol and bio coal/stillages. Furfural demand is as such limited in India but its derivative like furfuryl alcohol and furan resin shows high demand due to growth projection in major end-use industries, including chemical, pharmaceutical and foundry.

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.

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.NRL has replaced conventional street lights with solar powered lights in several places in its township. 100 KWH solar PV panel has installed on the rooftop of admin building. 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. Further, NRL gone ahead with tendering for a mega 1.0 MW Solar Power project in NRL premise which is under process. Due to its continual improvements towards various energy conservation measures, NRL has attained the ISO 50001:2011 Certification on confirming to Energy Management System Standard, the second refinery in India to attain ISO 50001 certification.

Renewable initiative :

To reduce fuel consumption, NRL has started installing solar panel to generate electricity and inject the same in the refinery grid. A 1.025 MW solar plant installed in 2018 to reduce power requirement to the extent of heat generation during the day time. NRL will continue to pursue the opportunity for further electricity production through solar resources.

R&D activities-

As a positive development, Our Company 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 at the 'NRL Centre of Excellence on Sustainable materials' to be set up in IITG.

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. The MoU was signed between our Sr. CGM (Corporate Affairs), Mr. Nikunja Borthakur and Director, IITG Prof. Dr. T.G.Sitharam in the presence of officials from NRL and IITG.

NCESM will facilitate further research activities in development of sustainable materials from Oil and Bio-refinery streams, which is in sync with our Company's Environment Management Policy. Further, specific R&D projects would be sponsored by NRL under this MoU for which project specific Memorandum of Agreement (MoAs) will be signed separately. NRL employees will be actively engaged in the R&D projects under NCESM.

View of signing ceremony of the MoU

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.

Re-processing of DCU Slop: Re-processing of DCU Slop scheme implemented. DCU internal slop generated now being used as quench oil in DCU itself resulting reduction of slop generation in the refinery.

Other schemes adding to continual benefit are:

1. **CDU/VDU column internal modification for yield/energy optimization.**
2. **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 High Capacity Tray in HCU fractionator.**
5. **Up-rating of GTG-1&2 for augmentation of capacity (4-5MW).**
6. **Replacement of metallic blades with E-FRP blades in air fin fan coolers of the Process Units**

7. Environment friendly chemical (Hydrazine, phosphate, silica) injection in BFW of CPP and MSP done. This resulted in substantial reduction in Blow down.
8. Steam traps dynamic analysis and monitoring.
9. 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.
10. Continuous operation of APC in CDU, DCU, HCU and H2U.
11. Conventional light replacement with Energy efficient light
12. 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.

Up coming Major Projects :

The Company's focus is primarily on three major ongoing projects namely the Refining Capacity Expansion Project, Indo-Bangladesh Friendship pipeline(IBFPL) and Bio Refinery Project; which have gained momentum and recorded definitive progress.

NRL has recently been accorded the Environmental clearance from the Ministry of Environment, Forest & Climate Change for the Refinery Expansion Project on 27th July 2020, which would be the zero date for the Project. M/s SBI Capital Markets Limited, Mumbai has been appointed for Debt syndication of Rs. 15,102 Crore for Refinery Expansion Project. Lining up of Technical Management Consultant for Refinery Expansion Project, EPCM for Pipeline project, licensors for Fluid Catalytic Cracking Gasoline Desulphurisation Unit (FCC-GDS) and Motor Spirit (MS) Block and allocation of 200 acres of land to set up Crude Oil Terminal in Paradip are other significant developments in implementation of the integrated mega refinery expansion project.

The 130 KM Indo-Bangla Friendship Pipeline (IBFPL) for exporting NRL products from the Siliguri Marketing Terminal to Bangladesh is progressing well.

Also, the country's first 2G bamboo based bio refinery being executed through a JV with Finnish collaborators has recorded adequate progress on ground.

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) with equity participation of 20% each 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. As on 31st March 2019, the paid up share capital of IGGL is `25.00 crore. The registered office of the company is at Guwahati, Assam. NRL had contributed `5.00 crore towards equity in this joint ve

Awards and Recognitions :

During 2019-20, NRL was honoured with the several awards in recognition of its accomplishments in various spheres of activities. They include FAME Environment Excellence Platinum Award 2018-19; Refinery of the Year Award at Downstream India Excellence Awards 2019; CII National Award 2019 for excellence in Water Management; PRSI National Award 2019 for best House Journal- English; Chal Vaijayanti Shield 2019 (3rd Prize) for effective implementation of the Official Language Policy of Govt. of India by Town Official Language Implementation Committee (TOLIC) of PSUs ; Best Hindi magazine (1st Prize) for PRAYAS by Town Official Language Implementation Committee (TOLIC) of PSUs; Governance Now PSU Leadership Award 2019 for MD NRL and Governance Now Award 2019 for Environment and Sustainability, Investment in Start-ups.Refinery Performance Improvement Award instituted by Ministry of P& Natural Gas.

View of receiving Refinery Performance Improvement Award

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