नुमलीगढ़
रिफाइनरी
लिमिटेड
भारत सरकार का उपक्रम
NUMALIGARH
REFINERY
LIMITED
A GOVERNMENT OF INDIA ENTERPRISE

June,01, 2020

To

The Conservator of Forests (C),MoEF&CC
North Eastern regional Office,Near MTC Central Workshop
Law-u-sib, Lumbatengen
Shillong-793021

Ref. No: NRL/TS/ENV/2.3/198

Sub: Submission of Half Yearly Compliance status on Environment Stipulation during the period Oct'19 to Mar'20.

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	i) Petroleum Refinery at Numaligarh (3 MMTPA) ii) NOC of MoEF for the Township iii)NOC,SPCB,Assam	i)J-11011/16/78-IA. II ii) J-11014/2/91-IA iii)WB-T-843/89-90/154	i)May 31,1991 (EA) ii)18.01.1994 iii)01.09.1990
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	Naptha 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

Please reply to Refinery Office :

रिफाईनरी कार्यालय :REFINERY OFFICE
पंकाग्रांट, पों, : नुमलीगढ़ रिफाईनरी कॉम्पलेक्स, जि, : गोलाघाट (असम), पिन - ७८५ ६९९, : Pankagrant, P.O.: Numaligarh Refinery Complex, Dist, : Golaghat, Assam, Pin - 785 699,
फेक्स / Fax- 03776-266514, ई.पि.ए. बि.एक्स / EPABX- 03776-265593/594/413, पि. एंड.ए विभाग / P&A Dept., फोन / Phone- 03776-265411/ 265493/ 265408, फेक्स / Fax- 03776-266514, फेक्स / Fax- 03776-265800,
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CERTIFIED UNDER
ISO 9001:2000
ISO 14001:1996
OHSAS 18001:1999

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समन्वय कार्यालय / COORDINATION OFFICE
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Tolstoy House, 6th Floor, 15-17, Tolstoy Marg
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New Delhi - 110 001(India)
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टेलिफैक्स / Telefax : (011) 23739412
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४ था तल्ला, भारत भवन, प्लोट नम्बर - ३१
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के.आइ.टी योजना नम्बर -११८, प्रिंस गुलाम म: शाह पथ
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ई-मेल / E_mail:nrl@caltiger.com

Hope, the above will meet the requirement.

Thanking you

Your's faithfully

(Alok Nayan Nath)

Chief Manager (TS)

cc: i) PCBA Regional Office, Golaghat

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June,01, 2020

To

The Member Secretary,

State Environment Impact Assessment Authority (SEIAA)

Bamunimaidam, Guwahati -7810 21

Ref No: NRL/TS/ENV/2.3/199

Sub: Submission of Half Yearly Compliance report on Environment Stipulation w.r.t Extension of Township Phase-III during the period Oct'19 to Mar'20.

Dear Sir,

Kindly find enclosed herewith the point wise Half Yearly Compliance Status pertaining to the conditions of EC for Extension of Township Phase -III for Numaligarh Refinery Ltd, obtained from MoEF vide letter no SEIAA .12 /2013 /03 dated 14th August, 2013.

Hope, the above will meet the requirement.

Thanking you

Yours' faithfully

(Alok Nayan Nath)

Chief Manager (TS)

cc: i) Zonal Office, MOEF , Shillong

ii) Regional Office, Golaghat

Please reply to Refinery Office :

रिफाईनरी कार्यालय :REFINERY OFFICE
पंकाग्रांट, पो, : नुमलीगढ़ रिफाईनरी कॉम्प्लेक्स, जि, : गोलाघाट (असम), पिन - ७८५ ६९९, : Pankagrant, P.O.: Numaligarh Refinery Complex, Dist, : Golaghat, Assam, Pin - 785 699, फेक्स / Fax- 03776-266514, ई.पि.ए. बि.एक्स / EPABX- 03776-265593/594/413, पि. एंड.ए बिभाग / P&A Dept., फोन / Phone- 03776-265411/ 265493/ 265408, फेक्स / Fax- 03776-266514, फेक्स / Fax- 03776-265800, ई-मेल / e-mail: comml@nrl.co.in

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POINT-WISE STATUS OF CONDITIONS STIPULATED IN THE ENVIRONMENTAL CLEARANCE, DATED MAY 31st '1991 OF MOEF, GOVT. OF INDIA

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.*

2. The residential site as proposed should not be to the west of the refinery as it is only 19.5 kms from the boundary of Kaziranga National Park. It should be shifted further away, but keeping in view the distance from the Garampani Sanctuary, which is only 24 kms south of the proposed refinery site. The newly proposed site of the residential colony should be settled to the satisfaction of this Ministry.

   -The NOC for the residential site has been issued by MoE&F vide No.J-11014/2/91 IA.II dated 18th January1994 with six conditions. Details on the present status of compliance on these conditions are enclosed as annexure A.

3. The National Highway-37 should be diverted away from the Kaziranga National Park and that portion of this road through and along the National Park (From Jakhalabandha to Bokakhat) to be denotified from all highway records and handed over to the National Park Authorities for regulating traffic. No movement of personnel, material or equipment for the project shall take place on the existing National Highway-37. The realignment of the National Highway-37 would be finalised in consultation with the Ministry of Environment and Forests, so that the wildlife habitat in the nearby Mikir Hills and areas rich in biological diversity therein are protected. Work on the diversion of NH-37 will start before construction of the refinery begins and the Ministry of Petroleum should ensure that the road is completed before the commissioning of the project.

   - ***The original NGT applicationno.174 of 2013in this matters disposed of in July'18.Order submitted to MoEF RO 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.*

5. No pipeline will be laid through the Kaziranga National Park and adjacent wildlife habitats in the Mikir Hills. Pipeline alignment shall be finalized in consultation with

the Ministry of Environment and Forests to minimize impact on environment and forests.

- *NRL has not laid any pipeline through KNP*

6. The project authority must strictly adhere to the stipulations made by the SPCB and the State Government.

   - *The stipulations laid down by SPCB, Assam and the State Govt. are adhered to. The status on the compliance report has been regularly sent to PCBA, Regional Office, Golaghat. A copy is enclosed as Annexure B.*

7. Any expansion of the plant either with the existing product mix or new products can be taken up only with the prior approval of this Ministry.

   - *This is complied with as and when a change or expansion is contemplated. Any expansion of the plant either with the existing product mix or new products will be taken up with prior approval of the Ministry.*

8. The gaseous emissions from various process units should conform to the standard prescribed by the concerned authorities, from time to time. At no time, the level should go beyond the stipulated standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should be put out of operation immediately and should not be restarted until the control measures are rectified to achieve the desired efficiency.

   - *Automatic online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2, NOx, CO & SPM. Further manual stack monitoring is being carried out bi-monthly as per latest MOEF notification. Monitoring reports of stack emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong in every month. Real-time emission data has been transmitted to CPCB server on continuous basis.*

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.* 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.

- *Automatic online stack analysers have been provided in all the major Stacks for continuous monitoring of SO2,NOx, CO & SPM. The monitoring reports of stacks emissions are regularly submitted to the PCBA Regional Office, Golaghat and CPCB Regional Office, Shillong in every month and to the MoEFCC Regional Office, Shillong in every six month.*

NRL has installed one continuous Ambient Air Monitoring System inside the refinery premises. Real-time emission data is transmitted to CPCB server on continuous basis.

One more CAAQMS installed as per MoEFCC's recommendation in the refinery premises. Commissioning ispending.

-Ambient air quality for the period Oct'19 to Mar'20 is enclosed as **annexure-IV**.

10. There should be no change in the stack design without the approval of SPCB. Alternate Pollution control system and proper design (Steam Injection System) in the stack should be provided to take care of excess emissions due to failure in any system of the plant.

- *Prior approval of SPCB will be taken for any change in the stacks design. Pollution control measures like – Low NOx burners, Steam Injection System, Low excess air firing, ID and FD fan, Stack dampers have been provided.*

11. Only natural gas after de-sulphurization has to be used as fuel with low NO_X burners.

- *Permission has been obtained from MoE&F, New Delhi vide No. J-11011/16/90-IA.II(I) dated 22 May,1996 to use Naphtha, which is produced in the refinery itself. Low NOx burners have been installed in all the refinery furnaces.*

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.

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 elevated flare has been installed as regular flare. However, additionally, a ground 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, watering Green Belt and filter back washing in Cooling Tower. Treated effluent quality for the period Oct'19 to Mar'20 is enclosed as* ***annexure-V****.*

16. Guard ponds of sufficient holding capacity to take care of monsoon rains should be provided.

    - *Guard ponds (of capacity: 5329 m^3) for oily water sewer (OWS) and Surge tank (of capacity: 5760 m^3) for 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 4th March, 2004.

The proposal of solid waste disposal by Secured Land Fill was submitted to MoE&F and PCB, Assam.

NRL has installed another Secured Land Fill facility of capacity around 6000 m3 as per the latest CPCB guidelines. Also, NRL has 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.

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.*

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 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. A wide natural green belt already existed all around the refinery.

  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 15th October, 2001).

  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 & 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.

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 General Manager (Technical). The QC lab is a NABL accreditated Laboratory and it has been proposed to apply as Environmental Approved Laboratory under EPA act.

26.A separate environment management cell with suitably qualified people to carry out various functions should be set up under the control of senior executive who will report directly to the head of the organization.

- *A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, 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.*

27.The funds ear-marked for the environmental protection measures should not be diverted for other purposes and year-wise expenditure should be reported to this Ministry.

- *The same has been complied with.*

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*

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Annexure-A

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

CONDITIONS:

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

- Noted.

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

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

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

- Noted.

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

iv) Township site should not involve any forest area.

- Township is constructed only in the permitted area.

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

- It is not disturbed.

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

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

Annexure B

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

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

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

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

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

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

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

-This has been followed without any exception.

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

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

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

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

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

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

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

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

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

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

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

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

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

-Does not arise.

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

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

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

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

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

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

- This is complied.

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

-The point is adhered to without any deviation.

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

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

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

-Noted

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

-Noted

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

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

This includes:

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

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

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

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

-Complied.

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

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

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

-Noted.

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

-Noted.

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

-Noted.

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

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

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

-That has been complied

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

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

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

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

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

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

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

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

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

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

- This has been complied.

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

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

-Sampling points as required have been provided.

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

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

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

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

33. Recording and monitoring activities and results:

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

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

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

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

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

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

- This is complied.

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

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

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

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

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

-Noted.

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

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

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

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

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

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

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

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

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

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

-Adequate care has been taken.

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

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

43. Disposal of Sludge:

a) Intake Water Treatment:

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

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

-This has been complied.

b) Waste /Water Treatment:

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

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

c) Hazardous waste disposal:

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

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

d) Spent Catalyst:

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

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

e) Sewage Treatment:

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

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

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

- *Complied.*

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

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

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

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

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

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

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

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

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

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

-This is complied

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

-This has been complied.

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

-The reports have been submitted.

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

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

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

-Automatic pH analyzer has been installed.

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

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

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

-*Steps have been taken accordingly.*

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

- *This is complied.*

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

-*Noted.*

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COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CLEARANCE FOR THE EURO III MOTOR SPIRIT PROJECT OBTAINED VIDE LETTER NO. J-11011/92/2003 – IA II (I) DATED FEBRUARY 13, 2004 FROM MOEF, NEW DELHI

A.SPECIFIC CONDITIONS:

i. 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.*

ii. The company shall ensure that the total sulphur emission from the Assam refinery (including MS Quality Improvement Project) shall not exceed 128 kg/hr as sulphur (256 kg/hr as SO_2). M/s NRL should maintain regular record of sulphur balance in the refinery. Off gases from the proposed unit should be treated in amine absorption and regeneration unit meant for H_2S removal for desulphurization of off gases. Performance evaluation of sulphur recovery block should be done regularly. Data on VOC should be monitored and submitted to the Ministry. The continuous emission monitoring systems for SOx and NOx in the major stacks with proper calibration facilities should be installed. The low NOx burners should be installed in all the furnaces.

-The total sulphur emission from the refinery including Euro III Motor Spirit Project being maintained below 128 kg/hr as Sulphur (256 kg/hr as SO_2).

-Regular sulphur balance of the refinery is maintained and the average SO_2 emission from the refinery during The average SO2 emission during this period is well below the limit..

-Off gases from the proposed unit has been treated in the amine absorption and regeneration unit.

-Performance evaluation of Sulphur Recovery Block is done on a daily basis.

- VOC data for MS is attached.

-Continuous emission monitoring for SO_2 and NOx have been provided in all the stacks.

-Ultra low NOx burners have been provided in all the furnaces.

iii. Additional water requirement shall not exceed 1200 m^3/hr. The total quantity of effluent generation should not exceed 3830 m^3/day as indicated in the EMP of which (3530 m^3/d from the existing and 300 m^3/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 a*dditional 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 recycled inside the refinery. NRL has achieved 100 % reuse of treated effluent since October,2006.*

iv. As reflected in the EIA / EMP, the spent catalyst (0.33 TPM) along with small quantity of oily and chemical sludge should be disposed off in secured landfill site within the plant premises. The leachate from the landfill site should be sent back to the effluent treatment plant. The ground water quality around the secured landfill site should be monitored regularly and data submitted to the Ministry/CPCB/SPCB. The biological sludge generated from the ETP should be used as manure/fertilizer for the green belt.

The oily 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 has been monitored on a regular basis and the monitoring data has been submitted regularly to the MoE&F Regional Office, Shillong along with the half-yearly report and to SPCB.

Spent cata;yst is disposed off through authorized recyclers as per Hazardous Waste Management Handling and Tran boundary Movement Rules, of latest amendment.

Ground water monitoring data around Secured Land Fill is enclosed as Annexure –I

v. 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.

-*The same is complied.*

- Oil from various units is routed through OWS (Oily Water Sewer) & CRWS (Contaminated rain Water Sewer) to ETP. The oily water from various units, OM&S and NRMT go through the CRWS and OWS systems to ETP for necessary oil removal and treatment in various sections. The slop oil is recovered in ETP and sent to OM&S for needful reprocessing in various units.

The Strom Water Channel from various plans are connected and channel through Oil Catchers .There are several oil catchers in the final outlet of Strom Water channel. The final outlet of storm water channel is made 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).

vi. 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 consultation with the local DFO. The bio sludge should be used as manure in the Green Belt development.

A Green Belt of width around 100 mtrs surrounding the refinery and around 25 mtrs. around the NRMT covering a total area of about 60 hectares have been provided. with adequate trees and proper density. Massive plantation has been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. Nos of local variety have been planted including some fruit bearing samplings in & all around Greenbelt. Further, to increase the density in the Green Belt, fresh plantation it being continued at regular intervals. Within the Numaligarh Refinery premises, few gardens have been developed near various units including one in ETP with varieties of flowering plants. Also, different varieties of saplings are also planted in the roadside areas, through-out the refinery.

vii. 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.

- *The same is complied.*

B. GENERAL CONDITIONS:

i. 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. A copy is enclosed as Annexure B.

ii. No further expansion or modernization in the plant should be carried out without prior approval of the Ministry of Environment and Forests.

- *Noted. Any expansion or modernization in the plant will be taken up only with prior approval of the Ministry of Environment & Forests.*

iii. The Company shall implement all recommendations made in the EMP and Risk Analysis reports.

- *Complied.*

iv. 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.

v. 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. 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 result carried out is enclosed as Annexure II

- Measures taken towards noise control:

- Ensuring PPE use in high noise areas of the plant.
- CDU Crude booster pumps replaced with pump of latest design.

vi. 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.

vii. 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, 2008 are adhered to. In regard to the same, authorization for collection/treatment/storage and disposal of hazardous wastes has been obtained from the PCB, Assam.

viii. 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.*

ix. 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, Shillong, CPCB, Shillong and the SPCB, Regional Office, Golaghat, Assam.*

x. The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board / Committee and may also be seen at Website of the Ministry of Environment & Forests at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office.

The same has been complied. Advertisement regarding the environmental clearance for the Euro III MS Project was published in two local newspapers, The Assam Tribune (in English) and The Pratidin (in Assamese) on 18th Feb'04 and copies of both were forwarded to the MoE&F Regional Office, Shillong vide letter no NRL/NG/ENV/2.1/11 dated 20th Feb'04.

xi. 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.*

3.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

- *Noted.*

4.0 The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions.

- *Noted.*

5.0 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.*

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COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CEARANCE FOR THE COKE CALCINATION UNIT OBTAINED VIDES LETTER NO. J-11011/203/2003 –IA II (I) DATED MARCH 22, 2004 FROM MOEF, NEW DELHI

A. SPECIFIC CONDITIONS:

i. 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.

ii. The company shall ensure that the total sulphur emission from the Assam refinery (including Coke Calcination Unit) shall not exceed the existing level of 128 kg/hr as sulphur (256 kg/hr as SO_2).

-The average SO_2 emission during the period is well below the limit.

iii. 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 has been developed.

iv. Water requirement of 15 m^3/hr should be met from the recycling of coke cutting water from Delayed Coker Unit. There should be no additional drawl of water for the CCU from the river Dhansiri.

-Coke cutting water from DCU is regularly used for quenching in CCU. There is no additional drawl of water beyond the permissible limit from the river Dhansiri for CCU.

v. The Company should install continuous stack monitoring system for online measurement for SPM, SO_2 and NOx.

-Continuous stack monitoring systems for online measurement of SPM, SO_2 NOx and CO have been provided in the CCU stack.

vi. 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 back will be disposed off in the Secure Land Fill Facility.

Ground water around the secured landfill is monitored and results are submitted to MOE&F / CPCB & PCBA regularly.

Analysis report of ground water around Secured Land Fill is enclosed as Annexure –I.

B. GENERAL CONDITIONS:

i. 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. A copy is enclosed as Annexure B.

ii. 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.

iii. 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.

iv. 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.

v. The overall noise levels in and around the plant area should be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).

-The major sources of noise generation in the CCU are the BFW pumps and the Air Blowers, having low duty. Strong foundations have been provided to mitigate the noise generation further. The equipments are monitored regularly at a distance of 01 mtr from the source and corrective measures are taken to maintain the noise level below 85 dBA. The ambient noise levels all around the refinery are monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).

- Noise monitoring result carried out in the Refinery recently enclosed as Annexure II

vi. 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.*

vii. 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, 2008 are adhered to. In regard to the same, authorization for collection/treatment/storage and disposal of hazardous wastes through Secured Land Fill has been obtained from the PCB, Assam.

viii. 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 MoE&F and the State Govt. and not diverted for any other purpose.

ix. 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 the Numaligarh Refinery along with the monitored data has been submitted regularly to the MoE&F Regional Office, Shillong. Along with six monthly compliance report, the compliance status on the environmental clearance conditions for the CCU Unit also have been submitted to the MoE&F Regional Office at Shillong, CPCB, Shillong and the SPCB, Assam.

x. The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board / Committee and may also be seen at Website of the Ministry of Environment & Forests at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office.

-The same has been complied. Advertisement regarding the environmental clearance for the Coke Calcination Unit was published in two local newspapers namely, The Assam Tribune (in English) and The Pratidin (Assamese) on the 26th March'04 and copies of both advertisements were forwarded to the MoEF Regional Office, Shillong vide letter no. NRL/TS/ENV/2.1/14 dated 27.03.04.

xi. 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.*

3.0. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

- *Noted.*

4.0. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner will implement these conditions.

- *Noted.*

5.0. 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.*

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COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CEARANCE FOR THE DIESEL QUALITY UPGRADATION PROJECT (DQUP) OBTAINED VIDES LETTER NO. J-11011/272/2008 –IA II (I) DATED NOVEMBER 10, 2008 FROM

MOEF, NEW DELHI

A. SPECIFIC CONDITIONS:

i. The company shall comply with new standards/norms Notified by the Ministry for Oil refineries vide G.S.R. 186(E) dated 18th March 2008.

- *Compliance status of few points are as follows:*

  (a) Secondary seals in IFRT and EFRT tanks -installation of double seals in EFRT, IFRT completed.

  (b) LDAR-programme: The same is implemented.

  (c) Implementation of VOC recovery system in ETP: VOC recovery system in ETP has been implemented.

ii. The company shall comply with all the stipulations of environmental clearances issued vide letter No. J-11011/92/2003-IA.II(I) dated 13th February 2004 and J-11011/203/2003-IA.II(I) dated 22nd March, 2004.

- *Complied.*

iii. The process emissions (SO2, NOx, HC, VOCs and Benzene) from various units shall conform to the standards prescribed by the Assam State Pollution Control Board from time to time. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.

- *Presently being practiced and complied*

iv. 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.*

v. Quarterly monitoring of fugitive emissions shall be carried out as per the guidelines of CPCB by fugitive emission detectors (GMI Leak Surveyor) and reports shall be submitted to the Ministry's regional office at Shillong.

- *Presently being practiced and complied.* ***Fugitive emission data attached.***

vi. 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.

- *Taken care during the preparation of DFR and BEDP.*

vii. The company shall strictly follow all the recommendation mentioned in the charter on corporate responsibility for environmental protection (CREP).

- *Complied.*

viii. 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.*

ix. 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.

- *Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI.*

On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery.

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

Massive Plantation have been carried out in the Green Belt so 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.

x. 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), 2008 with latest amendments and the reports are being sent to Pollution Control Board.* ***The annual report of waste disposal*** (2018-19) submitted with HYR-Dec'19. For 19-20 due is on June'20, same will be submitted with next HYR status.

xi. 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.

- *Knockout drums are installed in the flare systems.*

xii. 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.*

xiii. 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. GENARAL CONDITIONS:

i. The project authorities must strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government and any other statuary body.

- The stipulations made by the Pollution Control Board of Assam and the State Government are strictly adhered to. A copy is enclosed as Annexure B.

ii. 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.

iii. At no time, the emissions should go beyond the prescribed standards. In the event of failure of any pollution control system, the respective well site should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved. Provision of adequate height of stack attached to DG sets & flare is to be done.

- 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.

iv. 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 very minimal in quantity and is routed through the existing ETP for proper treatment. The effluent generated from refinery and township is totally reused after treatment.

v. 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. The noise levels all around the refinery is being monitored regularly so as to maintain within the standards, prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time). Noise monitoring report during the period is enclosed in Annexure-II.

- *Measures taken towards noise control:*

- *Ensuring PPE use in high noise areas of the plant.*
- *CDU Crude booster pumps replaced with pump of latest design .*

vi. 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.

vii. 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, 2008 as per latest amendments are adhered to.

viii. The project authorities will provide adequate funds as non-recurring and recurring expenditure to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule 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.

ix. The company shall develop rain water harvesting structures to harvest the run off water for recharge of ground water.

- Storm water reuse system to refinery fire water network scheme commissioned.

x. The stipulated conditions will be monitored by the concerned Regional Office of this Ministry /Central Pollution Control Board/State Pollution Control Board. A six monthly compliance report and the monitored

data should be submitted to them regularly. It will also be displayed on the Website of the Company.

- 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, Shillong. The same is being displayed in the company's website also.

xi. The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the concerned Regional office of this Ministry.

- The same has been complied. 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.

xii. 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, 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 and monitors the regular environmental activities.

xiii. 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.

COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CEARANCE FOR THE WAX PROJECT OBTAINED VIDES LETTER NO. J-110011/113/2009-IA II (I) dated 5th Sep,12 FROM MOEF, NEW DELHI

A. SPECIFIC CONDITIONS:

i Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J011011/16/90-1A.ll dated 31st May, 1991, J011011/92/2003-1A.ll (I) dated 13th February, 2004, J011011/203/2003-IA. II (I) dated 22nd March, 2004, J011011/272/2008-IA. II (I) dated 10nd November, 2008 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.

- *Complied. Half yearly compliance report of all ECs regulary being sent to RO Shillong.*

ii. 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.*

iii. 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 is not envisaged.*

iv. No heavy equipments shall be routed through Kaziranga National Park, for which only the route identified earlier shall be used.

-*Complied.*

v. 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 SOx ,NOx, CO,SPM analysers are installed in all the stacks. NRL is using low sulfur fuels in the boilers.

vi. Continuous on-lines stack monitoring equipment shall be installed for the measurement of particulate matter, VOCs, SO2, NOX, non-methanated Hydrocarbons (Benzene, Xylene and Tolune).

- PM analysers installed in all the stacks. For continuous monitoring of VOCs, Non-methanated hydrocarbon (Benzene, Xylene and Toluene) , online analysers are available with the existing CAAQMS.

vii. Fugitive emissions from HVGO, MVGO and MIBK shall be recovered and controlled. Fugitive emissionis 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.

viii. The process emissions [SO2, NOx, HC (Methane& Non-methane)] VOCs and Benzene from various units shall conform to the standards prescribed under the Environment Protection Act. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control systems adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.

- Complied.

ix. Ambient air quality monitoring stations [,SPM, SO2, NOx, H2S, mercaptan, non-methane-HC, and Benzene shall be set up in the complex in consultation with Assam Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on 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.

-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. 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.

- Further, continuous ambient air quality data and online stack anayser data have been made accessible to CPCB from NRL's company's website since Sept'11.

- 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.

-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.

Ambient air quality for the period Oct'19 to Mar'20 is enclosed as Anexure-IV.

x. Ambient air quality data shall be collected as per NAAQMSs standard notified by the Ministry on 16th September, 2009 and trend analysis w.r.t past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area.

-Being practiced.

xi. Monitoring of fugitive emission shall be carried out as per the guidelines of CPCB by fugitive emission detectors and reports shall be submitted to the Ministry's regional office at Shillong. For control of fugitive emissions all unsaturated hydrocarbon will be routed to the flare system and the flares system shall be designed for smoke less burning.

The same has been noted. 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. ***Fugitive emission data attached.***

xii. 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.

xiii. Methyl lso Butyl Ketone (MIBK) solvent should be handled as per the standard procedure and guidelines issued time to time. MIBK solvents should be stored in cool and dry place, recovered from process through solvent recovery unit and reused in the system.

- The system is designed to strictly follow standard procedure & statutory guidelines for handling & storage of MIBK solvent, and is adequate. Also a highly efficient solvent recovery unit has been implemented to recover and re-use MIBK solvent from foots oil & wax.

xiv. Total fresh water requirement from River Dhansiri for the proposed unit shall not exceed 60 m3/hr. and prior permission shall be obtained from the competent authority. The industrial effluent generation shall not exceed 5 m3/hr. The industrial effluents shall be treated in the ETP and the treated effluent shall meet the prescribed standards. Treated effluents hall be recycled/reused within the factory premises. Domestic sewages hall be treated in sewage treatment plant(STP).

-Scheme for reuse of storm water as cooling tower/FW makeup implemented. Treated effluent is fully recycled .

xv. 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.

Treated effluent quality for the period Apr'19 to Sept'19 is enclosed as annexure-V.

xvi. 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. Insignificant quantities of emulsified oil generated if any has been recovered and reused with the help of MOSRU (Mobile Oil Spill Recovery Unit). Six new oil catcher has been installed.

xvii. Methyl-lso-Butyl Ketone (MIBK) shall not be allowed to mix with the effluents as well as with storm water and ground water.

Due consideration has been taken in the unit design to avoid MIBK carryover along with effluent and avoid ground water Contamination. Moreover, a dedicated MIBK close blow-down facility along with recovery system has been incorporated to avoid intermixing of MIBK with other streams.

xviii. 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 bioremediation or is being sold to CPCB authorized recyclers.

To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19. The annual report of waste disposal (2018-19) submitted with HYR-Dec'19. For 19-20 due is on June'20, same will be submitted with next HYR status.

xix. The Company should strictly comply with the rules and guidelines under Manufacture, and import of Hazardous storage chemical Rules, 1989 as amended in october,1994 and January, 2000. Hazardous waste should be disposed of as per Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and amended time to time.

- The rules and regulations under 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.

xx. 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 dipsal 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.

xxi. Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products of and ensure regular monitoring.

- *Complied. Proper oil spill prevention management in place. Alternately, a MOSROU 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.

xxii. The company shall strictly follow all the recommendation mentioned in the charter of Corporate Responsibility for Environmental Protection (CREP).

-The same is being complied.

xxiii. 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.

- Knockout drums are installed in the flare system.

xxiv. 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.

xxv. Green belt shall be developed at least in 33% of the total plant area in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around units. Selection of plant species as per the CPCB guidelines.

- Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI.

On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery.

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

Massive Plantation has been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead.

xxvi. Company shall prepare project specific environmental manual and a copy should be made available at the project site for the compliance.

-*Complied.*

xxvii. All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.

-*Complied.*

xxviii. All the issues raised and committed made during the public hearing/consultation meeting held on 14th July, 2011 shall be satisfactorily implemented. Accordingly, provision of budget to be kept.

-*Complied.*

xxix. Company shall adopt Corporate Environment policy as per the Ministry's O .M. No. J- 11013/41/2O06-IA(l) dated 26th April, 2011and implemented.

- *NRL has already adopted a Env. policy as per the requirement of Environment Management ISO 14001*.

xxx. 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.

B. GENERACL ONDITIONS:

i. 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.*

ii. 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.*

iii. 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.

iv. 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).

v. 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.

vi. 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.*

vii. 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 oard/State Pollution Control Board as per the requirement.*

viii. 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.

ix. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely SPM, RSPM, SO2, NOx, HC (Methane& Non-methane),VOCs (ambient levels as wel1 as stack emissions) or critical sectoral parameters indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

-*Complied.*

x. 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.

-*The same is being complied.*

The same is being displayed in the company's website also.

xi. The environmental statement for each financial year ending 31st March, in form-IV as is mandated to be submitted by the project proponent to the concerned state pollution control board as prescribed under the Environment (Protection) Rules 1986 as mended subsequently shall also be put in the website of the company alonwith the status of compliance of environmental conditions and shall also be sent to the respective Regional offices of the MoEF by e-mail.

-The same is being complied. Environmental Statement for each financial year ending 31st March, in form-IV is being sent to SPCB every year as per the requirements. ***The environmental statement for financial year, 2018-19*** submitted with HYR-Dec'19. For 19-20 due is on Sept'20, same will be submitted with next HYR status.

xii. The Project Proponent shall inform the public that the project has been accorded environmental clearance by Ministry and copies of the clearance letter area available with the SPCB and may also be seen at website of the Ministry of Environment & Forests at http:/ envfor.nic.in. this shall be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locally concerned and a copy of the same shall be forwarded to the Regional Office.

- The same has been complied. Advertisement regarding the environmental clearance was published in two local newspapers namely, The Assam Trubine (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, Shillong.

xiii. 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.

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above Conditions is not satisfactory.

-The same has been noted.

9.0. 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.

10. The above conditions will be enforced inter-alia under the provisions of Water (Prevention & Control of pollution) Act 1974, Air (Prevention & control of Pollution) Act' 1981' the Environment (Protection) Act 1986, Hazardous Waste (Management Handling and Transboundary Movement) Rules 2008 and the Public Liability Insurance Act 1991 alonwith their amendments and rules.

-*The same has been noted.*

COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CEARANCE FOR NAPHTHA SPLITTER PORJECT OBTAINED VIDE LETTER NO. J-11011/534/2009 –IA II (I) DATED SEPTEMBER 12, 2012 FROM

MOEF, NEW DELHI

SPECIFICC ONDITIONS:

i. Compliance to all the environmental conditions stipulated in the environmental clearance letter nos J011011/16/90-IA.II dated 31st May, 1991, J011011/92/2003-IA.II dated 13th February, 2004, J011011/272/2008-IA.II (I) dated 10th November, 2008 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.

- *Complied. Only point no.1 of J011011/272/2008-IA.II (I) dated 10th November, 2008 is under progress detail of which is mentioned in the particular EC compliance status of the same. Half yearly compliance report of all ECs reggulary being sent to RO Shillong.*

ii. 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 matter has been discussed with Chief Wildlife Warden of Assam and Director, Kaziranga National Park. However, 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.

iii. No heavy equipments shall be routed through Kaziranga National Park, for which only the route identified earlier shall be used.

- *Complied.*

iv. M/s Numaligarh Refinery Limited shall comply with new standards/norms for oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide GSR 186 (E) dated 18th March, 2008.

- *Complied.*

v. Continuous online stack monitoring for SO2 and SPM of all the stacks shall be carried out. SO2 on-line analysers shall be installed in all the furnace stacks. Low NOx burners shall be installed with online analysers to monitor NOx emissions shall be provided.

-Online stack analysers have been provided in all the major stacks for continuous monitoring of SO_2 and 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 in every month.

vi. The process emissions [SO2, NOx, HC (Methane & Non-methane)], VOCs and Benzene from various units shall conform to the standards prescribed under the Environment (Protection) Act, 2008. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control systems(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.

- Presently being practiced and complied.

vii. Ambient air quality monitoring stations [SPM, SO2, NOx, H2S, Mercaptan, non-methane-HC, and benzene] shall be set up in the complex in consultation with Assam State Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs. Ambient air quality shall also be carried out in one location at Kaziranga National Park for SOx, NOx, SPM, CO & HC.

-As an action of compliance, five (5) nos. of ambient air quality monitoring stations have been set up at the following locations:

SS 1 : Inside the refinery (Near WT No.5).
SS 2 : At the Eco-Park in NRL Township.
SS 3 : At the Raw Water Intake.
SS 4 : Near the NH-39 bypass.
SS 5 : Near the Kaziranga Wildlife Sanctuary at Agartoli.

-Ambient Air Quality monitoring at the above locations is being carried out in line with NAAQS-2009 in totality. The Ambient Air Quality Monitoring reports are regularly submitted to the PCBA HQ Guwahati, PCBA Regional Office, Golaghat in every month. Further, continuous ambient air quality data and online stack anayser data have been made accessible to CPCB from NRL's company's website since Sept'11.

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. 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.

-Ambient air quality for the period Oct'19 to Mar'20 is enclosed as Annexure –IV.

viii. Ambient air quality data shall be collected as per NAAQMS notified by the Ministry on 16th September, 2009 and trend analysis wrt. past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area.

- *Ambient air quality data is monitored in line with NAAQMS, 2009 in totality and trend analysis is carried out.*

ix. Monitoring of fugitive emissions shall be carried out as per the guidelines of CPCB by fugitive emission detectors and reports shall be submitted to the Ministry's Regional Office at Shillong. For control of fugitive emissions, all unsaturated hydrocarbon will be routed to the flare system and the flare system shall be designed for smoke less burning.

- Presently being practiced as per the requirement. Regular monitoring of fugitive emission has been carried out using GMI. The GMI survey has been carried on all gas/vapour valves, light liquid valves, hydrogen valves, light liquid pump seals, hydrocarbon compressor seals, hydrogen compressor seals, safety relief valves, flanges, connections, open-ended lines, drains, tankages, and furnaces etc. as per the guidelines. In case of any leak observed, the same is attended immediately in line with the requirement.

Fugitive emission data attached.

x. fugitive emissions of HC from product storage tank yards etc. must be regularly monitored. Sensors for detecting HC leakage shall also be provided at strategic locations. The company shall use low Sulphur fuel to minimize SO2 emissions. Sulphur recovery units shall be installed for control of H2S emissions. Leak detection and Repair porgramme 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.

-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 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. It is being practiced in all the Process Units, Tankage areas, Marketing Terminal, and other important locations. Low suphur fuels is being used in all the furnaces to minimize SO2 emissions and will be implemented in future projects if required, a SRU is already installed during the commissioning of the refinery. Monitoring of fugitive emissions is carried out near the storage tanks.

xi. As proposed, record of sulphur balance shall be maintained at the Refinery as a part of the environmental data on regular basis. The basis component of sulphur balance includes sulphur input through feed (sulphur content in crude oil), sulphur output from Refinery through products, byproduct (elemental sulphur), and atmospheric emissions.etc.

-The total sulphur emission from the refinery including NSU Spirit Project being maintained below 128 kg/hr as Sulphur (256 kg/hr as SO_2).

-Regular sulphur balance of the refinery is maintained and the average SO_2 emission from the refinery during this period is well below the limit.

xii. 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).

- Complied. 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 which means the effluent is totally recycled.

xiii. 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 at Shillong is kept informed.

xiv. Oil catchers/oil traps shall be provided at all possible locations in rain/storm water drainage system inside the factory premises.

Complied. 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 adsorbent booms as precautionary measures. As a step towards conservation of water, construction of a holding pond near the storm water channel is completed.

xv. 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 bioremediation or is being sold to CPCB authorized recyclers.

To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19.

The annual report of waste disposal (2018-19) submitted with HYR-Dec'19. For 19-20 due is on June'20, same will be submitted with next HYR status.

xvi. The project authorities must strictly comply with the rules and regulation with regard to handling and disposal of Hazardous Waste (Management, Handling and Tran boundary Movement) Rules, 2008 wherever applicable. Authorization from the State Pollution Control Board must be obtained for collection/treatment/storage/disposal of hazardous wastes.

- The rules and regulations under the Hazardous Waste (Management, handling and Trans-boundary Movement) Rules, 2008 as amended in 2009 are adhered to.

Approvals from State Pollution Control Board for authorization (management, handling & disposal) of hazardous waste as per the requirement) has been obtained. Hazardous waste Authrisation certificate valid upto Jan, 2021.

xvii. Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products and ensure regular monitoring.

- *Complied.*

- Oil from various units is routed through OWS (Oily Water Sewer) & CRWS (Contaminated rain Water Sewer) to ETP. The oily water from various units, OM&S and NRMT go through the CRWS and OWS systems to ETP for necessary oil removal and treatment in various sections. The slop oil is recovered in ETP and sent to OM&S for needful reprocessing in various units.

-The Strom Water Channel from various plans are connected and channel through Oil Catchers .There are several oil catchers in the final outlet of Strom Water channel. The final outlet of storm water channel is made 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).

xviii. The company shall strictly follow all the recommendation mentioned on the Charter on corporate Responsibility for Environmental protection (CREP).

- *Complied.*

xix. 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.

- Knockout drums are installed in the flare systems.

xx. 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.

xxi. Green belt shall be developed at least in 33% of the plant area in and around plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines.

- Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI.

On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery.

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

Massive Plantation have been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead.

xxii. Company shall prepare project specific environmental manual and a copy shall be made available at the project site for the compliance.

- Complied.

xxiii. All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.

- Complied.

xxiv. All the issue raised in the public hearing/consultation meeting held on 14th July, 2011 shall be satisfactorily implemented.

- Complied.

xxv. Company shall adopt Corporate Environment Policy as per the Ministry's O.M No. J-11013/41/2006-IA.II (I) dated 26th April, 2011 and implemented.

- *NRL has already adopted a Env. policy as per the requirement of Environment Management ISO 14001.*

xxvi. 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.*

B. GENERAL CONDITIONS:

i. 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.*

ii. 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.*

iii. 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.*

iv. 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. 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).

v. A separate Environmental Management Cell equipped with full fledged laboratory facilities must me set up to carry out the environment management and monitoring functions.

- A fully functional, dedicated environment management cell manned by qualified engineers/officers and headed by a Chief General Manager (Technical) has been continuously working for constant improvement, monitoring, safe guarding and reporting of environmental activities of the refinery. Also, a multidisciplinary Apex-level Committee on Environment which includes senior level officers from various departments as members under the chairmanship of Director (Technical) constantly guides the Environment Cell regarding all the environmental issues in the refinery. The Apex Committee that convenes quarterly discusses the unresolved issues if any, regarding the environment and monitors the regular environmental activities.

vi. 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.

vii. 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.

viii. 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.*

ix. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO2, NOx, HC (Methane & Non-methane), VOCs (ambient levels as well as stack emission) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

- *The same is complied.*

x. 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, Shillong.*

The same is being displayed in the company's website also.

xi. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986. As amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.

- *Environmental Statement for each financial year ending 31st March, in form-V is being sent to SPCB every year as per the requirements.*
- *The same is being displayed in the company's website also.*
- ***The environmental statement for financial year, 2018-19*** submitted with HYR-Dec'19. For 19-20 due is on Sept'20, same will be submitted with next HYR status.

xii. The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locally concerned and a copy of the same shall be forwarded to the Regional Office.

- *The same has been complied. Advertisement regarding the environmental clearance for the Naphtha Splitter Unit (NSU) was published in two local newspapers namely, The Assam Tribune (in English) and The Dainik Janambhumi (in Assamese (on the 21st September'12and copies of both the advertisements were forwarded to the MOEF Regional Office, Shillong.*

xiii. 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.*

COMPLIANCE STATUS ON THE CONDITIONS OF ENVIRONMENTAL CEARANCE FOR COMPLETE EURO-IV HSD PROJECT ALONGWITH INSTALLTION OF LPG MOUNDED BULLET AND MODIFICATION OF EXISTING LPG BOTTLING FACILITY OBTAINED VIDES LETTER NO. J-110011/150/2015-IA II (I) dated 9th Dec,16 FROM MOEFCC, NEW DELHI

A. SPECIFIC CONDITIONS:

i 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.

- *Compliance status of few points are as follows:*

(a) Secondary seals in IFRT and EFRT tanks -installation of double seals in EFRT, IFRT tanks completed.
(b) LDAR-programme: The same is under implementation.

(c) Implementation of VOC recovery system in ETP: VOC recovery system in ETP has been implemented.

ii. Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J011011/16/90-1A.ll dated 31.05.1991, J011014/2/1991-1A (I) dated 18.01.1994, J011011/92/2003-1A.ll (I) dated 13.02.2004, J011011/203/2003-IA. II (I) dated 22.03.2004, J011011/272/2008-IA. II (I) dated 10.11.2008, J011011/113/2009-IA. II (I) dated 05.09.2012, J011011/534/2009-IA. II (I) dated 12.09.2012 shall be satisfactorily implemented and monitoring reports submitted to the Ministry's Regional Office at Shillong.

- *Being complied. Half yearly compliance report of all Ecs reggulary being sent to RO Shillong.*

iii. Continuous on-line stack monitoring for SO2, NOx and CO of all the stacks shall be carried out. Low NOx burners shall be installed

- Online Sox, NOx , CO and SPM analyser installed in all the stacks. Low NOx burners installed in all the stacks

iv. The process emissions [SO2, NOx, HC (Methane & Non-methane)], VOCs and Benzene from various units shall conform to the standards prescribed under the Environment (Protection) Act. In the event of failure of pollution control system(s) adopted bythe unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency of the pollution control device has been achieved.

- *complied.*

v. Leak Detection and Repair programme shall be prepared and implemented to control HC/VOC emissions. Focus shall be given to prevent fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to. Fugitive emissions of HC from product storage tank yards etc. must be regularly monitored. Sensors for detecting HC leakage shall be provided at strategic locations.

- LDAR program under implementation for DHT in line with the existing practice carried out in various units.

vi. SO2 emissions after expansion from the plant shall not exceed 256 kg/hr and further efforts shall be made for reduction of SO2 load through use of low sulphur fuel. Sulphur recovery unit with tail gas treating facilities having 99.9 % efficiency shall be provided.

- SO2 emission within limit. TGTU is being implemented.

vii. 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 from Refinery through products, byproduct (elemental sulphur), atmospheric emissions etc.

- *Complied. Regular Sulphur balance for the refinery is carried out and record maintained. Also, sulfur balance post DHDT prepared.*

viii. 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

- Monitoring of ambient air quality parameter is being complied as pet NAAQM, 2009. Installation of New CAAQMS alongwith Mercaptan / methanated & non methanated analyser inside the refinery premises based *on occurrence of maximum ground level concentration and down-wind direction of wind under progress.*

ix. 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.*

x. 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.

- *Treated effluent is being fully recycled .*

xi. No effluent shall be discharged outside the plant premises and „Zero" effluent discharge concept shall be followed.

- *The same has been complied.*

xii. Comprehensive water audit to be conducted on annual basis and report to the concerned Regional Office of MEF&CC. Outcome from the report to be implemented for conservation scheme

- *Water audit completed.*

xiii. 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 pH,COD & BOD)analyser is already exist. TSS analyser installaed in November'18.

xiv. 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. Insignificant quantities of emulsified oil generated if any has been recovered and reused with the help of MOSRU (Mobile Oil Spill Recovery Unit).* ***Construction of 6 nos oil catcher Near CDU,HCU,OMS north, near ETP, near PH-3, near storm water final O/L completed , So, complied .*** *Also storm water recycle system to FW/CW has been commissioned.*

xv. 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 bioremediation or is being sold to CPCB authorized recyclers.

To waive this condition NRL submitted one application to MoEF, Delhi on 29.01.19.

The annual report of waste disposal (2018-19) submitted with HYR-Dec'19. For 19-20 due is on June'20, same will be submitted with next HYR status.

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xvi. 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 the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and as amended in 2000 are adhered to. Hazardous waste authorization is valid till 2021.

xvii. 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. Installation of another SLF as per CPCB recommendation has been completed.*

xviii. 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*

xix. Acoustic enclosure /silencer shall be installed wherever it is possible

- *Complied.*

xx. Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act
- Complied.

xxi. *The company should make the arrangement for protection of possible fire and explosion hazards during construction and operation phase.*

- *Complied.*

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xxii. The company shall strictly follow all the recommendation mentioned in the charter of Corporate Responsibility for Environmental Protection (CREP).

- *Complied.*

xxiii. Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines.

- Initially, as per Environmental Clearance granted for the Numaligarh Refinery Project, Ministry of Environment & Forest had stipulated a 500 mtrs wide green belt all around the refinery based on the EIA of Numaligarh Refinery carried out by NEERI.

On request from Numaligarh Refinery, the width of the Green Belt was later reduced from the suggested width of 500 mtrs to 100 mtrs because of the reason that almost all the surrounding areas are having tea garden with shade trees (Sirish trees). A wide natural green belt already existed all around the refinery.

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

Massive Plantation have been carried out in the Green Belt so that it can provide a natural barrier for attenuation of noise and air pollution. No. of local variety have been planted including some fruit bearing samplings in & all around Green Belt. Again it has been planned to increase the density by planting more saplings in the Green Belt in the days ahead.

xxiv. 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. QRA by M/s Ifluids completed.

xxv. 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. Many activities under the plan are being executed. A*ction *plan with financial and physical breakup/details with time line submitted to the Ministry¨s Regional Office at Shillong earlier.*

B. GENERACL ONDITIONS:

i. 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.

ii. 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.

iii. 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.

iv. 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).

v. 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.

vi. 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.

vii. 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 oard/State Pollution Control Board as per the requirement.

viii. 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.

-The same has been noted. Copy of the clearance letter sent to concerned Panchayat/ Zila Parishad/ Circle Office.

ix. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions including results of monitored data on their website and shall update the same periodically. It

shall simultaneously be sent to the Regional Office of the MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely SPM, RSPM, SO2, NOx, HC (Methane& Non-methane),VOCs (ambient levels as wel1 as stack emissions) or critical sectoral parameters indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

-*Complied.*

x. 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, Shillong.*

The same is being displayed in the company's website also.

xi. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986. As amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.

- *The same is being complied. The reports as mentioned being uploaded in NRL website.* ***The environmental statement for financial year, 2018-19*** submitted with HYR-Dec'19. For 19-20 due is on Sept'20, same will be submitted with next HYR status.

xii. The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locally concerned and a copy of the same shall be forwarded to the Regional Office.

- *The same has been complied. Advertisement regarding the environmental clearance for the DHDT Unit was published in two local newspapers namely, The Assam Tribune (in English) and The Dainik*

Janambhumi (in Assamese (on the 26th December, 2016 of both the advertisements were forwarded to the MOEF Regional Office, Shillong.

xiii. 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.*

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above Conditions is not satisfactory.

-*The same has been noted.*

9.0. 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.*

10. The above conditions will be enforced inter-alia under the provisions of Water (Prevention & Control of pollution) Act 1974, Air (Prevention & control of Pollution) Act' 1981' the Environment (Protection) Act 1986, Hazardous Waste (Management Handling and Transboundary Movement) Rules 2008 and the Public Liability Insurance Act 1991 alonwith their amendments and rules.

-*The same has been noted.*

POINT-WISE STATUS OF CONDITIONS STIPULATED IN THE ENVIRONMENTAL CLEARANCE OF EXTENSION OF TOWNSHIP, PHASE-III VIDE NO. SEIAA.12/2013/03 DATED AUGUST 14st '2013 OF MOEF, GOVT. OF INDIA

Specific conditions

Construction Phase

1. "Consent for Establishment" shall be obtained from Assam Pollution Control Board under Air and water Act and a copy shall be submitted to the SEIAA before start of any construction work at the site'.

   - *Consent for Establishment obtained from PCBA vide no WB/GOL/T-290/13-14/63/804 dated 05.10.2013 and a copy submitted to SEIAA.*

   Job under suspension since 16.06.2015

2. The storm water drainage shall be worked out after analyzing the contour levels of the site and the surrounding area and the capacity of storm water drainage.

   - *Storm water drainage kept in line with existing township, wherein, part of surface runoff is absorbed by the soil surface and remaining is drained naturally to road side drains, finally culminating to natural stream*

   Job under suspension since 16.06.2015

3. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, toilets, STP, safe drinking water, medical health care ,etc. The housing may be in the form of temporary structures to be removed a after the completion of the project.

   - *Mostly local labours are engaged. Temporary housing facilities with proper drinking water, toilets etc. have been arranged for office staff, watchman & skilled workers. Medical health care facility is available inside the existing township*

   Job under suspension since 16.06.2015

4. A First Aid Room shall be provided in the project both during construction and operation of the project. -

   - *First aid facility is available in the construction site.*

   Job under suspension since 16.06.2015

5. All the topsoil excavated during construction activities should be stored for use in horticulture landscape development within the project site.

- *Topsoil excavated during construction activities has been stored for further use in landscape development.*

  Job under suspension since 16.06.2015

6. Disposal of muck during construction phase should not create any adverse effect on the site and necessary precautions for general safety and health aspects of people.

- *Generation of muck is very less, as there is no piling job and no large scale grading of the project site.*

  Job under suspension since 16.06.2015

7. Soil and ground water samples will be tested to ascertain that there is no threat o ground water quality by leaching of heavy metals and other toxic contaminants.

- *Soil and ground water samples have been tested and the parameters are well within the requirements and no threat of ground water contamination is envisaged*

  Job under suspension since 16.06.2015.

8. Constructions spoils, including bituminous material and other hazardous materials must not be allowed to contaminate water course sand the dump sites for such material must be secured so that they should not leach into the ground water.

- *As ready mix bitumen has been used, there is no storage of the same at construction site.*

  Job under suspension since 16.06.2015

9. Any hazardous waste generated during construction phase, should be disposed off as per applicable rules and norms.

- *Noted and complied*

  Job under suspension since 16.06.2015.

10. The diesel generator sets/ mixture machines to be used during construction phase should be of low sulphur diesel and should conform to Environment (protection) Rules prescribed for air and noise emission standards.

- *Complied and adhered to.*

  Job under suspension since 16.06.2015

11. The diesel required for operating D G sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.

    - *There is no DG sets. Power is being taken from NRL's own source.*

      Job under suspension since 16.06.2015

12. Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.

    - *Complied and adhered to.*

      Job under suspension since 16.06.2015

13. Ambient noise level should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB.

    - *The overall noise levels in and around the project premises is being carried out as per the prevailing practices in line with the requirements and the same is below the limit. Also, Massive plantation is being carried out in and around the construction site. As such, no significant generation of high noise during the construction activities is envisaged.*

      Job under suspension since 16.06.2015

14. Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September 1999 and amended as on 27th August, 2003.

    - *There is no coal or lignite based thermal power plant generating fly ash within 100 km radius of the project site.*

    - PPC (Fly ash based) cement is being used in the construction activities.

      Job under suspension since 16.06.2015

15. Ready mixed concrete must be used in building construction.

Concrete mix from RMC Plant and Batch Mixing are in use.

Job under suspension since 16.06.2015

16. Storm water control and its re-use as per CGWB and BIS standards for various applications.

    - *The same has been noted.*

      Job under suspension since 16.06.2015

17. Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.

    - *Complied.*

    - *Job under suspension since 16.06.2015*

18. Permission to draw ground water shall be obtained from the competent Authority prior to construction/operation of the project.

    - *The same has been noted. Presently requirement of ground water is not envisaged, permission shall be obtained from competent Authority if required. Water requirement is met from the existing resources.*

      Job under suspension since 16.06.2015

19. Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.

    - *The same has been noted.*

    - *It is planned to treat the sewage at STP with 100% reuse.*

      Job under suspension since 16.06.2015

20. Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

    - *Complied.*

      Job under suspension since 16.06.2015

21. Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air-conditioning. If necessary use high quality low E value glass.

    - *-4 mm thick glass is provided in the units as per design of consultant- M/s SPA*

Job under suspension since 16.06.2015.

22. Roof should meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirement.

    - *As provided by the consultant- M/s SPA, Precoated sheet roof (0.5mm thickness) at an approximate slope of 23 degrees, shall be provided with false ceiling of 12mm thick particle board.*

    Job under suspension since 16.06.2015

23. Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all air-conditioned spaces while it is aspirational for non-air conditioned spaces by use of appropriate thermal insulation material to fulfill requirement.

    - *Proposed wall system comprises 250 mm thick brick wall including plastering for outer walls and 125 mm thick brick wall including plastering for interior walls.*

    Job under suspension since 16.06.2015

24. The approval of the competent authority shall be obtained for structural safety of the building due to earthquake adequacy of fire fighting equipments, etc. as per National Building Code including protection measures from lightening etc.

    - *M/s SPA (School of Planning and Architecture), New Delhi has carried out structural design.*

    Job under suspension since 16.06.2015

25. Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.

    - *The same has been noted.*

    Job under suspension since 16.06.2015

26. Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it was found that construction of the project has been started without obtaining environmental clearance

    - *Environment clearance for the project has been obtained prior to initiation of construction activities.*

    Job under suspension since 16.06.2015

Operation Phase

1. The installation of the Sewage Treatment Plant (STP) should be certified by an independent expert and a report in this regard should be submitted to the SEIAA before the project is commissioned for operation. Treated affluent emanating from STP shall be recycled/ reused-to the maximum extent possible. Treatment of 100% grey water by decentralized treat rent should be done. Discharge of unused treated effluent shall conform to the norms and standards of the Assam State Pollution Control Board.

   - *Quantity of sewage generated will be around 15.0 KLD during the construction phase and the same shall be treated through septic tank and a soak pit which is designed to take care of the sewage and avoid any damage during flooding in case of heavy rain if any.*

     During the operational phase, the sewage generated will be around 90 KLD and the same shall be treated in the existing Sewage Treatment Plant (STP) which is adequate to take care of the additional load. Treated sewage will be pumped to refinery ETP through the existing network as per the prevailing practice for further treatment.

     Job under suspension since 16.06.2015

2. The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry/ inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.

   - The point has been noted. Solid waste generated is being collected, segregated and disposed off properly as per the prevailing guidelines in a land fill. NRL has installed one composting plant in line with the requirement since inception for safe and systematic disposal of garbage generated.

   Job under suspension since 16.06.2015

3. Diesel power generating sets proposed as source of power during operation phase should be of enclosed type and conform to rules made under the Environment (protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Use low sulphur diesel. The location of the DG sets may be decided suitably without disturbance to the public.

   - *There will not be any Diesel Power Generating set in this project. Power will be supplied from NRL's existing sub-stations/source.*

     Job under suspension since 16.06.2015

4. Noise should be controlled to ensure that it does not exceed the prescribed standards during night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

   - *The overall noise levels in and around the project premises shall be carried out as per the prevailing practices in line with the requirements. As such, there will not be any significant generation of high noise during the construction activities. However, proper care shall be taken to minimize the noise level and to maintain within the limit.*

     Job under suspension since 16.06.2015

5. The green belt of adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.

   - *Massive Plantation has been carried out in various locations inside the township by planting no. of local fast growing varieties. A unique Herbal Garden has also been developed inside the Township consisting of several medicinal plants. It has been planned to increase the density by planting more saplings in project construction site.*

     Job under suspension since 16.06.2015

6. Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.

   - *Complied.*

7. Rain water harvesting for roof run-off and surface run-off should be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease. The bore well for rainwater recharging should be kept at least 5 mts. above the height of ground water table.

   - *Main and internal roads are designed to carry the storm water during rainy season to the nearest natural gorges and enhance the ground water level.*

     Job under suspension since 16.06.2015

8. The ground water level and its quality should be monitored regularly.

   - *Regular monitoring of ground water has been carried out.*

     Job under suspension since 16.06.2015

9. Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.

- *The same has been noted for compliance.*

Job under suspension since 16.06.2015

10. A Report on the energy conservation measures conforming to energy conservation norms finalized by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R & D Factors, etc. and submit to the SEIAA in three months time.

- *The same has been noted.*

Job under suspension since 16.06.2015

11. Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the- building should be integral part of the project design. Use CFLs and TFLs should be properly collected and disposed off/ sent for recycling as per the prevailing guidelines/ rules of the authority to avoid mercury contamination, Use of solar energy should be incorporated for illumination of common areas, lighting for garden and street lighting in addition to provision for solar water heating.

- *CFL lighting will be used for building internal and external illumination. Street lightings will be LED light and Solar power will also be incorporated . Proper care will be taken for disposal of used CFLs as per prevailing guidelines.*

Job under suspension since 16.06.2015

12. Adequate measures should be taken to prevent odour problem from solid waste processing plant and STP.

- *A composting plant for systematic disposal of solid waste and one STP is operating since commissioning. Necessary measures are in place for preventing odour problem.*

Job under suspension since 16.06.2015

13. The building should have adequate distance between them to allow movement of fresh air and passage of natural light, air, and ventilation.

- *The same has been noted and shall be taken care*

Job under suspension since 16.06.2015.

PART _ B. GENERAL CONDITIONS

1. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by email) to the SEIAA/ Regional Office of MoEF Office of MoEF.

   - *Noted for compliance.*

     Job under suspension since 16.06.2015

2. The SEIAA will be monitoring the implementation of environmental safeguards and the project proponent should provide full cooperation, facilities and documents/ data during inspection.

   - *shall be provided whenever required.*

   Job under suspension since 16.06.2015

3. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by the SEIAA.

   - *The same has been noted.*

     Job under suspension since 16.06.2015

4. The SEIAA reserves the right to add additional safeguard measures subsequently if found necessary and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

   - *The same has been noted.*

   Job under suspension since 16.06.2015

5. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Forest Conservation Act 1980 and Wildlife (protection) Act, 1972, etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

   - *Shall be complied if need arises.*

     Job under suspension since 16.06.2015

6. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and

Control of pollution) Act, 1981, The Environmental (protection) Act, 1996, the Public Liability (Insurance) Act, l99l and EIA Notification, 2006.

- *The same has been noted.*

Job under suspension since 16.06.2015

7. The project proponent should advertise in at least two local Newspapers widely circulated in the region, one which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the SEIAA, the Assam. Pollution Control Board and may also be seen on the website of the proponent. The advertisernent should be made within l0 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional Office of MoEF at Shillong.

- *Complied*

8. Environmental clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (CMl) No. 460 of 2004 as may be applicable to this project.

- *The same has been noted.*

9. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/ Municipal corporation, urban Local Body and the local NGO, if any, from whom suggestions/representations if, any ,were received while processing the proposal.

-Noted

10. The proponent shall upload the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the SEIAA and Regional Office of MoEF. The criteria pollutant levels namely PM_{10}, $PM_{2.5}$, SO_2x, NOx etc. (ambient levels as well as stack emission) or critical sectoral parameters indicated for the project shall be monitored and a record be maintained for the public domain.

- *The same has been noted. The half yearly compliance report is uploaded in Company's website periodically.*

Job under suspension since 16.06.2015

11. The environmental statement for each financial year ending 3lst March in Form-V as is mandate to be submitted by the project proponent to the SEIAA and State pollution Control Board as prescribed under the Environmental (l

Protection) Rules, 1986, as amended subsequently and shall also be sent to the respective Regional Offices of MoEF by e-mail.

- *The same has been noted. The environmental statement for each financial year ending 3lst March in Form-V is being sent to PCBA every year as per the schedule.*

  Job under suspension since 16.06.2015

12. The internal roads of the township should be as per Guidelines.

    -Township Main road width 7.5 m and cluster roads width are 5.5 m.

    Job under suspension since 16.06.2015

13. Adequate steps should be taken to conserve and protect the Deopahar site and action plan should be submitted to the SEIAA in this regard.

- *The same has been noted.*
  Job under suspension since 16.06.2015

14. The green belt development should be adequately designed to compensate the uprooting of the tea bushes, felling of trees, etc. as per norms. The open space inside the plot should be suitably landscaped and covered with indigenous plants.

- *The same has been noted. Development of Green Belt is being given a top priority and adequately designed to compensate the uprooting of the tea bushes, felling of trees, etc. The open space inside the plot shall be suitably landscaped and covered with indigenous plants.*

  Job under suspension since 16.06.2015

15. The project proponent shall also comply with all the environment protection measures risk mitigation measures etc.

- *The same has been noted for compliance.*

  Job under suspension since 16.06.2015

16. This Environmental Clearance is valid for a period of five years from the date of issue.

- *The validity of EC expired on 14 th August'2018.EC validity extension applied on 25.10.18 to SEIAA.*

  Job under suspension since 16.06.2015

17. Processing fees shall be paid in due course to the SEIAA, Assam in the shape of Bank Draft in favour of SEIAA, Assam subject to approval of the Finance Department, Govt. of Assam.

- *The point has been noted, being complied.*

Annexure VI

ENVIRONMENTAL EXPENDITURE FOR OCT'19-MAR'20 (FY-2019-20)

Sl No	Name of the Facilities	Oct'19-Mar'20
1	Effluent Treatment plant	**2,04,52,181.50**
2	Sulphur Recovery Unit	**4,91,08,133.51**
3	Pollution & Environmental Expenses	**13,46,745.84**
4	R & M Contract Services	**1,29,94,473.76**
5	Environmental Cell	**49,24,177.79**
	Grand total (Rs)	**8,88,25,712.40**

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
UNIT : DCU						
Area = B/L						
1	LPG inlet line U/S I/V Gland	0	0	0	0.000	0.000
2	Steaer 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 Galnd	0	0	0	0.000	0.000
10	Vent line safety Flange	0	0	0	0.000	0.000
11	Naptha to Offside line 1st I/V U/S Flange	0	0	0	0.000	0.000
12	Naptha to Offside line 1st I/V Gland	0	0	0	0.000	0.000
13	Naptha to Offside line 1st I/V D/S Flange	0	0	0	0.000	0.000
14	Steaer Flange	0	0	0	0.000	0.000
15	Naptha to Offside line 2nd I/V U/S Flange	0	0	0	0.000	0.000
16	Naptha to Offside line 2nd I/V Gland	0	0	0	0.000	0.000
17	Naptha to Offside line 2nd I/V D/S Flange	0	0	0	0.000	0.000
18	Vent line I/V Galnd	0	0	0	0.000	0.000
19	Vent line safety Flange	0	0	0	0.000	0.000
20	Inert Gas inlet line U/S I/V U/S Flange	0	0	0	0.000	0.000
21	Inert Gas inlet line U/S I/V Gland	0	0	0	0.000	0.000
22	Inert 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	Inert Gas inlet line D/S I/V U/S Flange	0	0	0	0.000	0.000
26	Inert Gas inlet line D/S I/V Gland	0	0	0	0.000	0.000
27	Inert Gas inlet line D/S I/V D/S Flange	0	0	0	0.000	0.000
28	Vent line I/V Galnd	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
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 Galnd	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	Steaer 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 Galnd	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
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-SDV-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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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-1701 U/S I/V 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	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 Flange	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	0	0	0	0.000	0.000
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-0016-B-Suction line I/V U/S Flange	0	0	0	0.000	0.000
127	03-PA-0016-B-Suction line I/V Gland	0	0	0	0.000	0.000
128	03-PA-0016-B-Suction line I/V D/S Flange	0	0	0	0.000	0.000
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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-0018-B-Suction line I/V U/S Flange	0	0	0	0.000	0.000
180	03-PA-0018-B-Suction line I/V Gland	0	0	0	0.000	0.000
181	03-PA-0018-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
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 U/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
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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	0	0	0	0.000	0.000
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 U/S 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-00-021A					
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
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 Top 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
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	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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
108	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
109	Bypass line I/V Gland	0	0	0	0.000	0.000
110	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
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
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 U/S I/V U/S Flange	0	0	0	0.000	0.000
166	PA-001-A/B Pump out to storage line U/S I/V Gland	0	0	0	0.000	0.000
167	PA-001-A/B Pump out to storage line U/S I/V D/S Flange	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 D/S I/V U/S Flange	0	0	0	0.000	0.000
171	PA-001-A/B Pump out to storage line D/S I/V Gland	0	0	0	0.000	0.000
172	PA-001-A/B Pump out to storage line D/S I/V D/S Flange	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 U/S Flange	0	0	0	0.000	0.000
182	STAB NAPTHA to Slope HDR U/S line I/V Gland	0	0	0	0.000	0.000
183	STAB NAPTHA to Slope HDR U/S line I/V D/S Flange	0	0	0	0.000	0.000
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 U/S Flange	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
187	STAB NAPTHA to Slope HDR D/S line I/V Gland	0	0	0	0.000	0.000
188	STAB NAPTHA to Slope HDR D/S line I/V D/S Flange	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	DRR-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 D/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
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
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-00-003A					
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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-B D/S I/V U/S Flange	0	0	0	0.000	0.000
17	02-LV-1101-B D/S I/V Gland	0	0	0	0.000	0.000
18	02-LV-1101-B 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	Drain line I/V Gland	0	0	0	0.000	0.000
25	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
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-00-0017B					
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
59	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
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	Drain line I/V Gland	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 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	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 Flange	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
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 1st 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
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 Gland	0	0	0	0.000	0.000
128	Strainer 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
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
	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
	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
	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
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	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
78	Bypass line I/V Gland	0	0	0	0.000	0.000
79	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
	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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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
	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
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	Drain line I/V Gland	0	0	0	0.000	0.000
128	Stainer Flange	0	0	0	0.000	0.000
129	Drain line OWS Point	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 line 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 line U/S 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
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					

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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	B. No. -2-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
266	B. No. -2-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
267	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
268	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
269	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
270	B. No. -3-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
271	B. No. -3-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
272	B. No. -3-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
273	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
274	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
275	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
276	B. No. -4-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
277	B. No. -4-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
278	B. No. -4-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
279	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
280	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
281	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
282	B. No. -5-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
283	B. No. -5-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
284	B. No. -5-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
285	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
286	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
287	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
288	B. No. -6-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
289	B. No. -6-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
290	B. No. -6-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
291	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
292	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
293	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
294	B. No. -7-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
295	B. No. -7-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
296	B. No. -7-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
297	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
298	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
299	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
300	B. No. -8-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
301	B. No. -8-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
302	B. No. -8-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
303	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
304	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
305	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
306	B. No. -9-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
307	B. No. -9-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
308	B. No. -9-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
309	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
310	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
311	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
312	B. No. -10-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
313	B. No. -10-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
314	B. No. -10-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
315	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
316	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
317	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
318	B. No. -11-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
319	B. No. -11-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
320	B. No. -11-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
321	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
322	Fuel Gas line I/V Gland	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
323	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
324	B. No. -12-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
325	B. No. -12-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
326	B. No. -12-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
327	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
328	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
329	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
330	B. No. -13-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
331	B. No. -13-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
332	B. No. -13-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
333	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
334	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
335	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
336	B. No. -14-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
337	B. No. -14-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
338	B. No. -14-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
339	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
340	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
341	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
342	B. No. -15-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
343	B. No. -15-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
344	B. No. -15-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
345	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
346	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
347	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
348	B. No. -16-Pilot Gas line I/V U/S Flange	0	0	0	0.000	0.000
349	B. No. -16-Pilot Gas line I/V Gland	0	0	0	0.000	0.000
350	B. No. -16-Pilot Gas line I/V D/S Flange	0	0	0	0.000	0.000
351	Fuel Gas line I/V U/S Flange	0	0	0	0.000	0.000
352	Fuel Gas line I/V Gland	0	0	0	0.000	0.000
353	Fuel Gas line I/V D/S Flange	0	0	0	0.000	0.000
354	03-FV-1603 line U/S I/V U/S Flange	0	0	0	0.000	0.000
355	03-FV-1603 line discharge I/V Gland	0	0	0	0.000	0.000
356	03-FV-1603 line U/S I/V D/S Flange	0	0	0	0.000	0.000
357	Drain line I/V Gland	0	0	0	0.000	0.000
358	Drain line Safety Flange	0	0	0	0.000	0.000
359	03-FV-1603 line C/V U/S Flange	0	0	0	0.000	0.000
360	03-FV-1603 line C/V Gland	0	0	0	0.000	0.000
361	03-FV-1603 line C/V D/S Flange	0	0	0	0.000	0.000
362	Drain line I/V Gland	0	0	0	0.000	0.000
363	Drain line Safety Flange	0	0	0	0.000	0.000
364	west side line I/V U/S Flange	0	0	0	0.000	0.000
365	west side line I/V Gland	0	0	0	0.000	0.000
366	west side line I/V D/S Flange	0	0	0	0.000	0.000
367	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
368	Bypass line I/V Gland	0	0	0	0.000	0.000
369	Bypass line I/V D/S Flange	2	0	0	0.000	0.000
	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	0	0	0	0.000	0.000
8	UNSTAB Naptha Outlet Line U/S I/V	0	0	0	0.000	0.000
9	UNSTAB Naptha Outlet Line U/S I/V	0	0	0	0.000	0.000
10	UNSTAB Naptha Outlet Line D/S I/V	0	0	0	0.000	0.000
11	UNSTAB Naptha Outlet Line D/S I/V	0	0	0	0.000	0.000
12	UNSTAB Naptha Outlet Line D/S I/V	0	0	0	0.000	0.000
13	STAB Naptha to Storage Outlet Line	0	0	0	0.000	0.000
14	STAB Naptha to Storage Outlet Line	0	0	0	0.000	0.000
15	STAB Naptha to Storage Outlet Line	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 Safety 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 Safety Flange	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
30	LPG to Inlet U/S Line I/V U/S Flange	0	0	0	0.000	0.000
31	LPG to Inlet U/S Line I/V U/S Gland	0	0	0	0.000	0.000
32	LPG to Inlet U/S Line I/V D/S Flange	0	0	0	0.000	0.000
33	LPG to Inlet D/S Line I/V U/S Flange	0	0	0	0.000	0.000
34	LPG to Inlet D/S Line I/V U/S Gland	0	0	0	0.000	0.000
35	LPG to Inlet 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 Line U/S I/V U/S Flange	0	0	0	0.000	0.000
43	Fuel gas Inlet Line U/S I/V U/S Gland	0	0	0	0.000	0.000
44	Fuel gas Inlet Line U/S I/V D/S Flange	0	0	0	0.000	0.000
45	Fuel gas Inlet Line D/S I/V U/S Flange	0	0	0	0.000	0.000
46	Fuel gas Inlet Line D/S I/V U/S Gland	0	0	0	0.000	0.000
47	Fuel gas Inlet Line D/S 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 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	01-FV-1905 C/V Line I/V U/S Gland	0	0	0	0.000	0.000
64	01-FV-1905 C/V Line I/V D/S Flange	0	0	0	0.000	0.000
65	01-FV-1905 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
66	01-FV-1905 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
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 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 Gland	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 Gland	0	0	0	0.000	0.000
86	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
87	01-LV-1701 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
88	01-LV-1701 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
89	01-LV-1701 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
90	Drain line I/V Gland	0	0	0	0.000	0.000
91	Drain line Safety Flange	0	0	0	0.000	0.000
92	01-LV-1701 C/S Line I/V U/S Flange	0	0	0	0.000	0.000
93	01-LV-1701 C/S Line I/V U/S Gland	0	0	0	0.000	0.000
94	01-LV-1701 C/S Line I/V D/S Flange	0	0	0	0.000	0.000
95	01-LV-1701 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
96	01-LV-1701 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
97	01-LV-1701 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
98	Drain line I/V Gland	0	0	0	0.000	0.000
99	Drain line Safety Flange	0	0	0	0.000	0.000
100	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
101	Bypass line I/V 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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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	01-FV-1904 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
119	01-FV-1904 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
120	01-FV-1904 U/S Line I/V D/S Flange	0	0	0	0.000	0.000
121	Drain line I/V Gland	0	0	0	0.000	0.000
122	Drain line Safety Flange	0	0	0	0.000	0.000
123	01-FV-1904 C/V U/S Flange	0	0	0	0.000	0.000
124	01-FV-1904 C/V U/S Gland	0	0	0	0.000	0.000
125	01-FV-1904 C/V D/S Flange	0	0	0	0.000	0.000
126	01-FV-1904 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
127	01-FV-1904 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
128	01-FV-1904 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
129	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
130	Bypass line I/V Gland	0	0	0	0.000	0.000
131	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
132	01-FV-1903 U/S Line I/V U/S Flange	0	0	0	0.000	0.000
133	01-FV-1903 U/S Line I/V U/S Gland	0	0	0	0.000	0.000
134	01-FV-1903 U/S Line I/V D/S Flange	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	01-FV-1903 C/V U/S Flange	0	0	0	0.000	0.000
138	01-FV-1903 C/V U/S Gland	0	0	0	0.000	0.000
139	01-FV-1903 C/V D/S Flange	0	0	0	0.000	0.000
140	01-FV-1903 D/S Line I/V U/S Flange	0	0	0	0.000	0.000
141	01-FV-1903 D/S Line I/V U/S Gland	0	0	0	0.000	0.000
142	01-FV-1903 D/S Line I/V D/S Flange	0	0	0	0.000	0.000
143	Drain line I/V Gland	0	0	0	0.000	0.000
144	Drain line Safety Flange	0	0	0	0.000	0.000
145	Bypass line I/V U/S Flange	0	0	0	0.000	0.000
146	Bypass line I/V Gland	0	0	0	0.000	0.000
147	Bypass line I/V D/S Flange	0	0	0	0.000	0.000
148	01-PA-106A Suction Line I/V Gland	0	0	0	0.000	0.000
149	Stainer Top Flange	0	0	0	0.000	0.000
150	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
151	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
152	Suction line Flange	0	0	0	0.000	0.000
153	Pump seal	0	0	0	0.000	0.000
154	Discharge line flange	0	0	0	0.000	0.000
155	Meter line 1st I/V Gland	0	0	0	0.000	0.000
156	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
157	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
158	Discharge line Gland	0	0	0	0.000	0.000
159	01-PA-106B Suction Line I/V Gland	0	0	0	0.000	0.000
160	Stainer Top Flange	0	0	0	0.000	0.000
161	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
162	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
163	Suction line Flange	0	0	0	0.000	0.000
164	Pump seal	0	0	0	0.000	0.000
165	Discharge line flange	0	0	0	0.000	0.000
166	Meter line 1st I/V Gland	0	0	0	0.000	0.000
167	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
168	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
169	Discharge line Gland	0	0	0	0.000	0.000
170	01-PA-105A Suction line I/V U/S Flange	0	0	0	0.000	0.000
171	01-PA-105A Suction line I/V U/S Gland	0	0	0	0.000	0.000
172	01-PA-105A Suction line I/V D/S Flange	0	0	0	0.000	0.000
173	Stainer Top Flange	0	0	0	0.000	0.000
174	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
175	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
176	Suction line Flange	0	0	0	0.000	0.000
177	Pump seal	0	0	0	0.000	0.000
178	Discharge line flange	0	0	0	0.000	0.000
179	Meter line 1st I/V Gland	0	0	0	0.000	0.000
180	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
181	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
182	NRV I/V U/S Flange	0	0	0	0.000	0.000
183	NRV Top Flange	0	0	0	0.000	0.000
184	NRV I/V D/S Flange	0	0	0	0.000	0.000
185	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
186	Discharge line I/V Gland	0	0	0	0.000	0.000
187	Discharge line I/V D/S Flange	0	0	0	0.000	0.000
188	01-PA-105B Suction line I/V U/S Flange	0	0	0	0.000	0.000
189	01-PA-105B Suction line I/V U/S Gland	0	0	0	0.000	0.000
190	01-PA-105B Suction line I/V D/S Flange	0	0	0	0.000	0.000
191	Stainer Top Flange	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
192	Stainer Top Flange Drain line I/V Gland	0	0	0	0.000	0.000
193	Stainer Top Flange Drain line Safety Flange	0	0	0	0.000	0.000
194	Suction line Flange	0	0	0	0.000	0.000
195	Pump seal	0	0	0	0.000	0.000
196	Discharge line flange	0	0	0	0.000	0.000
197	Meter line 1st I/V Gland	0	0	0	0.000	0.000
198	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
199	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
200	NRV I/V U/S Flange	0	0	0	0.000	0.000
201	NRV Top Flange	0	0	0	0.000	0.000
202	NRV I/V D/S Flange	0	0	0	0.000	0.000
203	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
204	Discharge line I/V Gland	0	0	0	0.000	0.000
205	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 U/S 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	Pump seal	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 Flange	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 Flange	0	0	0	0.000	0.000
22	Suction Line to Outside Line 2nd I/V U/S Flange	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 Flange	0	0	0	0.000	0.000
25	Suction Line to Outside Line 3rd I/V U/S Flange	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 Flange	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 U/S 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 I/V 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 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
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-4003 C/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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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 C/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
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.A14 To EE-108Line I/V	0	0	0	0.000	0.000
102	3.P.01.3916.A14 To EE-108Line I/V	0	0	0	0.000	0.000
103	3.P.01.3916.A14 To EE-108Line I/V	0	0	0	0.000	0.000
104	3.P.01.3916.A14 To Naptha Pool	0	0	0	0.000	0.000
105	3.P.01.3916.A14 To Naptha Pool	0	0	0	0.000	0.000
106	3.P.01.3916.A14 To Naptha Pool	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 Safety Flange	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 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
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 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 Flange	0	0	0	0.000	0.000
146	Suction Line to Outside Line 1st I/V Gland	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
147	Suction Line to Outside Line 1st I/V D/S Flange	0	0	0	0.000	0.000
148	Suction Line to Outside Line 2nd I/V U/S Flange	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 Flange	0	0	0	0.000	0.000
151	Suction Line to Outside Line 3rd I/V U/S Flange	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 Flange	0	0	0	0.000	0.000
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 U/S Flange	0	0	0	0.000	0.000
173	To Naphtha PoolEx-PA-101 Line I/V	0	0	0	0.000	0.000
174	To Naphtha PoolEx-PA-101 Line I/V	0	0	0	0.000	0.000
175	To Naphtha PoolEx-PA-101 Line I/V	0	0	0	0.000	0.000
176	Naphtha To EE-109 Ex-PA-101 Line I/V	0	0	0	0.000	0.000
177	Naphtha To EE-109 Ex-PA-101 Line I/V	0	0	0	0.000	0.000
178	Naphtha To EE-109 Ex-PA-101 Line I/V	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
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 U/S Flange	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	Meter line 1st I/V Gland	0	0	0	0.000	0.000
203	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
204	Meter line Sampling I/V Gland	0	0	0	0.000	0.000
205	NRV I/V U/S Flange	0	0	0	0.000	0.000
206	NRV Top Flange	0	0	0	0.000	0.000
207	NRV I/V D/S Flange	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
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	Dischage Line 1st Flange	0	0	0	0.000	0.000
224	Dischage 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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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	Dischage Line 1st Flange	0	0	0	0.000	0.000
248	Dischage 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
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	Dischage Line 1st Flange	0	0	0	0.000	0.000
272	Dischage 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
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-A Suction Line I/V Gland	0	0	0	0.000	0.000
288	01-PA-CF-013-A 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	Dischage Line 1st Flange	0	0	0	0.000	0.000
295	Dischage 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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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
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
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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
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

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
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
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
Unit: WAX						
Area:pump-18PA109A Wax Scripper Bottom Pump						
1	Suction line I/V U/S Flange	0	0	0	0.000	0.000
2	I/V Gland	0	0	0	0.000	0.000
3	I/V D/S Flange	0	0	0	0.000	0.000
4	Drain line I/V Gland	0	0	0	0.000	0.000
5	Drain line Safety Flange	0	0	0	0.000	0.000
6	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
7	I/V Gland	0	0	0	0.000	0.000
8	I/V D/S Flange	0	0	0	0.000	0.000
9	Pump seal	0	0	0	0.000	0.000
10	Meter line I/V Gland	0	0	0	0.000	0.000
11	OWS point	0	0	0	0.000	0.000
12	18PA109B Suction line I/V U/S Flange	0	0	0	0.000	0.000
13	I/V Gland	0	0	0	0.000	0.000
14	I/V D/S Flange	0	0	0	0.000	0.000
15	Drain line I/V Gland	0	0	0	0.000	0.000
16	Drain line Safety Flange	0	0	0	0.000	0.000
17	Discharge line I/V U/S Flange	0	0	0	0.000	0.000
18	I/V Gland	0	0	0	0.000	0.000
19	I/V D/S Flange	0	0	0	0.000	0.000
20	Pump seal	0	0	0	0.000	0.000
21	Meter line 1st I/V Gland	0	0	0	0.000	0.000
22	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
23	OWS point	0	0	0	0.000	0.000
24	18PA105A Suction line I/V U/S Flange	0	0	0	0.000	0.000
25	I/V Gland	0	0	0	0.000	0.000
26	I/V D/S Flange	0	0	0	0.000	0.000
27	Drain line I/V Gland	0	0	0	0.000	0.000
28	Drain line Safety Flange	0	0	0	0.000	0.000
29	Meter line 1st I/V Gland	0	0	0	0.000	0.000
30	Meter line 2nd I/V Gland	0	0	0	0.000	0.000
31	OWS point	0	0	0	0.000	0.000

FUGITIVE EMISSIONS SURVEY REPORT

[October 2019]

Client : NRL **ETS**

Work Order No: 4300058771-BOR/12.04.2019 ***ETS/NRL/FUGITIVE/006/19***

S/N	Component ID	AVERAGE READING LEL %	READING (%NG)	READING (ppm)	EPA Correlation Kg/Hr/Source	Total Emission kg/annum
32	18PA105B Suction line I/V U/S Flange	0	0	0	0.000	0.000
33	I/V Gland	0	0	0	0.000	0.000

NUMALIGARH REFINERY LIMITED

(Quality Control Department)

ANNEXURE-I

Analysis of ground water around secured land fills
Date of sampling: 08.10.2019
Tested by: Prabhas Borthakur

Sl No.	Parameters	Results of piezometric tubes
1	Odour	Odourless
2	pH Value	7.0
3	Iron , mg/lit	7.150
4	Copper , mg/lit	0.000
5	Nickel , mg/lit	0.000
6	Cadmium , mg/lit	0.000
7	Arsenic. mg/lit	0.000
8	Lead , mg/lit	0.000
9	Zinc, mg/lit	0.090
10	Chromium,mg/lit	0.001
11	Magnesium, mg/lit	4.890
12	Calcium, mg/lit	16.210
13	Selenium, mg/lit	0.400
14	Sodium	43.200

NUMALIGARH REFINERY LIMITED

(Quality Control Department)

ANALYSIS OF GROUND WATER AROUND SECURED LAND FILL
DEC, 2019

DATE OF SAMPLING : 12.12.2019

Sl No.	Parameters	**Results of piezometric tubes**
1	Odour	Nil
2	pH Value	7.0
3	Iron , mg/lit	4.31
4	Copper , mg/lit	0.001
5	Nickel , mg/lit	0.009
6	Cadmium , mg/lit	Nil
7	Arsenic . mg/lit	Nil
8	Lead , mg/lit	Nil
9	Zinc, mg/lit	0.002
10	Chromium,mg/lit	Nil
11	Magnesium, mg/lit	4.6
12	Calcium, mg/lit	17.1
13	Selenium, mg/lit	0.03

NUMALIGARH REFINERY LIMITED

(Quality Control Department)

Analysis of ground water around secured landfills (For the month of February 2020)
Date of sampling: 17.02.2020
Tested by: Dr. Subrat Bora

Sl No.	Parameters	Results of piezometric tubes
1	Odour	Odourless
2	pH Value	7.0
3	Iron , mg/lit	6.95
4	Copper , mg/lit	0.00
5	Nickel , mg/lit	0.00
6	Cadmium , mg/lit	0.00
7	Arsenic. mg/lit	0.00
8	Lead , mg/lit	0.00
9	Zinc, mg/lit	0.78
10	Chromium,mg/lit	0.001
11	Magnesium, mg/lit	4.70
12	Calcium, mg/lit	17.62
13	Selenium, mg/lit	0.34
14	Sodium	50.00

QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.

DURING QUARTER III(Oct'19-Dec'19),2019-20

ANNEXURE-III

Online Stack Analyser data

UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE		Limiting Concentration in mg/Nm3	Remarks Limit conc. calculated using fuel type& quan. used during the period
			CONC. (In mg/Nm3)			
			MAX.	MIN.		
CDU/VDU	FF-01/02	SO2	287.60	19.71	**616**	Stack with dual firing (FG:FO=66:34)
		NOx	56.66	21.64	**384**	
		CO FF1	5.50	1.13	**167**	
		CO FF2	3.30	2.10		
DCU	FF-01	SO2	317.87	71.40	**878**	Stack with dual firing (FG:FO=50:50)
		NOx	175.94	86.43	**400**	
HCU	FF-01/02	SO2	26.56	2.57	**50**	Stack with Gas firing
		NOx	32.84	6.57	**350**	
HCU	FF-03	SO2	36.56	11.71	**195**	Stack with dual firing (FG:FO=91:9)
		NOx	60.94	13.70	**359**	
H2U	FF-01	SO2	46.83	23.40	**50**	Stack with Gas firing
		NOx	43.13	12.10	**350**	
CPP(HRSG)		SO2	45.98	38.84	**50**	Stack with Gas firing
		NOx	25.40	12.32	**350**	
CPP (UB)		SO2	46.55	37.13	**50**	Stack with dual firing (FG:FO=100:0)
		NOx	141.45	56.25	**350**	
MSP (FF-01/02)		SO2	43.40	23.99	**50**	Stack with Gas firing
		NOx	42.00	23.40	350	
DHDT		SO2	31.54	10.66	**50**	Stack with Gas firing
		NOx	125.66	77.19	**350**	

Limiting concentration of emission calculated as per MOEF notification on standard vide GSR-186 (E) dated 18th March, 2008.

QUARTERLY PERFORMANCE REPORT W.R.T ENVIRONMENTAL ASPECT.
DURING QUARTER IV(Jan-Mar'20),2019-20

ANNEXURE-III

Online Stack Analyser data

UNIT	FURNACE STACK	PARAMETER	OBSERVED VALUE CONC. (In mg/Nm3) MAX.	OBSERVED VALUE CONC. (In mg/Nm3) MIN.	Limiting Concentration in mg/Nm3	Remarks Limit conc. calculated using fuel type& quan. used during the period
CDU/VDU	FF-01/02	SO2	287.6	19.7	717	Stack with dual firing (FG:FO=60:40)
		NOX	280.2	21.6	390	
		CO (FF1)	7.0	1.13	170	
		CO (FF2)	6.6	2.10		
DCU	FF-01	SO2	217.9	14.57	349	Stack with dual firing (FG:FO=82:18)
		NOX	175.94	33.7	369	
HCU	FF-01/02	SO2	28.5	2.6	50	Stack with Gas firing
		NOX	109.8	6.6	350	
HCU	FF-03	SO2	80.2	12.40	101	Stack with dual firing (FG:FO=97:3)
		NOX	135.9	24.5	353	
H2U	FF-01	SO2	26.8	8.20	50	Stack with Gas firing
		NOX	43.1	10.47	350	
MSP	FF-01	SO2	23.4	2.5	50	Stack with Gas firing
		NOX	42.0	1.50	350	
CPP HRSG		SO2	25.98	3.50	50	Stack with dual firing (FG:NAP=100:00)
		NOX	26.0	6.14	350	
CPP UTILITY BOILER		SO2	29.1	10.2	50	Stack with Dual firing (FG:FO=100:0)
		NOX	161.4	7.16	350	
DHDT		SO2	21.5	3.9	50	Stack with Gas firing
		NOX	125.7	10.03	350	

* Limiting concentration of emission calculated as per MOEF new notification on standard vide GSR- 186 (E) dated 18th March, 2008. Emission level for all the stacks are found to be within limit

Annexure-IV

NUMALIGARH REFINERY LIMITED

QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS

DURING QUARTER III (Oct-Dec' 19), 2019-20

Ambient Air Quality Data

STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS MAX	 MIN	 AVG
REFINERY (WATCH TOWER NO. 6)	SO2	80 (24 hr avg.)	µg/m3	18.80	12.60	16.80
	NO2	80 (24 hr avg.)	µg/m3	21.80	16.20	19.00
	O3	100 (8 hr avg.)	µg/m3	28.80	22.40	26.40
	CO	2.0 (8 hr.avg.)	mg/m3	1.10	0.90	1.00
	NH3	400 (24 hr.avg.)	µg/m3	31.10	21.40	26.30
	PM 10	100 (24 hr.avg.)	µg/m3	76.80	69.20	72.20
	PM 2.5	60 (24 hr.avg.)	µg/m3	52.60	44.20	48.40
	Benzene	5.0 (Annual)	µg/m3	2.20	2.10	2.20
	HC	-	mg/m3	12.00	1.00	2.9
	BaP	1.0 (Annual)	ng/m3	<0.4	<0.4	<0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	0.30	0.20	0.20
	As	6.0 (Annual)	ng/m3	<1.0	<1.0	<1.0
	Ni	20 (Annual)	ng/m3	3.80	2.80	3.20
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	14.2	8.6	11.6
	NO2	80 (24 hr avg.)	µg/m3	18.1	9.4	13.80
	O3	100 (8 hr avg.)	µg/m3	19.8	12.80	16.1
	CO	2.0 (8 hr.avg.)	mg/m3	0.30	0.10	0.3
	NH3	400 (24 hr.avg.)	µg/m3	16.2	10.8	13.5
	PM 10	100 (24 hr.avg.)	µg/m3	71.6	64.8	68.7
	PM 2.5	60 (24 hr.avg.)	µg/m3	34.2	28.1	30.8

	Benzene	5.0 (Annual)	µg/m3	<2.08	<2.08	<2.08
	BaP	1.0 (Annual)	ng/m3	<0.4	<0.4	<0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	0.30	0.20	0.30
	As	6.0 (Annual)	ng/m3	<1.0	<1.0	<1.0
	Ni	20 (Annual)	ng/m3	3.10	2.20	2.70
RAW WATER INTAKE	SO2	80 (24 hr avg.)	µg/m3	12.60	9.60	10.60
	NO2	80 (24 hr avg.)	µg/m3	14.1	11.20	12.5
	O3	100 (8 hr avg.)	µg/m3	<10.0	<10.0	<10.0
	CO	2.0 (8 hr.avg.)	mg/m3	<0.1	<0.1	<0.1
	NH3	400 (24 hr.avg.)	µg/m3	<10.0	<10.0	<10.0
	PM 10	100 (24 hr.avg.)	µg/m3	64.6	58.2	60.8
	PM 2.5	60 (24 hr.avg.)	µg/m3	48.2	28.2	37.7
	Benzene	5.0 (Annual)	µg/m3	<2.08	<2.08	<2.08
	BaP	1.0 (Annual)	ng/m3	<0.4	<0.4	<0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	<0.2	<0.2	<0.2
	As	6.0 (Annual)	ng/m3	<1.0	<1.0	<1.0
	Ni	20 (Annual)	ng/m3	<2.0	<2.0	<2.0
NH-39 BYPASS	SO2	80 (24 hr avg.)	µg/m3	16.80	18.40	28.20
	NO2	80 (24 hr avg.)	µg/m3	18.4	14.8	17.0
	O3	100 (8 hr avg.)	µg/m3	28.2	21.4	24.4
	CO	2.0 (8 hr.avg.)	mg/m3	1.00	0.90	0.90
	NH3	400 (24 hr.avg.)	µg/m3	24.6	16.8	21.5
	PM 10	100 (24 hr.avg.)	µg/m3	72.6	64.8	69.9
	PM 2.5	60 (24 hr.avg.)	µg/m3	51.8	44.1	47.1

	Benzene	5.0 (Annual)	µg/m3	2.20	2.10	2.20
	BaP	1.0 (Annual)	ng/m3	<0.4	<0.4	<0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	0.40	0.20	0.30
	As	6.0 (Annual)	ng/m3	<1.0	<1.0	<1.0
	Ni	20.0 (Annual)	ng/m3	3.80	2.20	2.90
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	SO2	80.0 (24 hr avg.)	µg/m3	11.10	8.60	9.47
	NO2	80.0 (24 hr avg.)	µg/m3	11.40	9.10	9.86
	O3	100.0 (8 hr avg.)	µg/m3	<10.0	<10.0	<10.0
	CO	2.0 (8 hr.avg.)	mg/m3	<0.1	<0.1	<0.1
	NH3	400.0 (24 hr.avg.)	µg/m3	<10.0	<10.0	<10.0
	PM 10	100 (24 hr.avg.)	µg/m3	62.6	57.2	60.0
	PM 2.5		µg/m3	28.6	19.8	24.8
	Benzene	5.0 (Annual)	µg/m3	<2.08	<2.08	<2.08
	BaP	1.0 (Annual)	ng/m3	<0.4	<0.4	<0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	<0.2	<0.2	<0.2
	As	6.0 (Annual)	ng/m3	<1.0	<1.0	<1.0
	Ni	20 (Annual)	ng/m3	<2.0	<2.0	<2.0

Annexure-IV

NUMALIGARH REFINERY LIMITED

QUARTERLY PERFORMANCE WITH RESPECT TO ENVIRONMENTAL ASPECTS

DURING QUARTER IV (Jan-Mar'20), 2019-20

Ambient Air Quality Data

STATION	PARAMETER	STD NAAQS-2009	Unit	OBSERVATIONS MAX	 MIN	 AVG
REFINERY (WATCH TOWER NO. 6)	SO2	80 (24 hr avg.)	µg/m3	18.8	4.20	12.0
	NO2	80 (24 hr avg.)	µg/m3	27.4	14.1	21.3
	O3	100 (8 hr avg.)	µg/m3	36.1	10.0	23.8
	CO	2.000 (8 hr.avg.)	mg/m3	1.200	0.30	0.857
	NH3	400 (24 hr.avg.)	µg/m3	34.2	10.0	22.52
	PM 10	100 (24 hr.avg.)	µg/m3	76.8	38.0	64.7
	PM 2.5	60 (24 hr.avg.)	µg/m3	52.6	21.0	40.2
	Benzene	05 (Annual)	µg/m3	2.60	2.08	2.21
	HC		mg/m3	12.00	0.67	1.80
	BaP	01 (Annual)	ng/m3	0.89	0.40	0.40
	Pb	1.0 (24 hr.avg.)	µg/m3	0.30	0.02	0.14
	As	06 (Annual)	ng/m3	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m3	5.68	2.80	3.74
ECO-PARK IN NRL TOWNSHIP	SO2	80 (24 hr avg.)	µg/m3	14.20	4.30	9.2
	NO2	80 (24 hr avg.)	µg/m3	32.20	9.40	18.1
	O3	100 (8 hr avg.)	µg/m3	27.4	10.00	15.1
	CO	2.000 (8 hr.avg.)	mg/m3	0.480	0.100	0.333
	NH3	400 (24 hr.avg.)	µg/m3	17.2	10.00	12.9
	PM 10	100 (24 hr.avg.)	µg/m3	71.6	48.0	63.8
	PM 2.5	60 (24 hr.avg.)	µg/m3	39.0	18.8	28.8

	Benzene	05 (Annual)	µg/m3	2.08	2.08	2.08
	HC		mg/m3	1.55	0.79	0.9
	BaP	1.0 (Annual)	ng/m3	0.40	0.40	0.4
	Pb	1.0 (24 hr.avg.)	µg/m3	0.30	0.02	0.17
	As	6.0 (Annual)	ng/m3	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m3	5.32	2.00	2.96
RAW WATER INTAKE	SO2	80 (24 hr avg.)	µg/m3	12.6	4.1	8.2
	NO2	80 (24 hr avg.)	µg/m3	28.1	8.7	15.7
	O3	100 (8 hr avg.)	µg/m3	10.0	10.0	10.0
	CO	2.000 (8 hr.avg.)	mg/m3	0.10	0.10	0.10
	NH3	400 (24 hr.avg.)	µg/m3	12.60	9.80	10.38
	PM 10	100 (24 hr.avg.)	µg/m3	64.6	36.0	49.7
	PM 2.5	60 (24 hr.avg.)	µg/m3	48.2	15.0	26.6
	Benzene	05 (Annual)	µg/m3	2.08	2.08	2.08
	HC		mg/m3	1.36	0.10	0.6
	BaP	01 (Annual)	ng/m3	0.40	0.40	0.40
	Pb	1.0 (24 hr.avg.)	µg/m3	0.02	0.02	0.02
	As	06 (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	16.8	4.2	15.4
	NO2	80 (24 hr avg.)	µg/m3	31.4	14.6	20.2
	O3	100 (8 hr avg.)	µg/m3	28.2	10.0	20.8
	CO	2.000 (8 hr.avg.)	mg/m3	1.200	0.400	0.817
	NH3	400 (24 hr.avg.)	µg/m3	31.8	10.0	21.0

	PM 10	100 (24 hr.avg.)	µg/m3	76.8	48.0	66.8
	PM 2.5	60 (24 hr.avg.)	µg/m3	51.8	22.0	39.9
	Benzene	05 (Annual)	µg/m3	2.80	2.10	2.29
	HC		mg/m3	1.42	0.70	1.02
	BaP	1	ng/m3	0.40	0.40	0.40
	Pb	1.0 (24 hr.avg.)	µg/m3	0.40	0.20	0.20 7
	As	6	ng/m3	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m3	6.80	2.20	3.60
KAZIRANGA WILDLIFE SANCTUARY AT AGARTOLI	SO2	80 (24 hr avg.)	µg/m3	11.1 0	4.00	7.19
	NO2	80 (24 hr avg.)	µg/m3	30.4	8.4	13.2
	O3	100 (8 hr avg.)	µg/m3	10.0	10.0 0	10.0 0
	CO	2.000 (8 hr.avg.)	mg/m3	0.45 0	0.10 0	0.10 0
	NH3	400 (24 hr.avg.)	µg/m3	10.0 0	10.0 0	10.0 0
	PM 10	100 (24 hr.avg.)	µg/m3	62.6	26.0	47.6
	PM 2.5	60 (24 hr.avg.)	µg/m3	29.0	12.0	22.2
	Benzene	05 (Annual)	µg/m3	2.08	2.08	2.08
	HC		mg/m3	2.74	0.10	0.4
	BaP	1.0	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	ng/m3	1.00	1.00	1.00
	Ni	20 (Annual)	ng/m3	4.00	2.00	2.7
BDL:Below Detection Level, All the parameters are found to be within limt						

LIQUID EFFLUENT POLLUTANT LEVEL DURING QR. III (Oct-Dec'19) 2019-20								
MONITORED VALUES in mg/lit.except pH								
Annexure V								
SL. NO	**PARAMETERS**	**NO. OF OBS**	**MAX.**	**MIN.**	**AVG.**	**Limiting value for conc. (mg/l except for pH)**	**Quantum limit in Kg / 1000 MT of crude processed**	
							Actual	**Standard**
1	pH	**31**	7.5	5.5	6.8	**6-8.5**	-	-
2	OIL & GREASE	**31**	4.7	1.4	3.9	**5.0**	**1.87**	**2.0**
3	SULPHIDE	**31**	<0.10	<0.10	<0.10	**0.5**	**0.05**	**0.2**
4	PHENOL	**31**	0.34	0.1	0.20	**0.35**	**0.10**	**0.14**
5	S. SOLID	**31**	16.5	10	12.8	**20.0**	**6.13**	**8.0**
6	COD	**31**	103	32	73.3	**125.0**	**35.1**	**50.0**
7	BOD3	**31**	14.0	8	10.25	**15.0**	**4.91**	**6.0**
8	CN	**31**	<0.02	<0.02	<0.02	**0.2**	**0.01**	**0.08**
9	Ammonia as N	**1**			7.82	**15.0**	**3.74**	**6.0**
10	Cr (Hexavalent)	**1**			0.00	**0.1**	**0.00**	**0.04**
11	Cr (Total)	**1**			0.010	**2.0**	**0.00**	**0.8**
12	Pb	**1**			0.010	**0.1**	**0.005**	**0.04**
13	Zn	**1**			0.080	**5.0**	**0.04**	**2.0**
14	Ni	**1**			0.050	**1.0**	**0.02**	**0.4**
15	Cu	**1**			0.060	**1.0**	**0.029**	**0.4**
16	Benzene	**1**			0.050	**0.1**	**0.02**	**0.04**
17	Benzo (a)-Pyrene	**1**			0.0002	**0.2**	**0.00**	**0.08**
18	Hg	**1**			<0.001	**0.01**	**0.00**	**0.004**
19	V	**1**			0.020	**0.2**	**0.01**	**0.8**
20	TKN	**1**			17.00	**40.0**	**8.14**	**16.0**
21	P	**1**			**0.27**	**3.0**	**0.13**	**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**								

LIQUID EFFLUENT POLLUTANT LEVEL DURING QR. IV (Jan-Mar'20) 2019-20								
MONITORED VALUES in mg/lit.except pH								
			Annexure V					
SL. NO	**PARAMETERS**	**NO. OF OBS**	**MAX.**	**MIN.**	**AVG.**	**Limiting value for conc. (mg/l except for pH)**	**Quantum limit in Kg / 1000 MT of crude processed**	
							Actual	**Standard**
1	pH	**91**	7.5	5.5	**6.8**	**6-8.5**	-	-
2	OIL & GREASE	**91**	4.7	1.4	**2.90**	**5**	**1.03**	**2.0**
3	SULPHIDE	**91**	<0.1	<0.1	**<0.1**	**0.5**	**0.04**	**0.2**
4	PHENOL	**91**	0.34	0.10	**0.18**	**0.35**	**0.06**	**0.14**
5	S. SOLID	**91**	16.8	10.0	**11.97**	**20.0**	**4.26**	**8.0**
6	COD	**91**	103.0	32.00	**63.0**	**125.0**	**22.4**	**50.0**
7	BOD3	**91**	14.0	8.0	**9.11**	**15.0**	**3.24**	**6.0**
8	CN	**91**	<0.02	<0.02	**<0.02**	**0.2**	**0.01**	**0.08**
9	Ammonia as N	**3**	7.82		**6.22**	**15.0**	**2.21**	**6.0**
10	Cr (Hexavalent)	**3**	0		**0.00**	**0.1**	**0.00**	**0.04**
11	Cr (Total)	**3**	0.01		**0.007**	**2.0**	**0.00**	**0.8**
12	Pb	**3**	0.01		0.01	**0.1**	**0.004**	**0.04**
13	Zn	**3**	0.08		**0.080**	**5.0**	**0.03**	**2.0**
14	Ni	**3**	0.05		**0.037**	**1.0**	**0.01**	**0.4**
15	Cu	**3**	0.06		**0.04**	**1.0**	**0.014**	**0.4**
16	Benzene	**3**	0.09		**0.0633**	**0.1**	**0.023**	**0.04**
17	Benzo (a)-Pyrene	**3**	0.051		**0.02**	**0.2**	**0.0061**	**0.08**
18	Hg	**3**	0.004		**0.00**	**0.01**	**0.00**	**0.004**
19	V	**3**	0.02		**0.02**	**0.2**	**0.0**	**0.8**
20	TKN	**3**	12.6		**7.5**	**40.0**	**2.68**	**16.0**
21	P	**3**	1.85		**0.65**	**3.0**	**0.23**	**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**								

NOISE MONITORING REPORT
(Day timing- 8.30 AM to 4.30 PM and Night timing –10.00 PM to 6.00 AM)

ETS

Client: NRL	***Work Order No. : 4300058771-BOR/12.04.2019***
For The Month of : February 2020	***ETS/NRL/NOISE/010/20***

NOISE LEVEL IN dB(A)

AREA	***Sl NO.***	***CENTRAL LOCATION***	***Observed value dB(A)***		***Standard dB(A)***
			Day	***Night***	
CDU/ VDU	1	Field Cabin (inside)	58.3	56.4	***92 for 6 hrs***
	2	Crude Booster Pump (A)	98.4	96.5	
	3	Crude Booster Pump (B)	98.1	96.2	
DCU	4	Field Cabin	58.9	57.6	
	5	LPG Compressor	87.7	85.1	
HCU	6	Field Cabin(Inside)	60.1	58.3	
	7	Near RGC Area	70.6	69	
H2U	8	Field Cabin (Inside)	58.4	56.1	
	9	PSA AREA	88.8	87.2	
SRB	10	Field Cabin(Inside)	59.9	58.1	
	11	Control Room	61.2	59.3	
PH#1	12	Field Cabin (Inside)	62.3	60.1	
PH#3	13	Field Cabin (Inside)	61	58.2	
CPP(1)	14	Control Room	63.1	61.2	
	15	Field Cabin (Inside)	60.3	58.6	
	16	Instrumentation Room	65.5	63.1	
	17	Air Compressor (Utility)	95.6	93.2	
CPP(2)	18	Cabin(2)	58.3	56.1	
	19	Sound Prone Zone	88.6	86.2	
DM Plant	20	Field Cabin (Inside)	61.2	60.3	
FWPH	21	Control Room	59.3	57.2	
ETP	22	Disposal Pump House	60.2	58.1	
	23	Control Room	60.6	58.3	
CCU	24	Control Room	63.2	61.4	
	25	Near BFW	88.8	86.1	
	26	Near Air Blower	85.5	84.2	
MSP	27	Field Cabin	59.3	57.3	
	28	Near Compressor House	95.6	93.1	
	29	Near Furnace Area	88.3	87.2	
N2 PLANT/ Compressor	30	Control Room	61.2	59.3	
	31	Compressor House	96.6	95.2	
N2 PLANT	32	LP Compressor (2A)	95.3	93	
	33	LP Compressor (2B)	94.2	92.1	
WAX(ASPU)	34	Compressor (304A)	95.5	89.9	
	35	Compressor (304B)	94.3	88.6	
WAX(SDU)	36	Office Cabin	63.8	61.3	
	37	Field Cabin	62.1	61.3	

LPG Bottling Plant	38	Casual Area	105.8		
	39	Unloading Area	108.4		
	40	Cylinder Filling Area	112.2		
	41	Loading Area	113.1		
AREA	***Sl NO.***	***LOCATION***	***Observed value dB(A)***		***Standard dB(A)***
			Day	***Night***	
Lab	38	Outside Lab Building	65.5	62.1	75
	39	Near Laboratory	60.3	57.4	
IT DEPT	40	Server Room	47.1	45.2	
ADM Building	41	Near AC Room	64.5	61	
	42	Near ADM Building	62.2	60.4	
Control Room	43	Infront of CCR	58.8	56.2	
Flare Area	44	Near Flare Area	64.2	61.3	
VKNRL Hospital	45	Hospital Premises	59.5	57.2	
DPS	46	DPS Premises	62.1	59.3	
Watch Tower	47	Near W.T No.1	56.3	53.6	

Note : The sound level exceeding the limits in one location i.e. In CDU-VDU Crude Booster Pump area . While working in these locations, is to be ensured the use of PPE like ear plug, muff etc.

for ETS

VOC MONITORING REPORT [November -2019]

Client : NRL

ETS

Work Order No: 4300058771-BOR/12.04.2019 **ETS/NRL/VOC/007/19**

Plant- Numaligarh Refinery **Instrument Used-Firstcheck5000 VOC Meter**

S.No.	Location	Concentration PPM(Limit)	Emission Load Kg/hr/Source	Emission Load Kg/Annum
Unit :	**MSP**			
Area : B/L, Pump Area				
1	Fuel gas Inlet line U/S l/V U/S flange	0		0.00
2	Fuel gas Inlet line U/S l/V Gland	0		0.00
3	Fuel gas Inlet line U/S l/V D/S flange	0		0.00
4	Fuel gas Inlet line D/S l/V U/S flange	0		0.00
5	Fuel gas Inlet line D/S l/V Gland	0		0.00
6	Fuel gas Inlet line D/S l/V D/S flange	0		0.00
7	Sour gas outlet line U/S l/V U/S flange	0		0.00
8	Sour gas outlet line U/S l/V Gland	0		0.00
9	Sour gas outlet line U/S l/V D/S flange	0		0.00
10	Drain line l/V Gland	0		0.00
11	Drain line safety Flange	0		0.00
12	Sour gas outlet line D/S l/V U/S flange	0		0.00
13	Sour gas outlet line D/S l/V Gland	0		0.00
14	Sour gas outlet line D/S l/V D/S flange	0		0.00
15	LPG R/D outlet line U/S l/V U/S flange	0		0.00
16	LPG R/D outlet line U/S l/V Gland	0		0.00
17	LPG R/D outlet line U/S l/V D/S flange	0		0.00
18	Drain line l/V Gland	0		0.00
19	LPG R/D First l/V gland	0		0.00
20	LPG R/D outlet line D/S l/V U/S flange	0		0.00
21	LPG R/D outlet line D/S l/V Gland	0		0.00
22	LPG R/D outlet line D/S l/V D/S flange	0		0.00
23	Hydrogen Rich Gas To PSA outlet	0		0.00
24	Hydrogen Rich Gas To PSA outlet	0		0.00
25	Hydrogen Rich Gas To PSA outlet	0		0.00
26	Drain line l/V Gland	0		0.00
27	Drain line safety Flange	0		0.00
28	NRV U/S Flange	0		0.00
29	NRV Top Flange	0		0.00
30	NRV D/S Flange	0		0.00
31	Hydrogen Rich Gas To PSA outlet line U/S I/V U/S Flange	0		0.00
32	Hydrogen Rich Gas To PSA outlet line U/S I/V Gland	0		0.00
33	Hydrogen Rich Gas To PSA outlet line U/S I/V D/S Flange	0		0.00
34	Hydrogen from PSA Inlet line U/S I/V U/S Flange	0		0.00
35	Hydrogen from PSA Inlet line U/S I/V Gland	0		0.00
36	Hydrogen from PSA Inlet line U/S I/V D/S Flange	0		0.00
37	NRV U/S Flange	0		0.00
38	NRV Top Flange	0		0.00
39	NRV D/S Flange	0		0.00
40	Drain line l/V Gland	0		0.00
41	Drain line safety Flange	0		0.00
42	Hydrogen from PSA Inlet line D/S I/V U/S Flange	0		0.00
43	Hydrogen from PSA Inlet line D/S I/V Gland	0		0.00
44	Hydrogen from PSA Inlet line D/S I/V D/S Flange	0		0.00
45	To 14-VV-01 S/U H. NAPTHA To	0		0.00
46	To 14-VV-01 S/U H. NAPTHA To	0		0.00
47	To 14-VV-01 S/U H. NAPTHA To	0		0.00
48	NRV U/S Flange	0		0.00

49	NRV Top Flange	0		0.00
50	NRV D/S Flange	0		0.00
51	Drain line l/V Gland	0		0.00
52	Drain line safety Flange	0		0.00
53	To 14-VV-01 S/U H. NAPTHA To	0		0.00
54	To 14-VV-01 S/U H. NAPTHA To	0		0.00
55	To 14-VV-01 S/U H. NAPTHA To	0		0.00
56	To 14-VV-01 S/U H. NAPTHA To	0		0.00
57	To 14-VV-01 S/U H. NAPTHA To	0		0.00
58	To 14-VV-01 S/U H. NAPTHA To	0		0.00
59	NRV U/S Flange	0		0.00
60	NRV Top Flange	0		0.00
61	NRV D/S Flange	0		0.00
62	Drain line l/V Gland	0		0.00
63	Drain line safety Flange	0		0.00
64	To 14-VV-01 S/U H. NAPTHA To	0		0.00
65	To 14-VV-01 S/U H. NAPTHA To	0		0.00
66	To 14-VV-01 S/U H. NAPTHA To	0		0.00
67	14-LV-1701 U/S line l/V U/S Flange	0		0.00
68	14-LV-1701 U/S line l/V Gland	0		0.00
69	14-LV-1701 U/S line l/V D/S Flange	0		0.00
70	CDE line 1st l/V Gland	0		0.00
71	CDE line 2nd l/V Gland	0		0.00
72	stainer Flange	0		0.00
73	CDE line 3rd l/V Gland	0		0.00
74	14-LV-1701 C/V line U/S Flange	0		0.00
75	14-LV-1701 C/V line Gland	0		0.00
76	14-LV-1701 C/V line D/S Flange	0		0.00
77	14-LV-1701 D/S line l/V U/S Flange	0		0.00
78	14-LV-1701 D/S line l/V Gland	0		0.00
79	14-LV-1701 D/S line l/V D/S Flange	0		0.00
80	Bypass line l/V U/S Flange	0		0.00
81	Bypass line l/V Gland	0		0.00
82	Bypass line l/V D/S Flange	0		0.00
83	15-FV-1401 U/S line l/V U./S Flange	0		0.00
84	15-FV-1401 U/S line l/V Gland	0		0.00
85	15-FV-1401 U/S line l/V D/S Flange	0		0.00
86	CDE line 1st l/V Gland	0		0.00
87	CDE line 2nd l/V Gland	0		0.00
88	stainer Flange	0		0.00
89	CBD Drain line Top Flange	0		0.00
90	15-FV-1401 C/V line U./S Flange	0		0.00
91	15-FV-1401 C/V line Gland	0		0.00
92	15-FV-1401 C/V line D/S Flange	0		0.00
93	15-FV-1401 D/S line l/V U./S Flange	0		0.00
94	15-FV-1401 D/S line l/V Gland	0		0.00
95	15-FV-1401 D/S line l/V D/S Flange	0		0.00
96	Bypass line l/V U/S Flange	0		0.00
97	Bypass line l/V Gland	0		0.00
98	Bypass line l/V D/S Flange	0		0.00
99	15-PV-1401 U/S line l/V U/S Flange	0		0.00
100	15-PV-1401 U/S line l/V Gland	0		0.00
101	15-PV-1401 U/S line l/V D/S Flange	0		0.00
102	15-PV-1401 C/V line U/S Flange	0		0.00
103	15-PV-1401 C/V line Gland	0		0.00
104	15-PV-1401 C/V line D/S Flange	0		0.00
105	15-PV-1401 D/S line l/V U/S Flange	0		0.00
106	15-PV-1401 D/S line l/V Gland	0		0.00
107	15-PV-1401 D/S line l/V D/S Flange	0		0.00

108	To flare line 1st l/V U/S Flange	0		0.00
109	To flare line 1st l/V Gland	0		0.00
110	To flare line 1st l/V D/S Flange	0		0.00
111	NRV U/S Flange	0		0.00
112	NRV Top Flange	0		0.00
113	NRV D/S Flange	0		0.00
114	Drain line l/V Gland	0		0.00
115	Drain line safety Flange	0		0.00
116	To flare line 2nd l/V U/S Flange	0		0.00
117	To flare line 2nd l/V Gland	0		0.00
118	To flare line 2nd l/V D/S Flange	0		0.00
119	To FG Header line 1st l/V U/S Flange	0		0.00
120	To FG Header line 1st l/V Gland	0		0.00
121	To FG Header line 1st l/V D/S Flange	0		0.00
122	NRV Top Flange	0		0.00
123	NRV D/S Flange	0		0.00
124	Drain line l/V Gland	0		0.00
125	Drain line safety Flange	0		0.00
126	To FG Header line 2nd l/V U/S Flange	0		0.00
127	To FG Header line 2nd l/V Gland	0		0.00
128	To FG Header line 2nd l/V D/S Flange	0		0.00
129	**15-PA-CF-001A**	0		0.00
130	Suction line l/V U/S Flange	0		0.00
131	Suction line l/V Gland	0		0.00
132	Suction line l/V D/S Flange	0		0.00
133	stainer Top Flange	0		0.00
134	P.G. Meter line l/V Gland	0		0.00
135	Suction line Flange	0		0.00
136	Pump Seal	0		0.00
137	CBD line 1st l/V Gland	0		0.00
138	stainer Flange	0		0.00
139	CBD line 2nd l/V Gland	0		0.00
140	Drain line l/V Gland	0		0.00
141	OWS Point	0		0.00
142	Discharge line U/S Flange	0		0.00
143	Meter line Flange	0		0.00
144	NRV U/S Flange	0		0.00
145	NRV Top Flange	0		0.00
146	NRV D/S Flange	0		0.00
147	Discharge line l/V U/S Flange	0		0.00
148	Discharge line l/V Gland	0		0.00
149	Discharge line l/V D/S Flange	0		0.00
150	**15-PA-CF-001B**	0		0.00
151	Suction line l/V U/S Flange	0		0.00
152	Suction line l/V Gland	0		0.00
153	Suction line l/V D/S Flange	0		0.00
154	stainer Top Flange	0		0.00
155	P.G. Meter line l/V Gland	0		0.00
156	Suction line Flange	0		0.00
157	Pump Seal	0		0.00
158	CBD line 1st l/V Gland	0		0.00
159	stainer Flange	0		0.00
160	CBD line 2nd l/V Gland	0		0.00
161	Drain line l/V Gland	0		0.00
162	OWS Point	0		0.00
163	Discharge line U/S Flange	0		0.00
164	Meter line Flange	0		0.00
165	NRV U/S Flange	0		0.00
166	NRV Top Flange	0		0.00

167	NRV D/S Flange	0		0.00
168	Discharge line l/V U/S Flange	0		0.00
169	Discharge line l/V Gland	0		0.00
170	Discharge line l/V D/S Flange	0		0.00
171	15-PV-1301A U/S line l/V U/S Flange	0		0.00
172	15-PV-1301A U/S line l/V Gland	0		0.00
173	15-PV-1301A U/S line l/V D/S Flange	0		0.00
174	15-PV-1301A C/V line U/S Flange	0		0.00
175	15-PV-1301A C/V line Gland	0		0.00
176	15-PV-1301A C/V line D/S Flange	0		0.00
177	15-PV-1301A D/S line l/V U/S Flange	0		0.00
178	15-PV-1301A D/S line l/V Gland	0		0.00
179	15-PV-1301A D/S line l/V D/S Flange	0		0.00
180	Bypass line l/V U/S Flange	0		0.00
181	Bypass line l/V Gland	0		0.00
182	Bypass line l/V D/S Flange	0		0.00
183	15-PA-CF-002A	0		0.00
184	Suction line l/V U/S Flange	0		0.00
185	Suction line l/V Gland	0		0.00
186	Suction line l/V D/S Flange	0		0.00
187	stainer Top Flange	0		0.00
188	P.G. Meter line l/V Gland	0		0.00
189	Suction line Flange	0		0.00
190	Pump Seal	0		0.00
191	CBD line 1st l/V Gland	0		0.00
192	stainer Flange	0		0.00
193	CBD line 2nd l/V Gland	0		0.00
194	Drain line l/V Gland	0		0.00
195	OWS Point	0		0.00
196	Discharge line Flange	0		0.00
197	Meter line I/V Flange	0		0.00
198	NRV U/S Flange	0		0.00
199	NRV Top Flange	0		0.00
200	Discharge line l/V U/S Flange	0		0.00
201	Discharge line l/V Gland	0		0.00
202	Discharge line l/V D/S Flange	0		0.00
203	**15-PA-CF-002B**	0		0.00
204	Suction line l/V U/S Flange	0		0.00
205	Suction line l/V Gland	0		0.00
206	Suction line l/V D/S Flange	0		0.00
207	stainer Top Flange	0		0.00
208	P.G. Meter line l/V Gland	0		0.00
209	Suction line Flange	0		0.00
210	Pump Seal	0		0.00
211	CBD line 1st l/V Gland	0		0.00
212	stainer Flange	0		0.00
213	CBD line 2nd l/V Gland	0		0.00
214	Drain line l/V Gland	0		0.00
215	OWS Point	0		0.00
216	Discharge line Flange	0		0.00
217	Meter line I/V Flange	0		0.00
218	NRV U/S Flange	0		0.00
219	NRV Top Flange	0		0.00
220	Discharge line l/V U/S Flange	0		0.00
221	Discharge line l/V Gland	0		0.00
222	Discharge line l/V D/S Flange	0		0.00
223	15-FV-1503 U/S line I/V Gland	0		0.00
224	CBD line 1st l/V Gland	0		0.00
225	CBD line 2nd l/V Gland	0		0.00

226	stainer Flange	0		0.00
227	CBD line 3rd l/V Gland	0		0.00
228	15-FV-1503 line c/v U/S flange	0		0.00
229	15-FV-1503 line c/v Gland	0		0.00
230	15-FV-1503 line c/v D/S flange	0		0.00
231	15-FV-1503 D/S line l/V Gland	0		0.00
232	Bypass line l/V Gland	0		0.00
233	**14-PACF-004A**	0		0.00
234	Suction line l/V U/S Flange	0		0.00
235	Suction line l/V Gland	0		0.00
236	Suction line l/V D/S Flange	0		0.00
237	stainer Top Flange	0		0.00
238	Suction line Flange	0		0.00
239	Pump Seal	0		0.00
240	Discharge line Flange	0		0.00
241	Meter line I/V Flange	0		0.00
242	NRV U/S Flange	0		0.00
243	NRV Top Flange	0		0.00
244	NRV D/S Flange	0		0.00
245	Discharge line l/V U/S Flange	0		0.00
246	Discharge line l/V Gland	0		0.00
247	Discharge line l/V D/S Flange	0		0.00
248	CBD line 1st l/V Gland	0		0.00
249	CBD line 2nd l/V Gland	0		0.00
250	Drain line l/V Gland	0		0.00
251	OWS Point	0		0.00
252	stainer Flange	0		0.00
253	**14-PACF-004B**	0		0.00
254	Suction line l/V U/S Flange	0		0.00
255	Suction line l/V Gland	0		0.00
256	Suction line l/V D/S Flange	0		0.00
257	stainer Top Flange	0		0.00
258	Suction line Flange	0		0.00
259	Pump Seal	0		0.00
260	Discharge line Flange	0		0.00
261	Meter line I/V Flange	0		0.00
262	NRV U/S Flange	0		0.00
263	NRV Top Flange	0		0.00
264	NRV D/S Flange	0		0.00
265	Discharge line l/V U/S Flange	0		0.00
266	Discharge line l/V Gland	0		0.00
267	Discharge line l/V D/S Flange	0		0.00
268	CBD line 1st l/V Gland	0		0.00
269	CBD line 2nd l/V Gland	0		0.00
270	stainer flange	0		0.00
271	CBD line 3rd l/V Gland	0		0.00
272	Drain line l/V Gland	0		0.00
273	OWS Point	0		0.00
274	**14-PACF-006A**	0		0.00
275	Suction line l/V U/S Flange	0		0.00
276	Suction line l/V Gland	0		0.00
277	Suction line l/V D/S Flange	0		0.00
278	stainer Top Flange	0		0.00
279	Suction line Flange	0		0.00
280	Pump Seal	0		0.00
281	Discharge line Flange	0		0.00
282	Meter line I/V gland	0		0.00
283	NRV U/S Flange	0		0.00
284	NRV Top Flange	0		0.00

285	NRV D/S Flange	0		0.00
286	Drain line l/V Gland	0		0.00
287	Drain line safety Flange	0		0.00
288	Discharge line l/V U/S Flange	0		0.00
289	Discharge line l/V Gland	0		0.00
290	Discharge line l/V D/S Flange	0		0.00
291	Pump To CBD line 1st l/V U/S Flange	0		0.00
292	Pump To CBD line 1st l/V Gland	0		0.00
293	Pump To CBD line 1st l/V D/S Flange	0		0.00
294	Pump To CBD line 2nd l/V Gland	0		0.00
295	stainer Flange	0		0.00
296	Pump To CBD line 3rd l/V Gland	0		0.00
297	OWS Point	0		0.00
298	**14-PACF-OO6B**	0		0.00
299	Suction line l/V U/S Flange	0		0.00
300	Suction line l/V Gland	0		0.00
301	Suction line l/V D/S Flange	0		0.00
302	stainer Top Flange	0		0.00
303	Suction line Flange	0		0.00
304	Pump Seal	0		0.00
305	Discharge line Flange	0		0.00
306	Meter line I/V gland	0		0.00
307	NRV U/S Flange	0		0.00
308	NRV Top Flange	0		0.00
309	NRV D/S Flange	0		0.00
310	Drain line l/V Gland	0		0.00
311	Drain line safety Flange	0		0.00
312	Discharge line l/V U/S Flange	0		0.00
313	Discharge line l/V Gland	0		0.00
314	Discharge line l/V D/S Flange	0		0.00
315	Pump To CBD line 1st l/V U/S Flange	0		0.00
316	Pump To CBD line 1st l/V Gland	0		0.00
317	Pump To CBD line 1st l/V D/S Flange	0		0.00
318	Pump To CBD line 2nd l/V Gland	0		0.00
319	stainer Flange	0		0.00
320	Pump To CBD line 3rd l/V Gland	0		0.00
321	OWS Point	0		0.00
322	14-FV-1103 U/S line l/V U./S Flange	0		0.00
323	14-FV-1103 U/S line l/V Gland	0		0.00
324	14-FV-1103 U/S line l/V D/S Flange	0		0.00
325	Drain line 1st l/V Gland	0		0.00
326	Drain line 2nd l/V Gland	0		0.00
327	stainer Flange	0		0.00
328	Drain line 3rd l/V Gland	0		0.00
329	14-FV-1103 C/V line U/S Flange	0		0.00
330	14-FV-1103 C/V line Gland	0		0.00
331	14-FV-1103 C/V line D/S Flange	0		0.00
332	14-FV-1103 D/S line l/V U./S Flange	0		0.00
333	14-FV-1103 D/S line l/V Gland	0		0.00
334	14-FV-1103 D/S line l/V D/S Flange	0		0.00
335	Bypass line l/V U/S Flange	0		0.00
336	Bypass line l/V Gland	0		0.00
337	Bypass line l/V D/S Flange	0		0.00
338	14-UV-1101 CV U/S Flange	0		0.00
339	14-UV-1101 CV Gland	0		0.00
340	14-UV-1101 CV D/S Flange	0		0.00
341	**14-PA-CF-OO1A**	0		0.00
342	Suction line l/V U/S Flange	0		0.00
343	Suction line l/V Gland	0		0.00

344	Suction line l/V D/S Flange	0		0.00
345	stainer Top Flange	0		0.00
346	Drain line l/V Gland	0		0.00
347	Drain line stainer Flange	0		0.00
348	Suction line Flange	0		0.00
349	Pump Seal	0		0.00
350	Discharge line Flange	0		0.00
351	Meter line I/V gland	0		0.00
352	NRV U/S Flange	0		0.00
353	NRV Top Flange	0		0.00
354	NRV D/S Flange	0		0.00
355	Drain line l/V Gland	0		0.00
356	Drain line stainer Flange	0		0.00
357	Discharge line l/V U/S Flange	0		0.00
358	Discharge line l/V Gland	0		0.00
359	Discharge line l/V D/S Flange	0		0.00
360	Pump To CBD line 1st l/V Gland	0		0.00
361	Pump To CBD line 2nd l/V Gland	0		0.00
362	stainer flange	0		0.00
363	Pump To CBD line 3rd l/V Gland	0		0.00
364	OWS Point	0		0.00
365	**14-PA-CF-001B**	0		0.00
366	Suction line l/V U/S Flange	0		0.00
367	Suction line l/V Gland	0		0.00
368	Suction line l/V D/S Flange	0		0.00
369	stainer Top Flange	0		0.00
370	Drain line l/V Gland	0		0.00
371	Drain line stainer Flange	0		0.00
372	Suction line Flange	0		0.00
373	Pump Seal	0		0.00
374	Discharge line Flange	0		0.00
375	Meter line I/V gland	0		0.00
376	NRV U/S Flange	0		0.00
377	NRV Top Flange	0		0.00
378	NRV D/S Flange	0		0.00
379	Drain line l/V Gland	0		0.00
380	Drain line stainer Flange	0		0.00
381	Discharge line l/V U/S Flange	0		0.00
382	Discharge line l/V Gland	0		0.00
383	Discharge line l/V D/S Flange	0		0.00
384	Pump To CBD line 1st l/V Gland	0		0.00
385	Pump To CBD line 2nd l/V Gland	0		0.00
386	stainer flange	0		0.00
387	Pump To CBD line 3rd l/V Gland	0		0.00
388	OWS Point	0		0.00
389	NAPTHA to SLOP U/S line l/V U/S Flange	0		0.00
390	NAPTHA to SLOP U/S line l/V Gland	0		0.00
391	NAPTHA to SLOP U/S line l/V D/S Flange	0		0.00
392	NRV U/S Flange	0		0.00
393	NRV Top Flange	0		0.00
394	NRV D/S Flange	0		0.00
395	Drain line l/V Gland	0		0.00
396	Drain line safety Flange	0		0.00
397	NAPTHA to SLOP D/S line l/V U/S Flange	0		0.00
398	NAPTHA to SLOP D/S line l/V Gland	0		0.00
399	NAPTHA to SLOP D/S line l/V D/S Flange	0		0.00
400	Splitter Reflux To SLOP U/S line	0		0.00
401	Splitter Reflux To SLOP U/S line	0		0.00
402	Splitter Reflux To SLOP U/S line	0		0.00

403	NRV U/S Flange	0		0.00
404	NRV Top Flange	0		0.00
405	NRV D/S Flange	0		0.00
406	Drain line l/V Gland	0		0.00
407	Drain line safety Flange	0		0.00
408	Splitter Reflux To SLOP D/S line	0		0.00
409	Splitter Reflux To SLOP D/S line	0		0.00
410	Splitter Reflux To SLOP D/S line	0		0.00
411	2nd l/V U/S Flange	0		0.00
412	2nd l/V gland	0		0.00
413	2nd l/V D/S Flange	0		0.00
414	Splitter Reflux To SLOP U/S line	0		0.00
415	Splitter Reflux To SLOP U/S line	0		0.00
416	Splitter Reflux To SLOP U/S line	0		0.00
417	Splitter Reflux To SLOP U/S line	0		0.00
418	Splitter Reflux To SLOP U/S line	0		0.00
419	Splitter Reflux To SLOP U/S line	0		0.00
420	NRV U/S Flange	0		0.00
421	NRV Top Flange	0		0.00
422	NRV D/S Flange	0		0.00
423	Drain line l/V Gland	0		0.00
424	Drain line safety Flange	0		0.00
425	Splitter Reflux To SLOP D/S line	0		0.00
426	Splitter Reflux To SLOP D/S line	0		0.00
427	Splitter Reflux To SLOP D/S line	0		0.00
428	Hydrogen Rich gas From unit 15	0		0.00
429	Hydrogen Rich gas From unit 15	0		0.00
430	Hydrogen Rich gas From unit 15	0		0.00
431	NRV U/S Flange	0		0.00
432	NRV Top Flange	0		0.00
433	NRV D/S Flange	0		0.00
434	Drain line l/V Gland	0		0.00
435	Drain line safety Flange	0		0.00
436	Hydrogen Rich gas From unit 15	0		0.00
437	Hydrogen Rich gas From unit 15	0		0.00
438	Hydrogen Rich gas From unit 15	0		0.00
439	Hydrogen From PSA To 16-VV-2	0		0.00
440	Hydrogen From PSA To 16-VV-2	0		0.00
441	Hydrogen From PSA To 16-VV-2	0		0.00
442	NRV U/S Flange	0		0.00
443	NRV Top Flange	0		0.00
444	NRV D/S Flange	0		0.00
445	Drain line l/V Gland	0		0.00
446	Drain line safety Flange	0		0.00
447	Hydrogen From PSA To 16-VV-2	0		0.00
448	Hydrogen From PSA To 16-VV-2	0		0.00
449	Hydrogen From PSA To 16-VV-2	0		0.00
450	14-FV-1501-CV U/S l/V U/S Flange	0		0.00
451	14-FV-1501-CV U/S l/V Gland	0		0.00
452	14-FV-1501-CV U/S l/V D/S Flange	0		0.00
453	CBD line 1st l/V Gland	0		0.00
454	CBD line 2ND l/V Gland	0		0.00
455	CBD line 3RD l/V Gland	0		0.00
456	stainer flange	0		0.00
457	14-FV-1501-CV U/S Flange	0		0.00
458	14-FV-1501-CV Gland	0		0.00
459	14-FV-1501-CV D/S Flange	0		0.00
460	14-FV-1501-CV D/S l/V U/S Flange	0		0.00
461	14-FV-1501-CV D/S l/V Gland	0		0.00

462	14-FV-1501-CV D/S l/V D/S Flange	0		0.00
463	Bypass line l/V U/S Flange	0		0.00
464	Bypass line l/V Gland	0		0.00
465	Bypass line l/V D/S Flange	0		0.00
466	From 14-PA-4 A/B to SLOP 1st l/V	0		0.00
467	From 14-PA-4 A/B to SLOP 1st l/V	0		0.00
468	From 14-PA-4 A/B to SLOP 1st l/V	0		0.00
469	From 14-PA-4 A/B to SLOP 2nd l/V	0		0.00
470	From 14-PA-4 A/B to SLOP 2nd l/V	0		0.00
471	14-FV-1701 U/S l/V U./S Flange	0		0.00
472	14-FV-1701 U/S l/V Gland	0		0.00
473	14-FV-1701 U/S l/V D/S Flange	0		0.00
474	CBD line 1st l/V Gland	0		0.00
475	CBD line 2ND l/V Gland	0		0.00
476	CBD line 3RD l/V Gland	0		0.00
477	stainer flange	0		0.00
478	14-FV-1701 C/V U/S Flange	0		0.00
479	14-FV-1701 C/V Gland	0		0.00
480	14-FV-1701 C/V D/S Flange	0		0.00
481	14-FV-1701 D/S l/V U/S Flange	0		0.00
482	14-FV-1701 D/S l/V Flange	0		0.00
483	14-FV-1701 D/S l/V D/S Flange	0		0.00
484	Bypass line l/V U/S Flange	0		0.00
485	14-FV-1401 U/S l/V U./S Flange	0		0.00
486	14-FV-1401 U/S l/V Gland	0		0.00
487	14-FV-1401 U/S l/V D/S Flange	0		0.00
488	CBD line 1st l/V Gland	0		0.00
489	CBD line 2ND l/V Gland	0		0.00
490	CBD line 3RD l/V Gland	0		0.00
491	stainer flange	0		0.00
492	14-FV-1401 C/V U/S Flange	0		0.00
493	14-FV-1401 C/V Gland	0		0.00
494	14-FV-1401 C/V D/S Flange	0		0.00
495	14-FV-1401 D/S l/V U/S Flange	0		0.00
496	14-FV-1401 D/S l/V Flange	0		0.00
497	14-FV-1401 D/S l/V D/S Flange	0		0.00
498	Bypass line l/V U/S Flange	0		0.00
499	Bypass line l/V Gland	0		0.00
500	Bypass line l/V D/S Flange	0		0.00
501	From 14-PA-CF-001 Start Up line	0		0.00
502	From 14-PA-CF-001 Start Up line	0		0.00
503	From 14-PA-CF-001 Start Up line	0		0.00
504	Hydrogen From unit 15 1st l/V	0		0.00
505	stainer flange	0		0.00
506	Top flange	0		0.00
507	Drain line l/V Gland	0		0.00
508	Drain line safety Flange	0		0.00
509	Hydrogen From unit 15 2nd l/V	0		0.00
510	14-FV-1402 U/S Line l/V Gland	0		0.00
511	CBD line l/V Gland	0		0.00
512	14-FV-1402 C/V U/S Gland	0		0.00
513	14-FV-1402 C/V Gland	0		0.00
514	CBD line l/V Gland	0		0.00
515	14-FV-1402 D/S l/V Gland	0		0.00
516	Bypass line l/V Gland	0		0.00
517	Heavy Naptha From Unit 14 line	0		0.00
518	Heavy Naptha From Unit 14 line	0		0.00
519	Heavy Naptha From Unit 14 line	0		0.00
520	Heavy Naptha From Unit 14 line	0		0.00

521	Heavy Naptha From Unit 14 line	0		0.00
522	Feed Naptha To Unit 15 line U/S	0		0.00
523	Feed Naptha To Unit 15 line U/S	0		0.00
524	Feed Naptha To Unit 15 line U/S	0		0.00
525	NRV U/S Flange	0		0.00
526	NRV Top Flange	0		0.00
527	NRV D/S Flange	0		0.00
528	Drain line l/V Gland	0		0.00
529	Drain line safety Flange	0		0.00
530	Feed Naptha To Unit 15 line D/S	0		0.00
531	Feed Naptha To Unit 15 line D/S	0		0.00
532	Feed Naptha To Unit 15 line D/S	0		0.00
533	S/U line (Reaction Section BP) line	0		0.00
534	S/U line (Reaction Section BP) line	0		0.00
535	S/U line (Reaction Section BP) line	0		0.00
536	S/U line (Reaction Section BP) line	0		0.00
537	S/U line (Reaction Section BP) line	0		0.00
538	Hydrogen From PSA To 15-KA-0	0		0.00
539	Hydrogen From PSA To 15-KA-0	0		0.00
540	Hydrogen From PSA To 15-KA-0	0		0.00
540	NRV U/S Flange	0		0.00
542	NRV Top Flange	0		0.00
543	NRV D/S Flange	0		0.00
544	Drain line l/V Gland	0		0.00
545	Drain line safety Flange	0		0.00
546	Hydrogen From PSA To 15-KA-0	0		0.00
547	Hydrogen From PSA To 15-KA-0	0		0.00
548	Hydrogen From PSA To 15-KA-0	0		0.00
549	From 16-KA-001 A/B To 15-KA-0	0		0.00
550	From 16-KA-001 A/B To 15-KA-0	0		0.00
551	From 16-KA-001 A/B To 15-KA-0	0		0.00
552	NRV U/S Flange	0		0.00
553	NRV Top Flange	0		0.00
554	NRV D/S Flange	0		0.00
555	Vrain line l/V Gland	0		0.00
556	Vrain line Safety Gland	0		0.00
557	From 16-KA-001 A/B To 15-KA-0	0		0.00
558	From 16-KA-001 A/B To 15-KA-0	0		0.00
559	From 16-KA-001 A/B To 15-KA-0	0		0.00
560	To-15-KA-001 Seal line U/S I/V U/S Flange	0		0.00
561	To-15-KA-001 Seal line U/S I/V Gland	0		0.00
562	To-15-KA-001 Seal line U/S I/V D/S Flange	0		0.00
563	NRV U/S Flange	0		0.00
564	NRV Top Flange	0		0.00
565	NRV D/S Flange	0		0.00
566	To-15-KA-001 Seal line D/S I/V U/S Flange	0		0.00
567	To-15-KA-001 Seal line D/S I/V Gland	0		0.00
568	To-15-KA-001 Seal line D/S I/V D/S Flange	0		0.00
569	16-PA-CF-0011A Suction line l/V	0		0.00
570	16-PA-CF-0011A Suction line l/V	0		0.00
571	16-PA-CF-0011A Suction line l/V	0		0.00
572	stainer flange	0		0.00
573	Drain line 1st l/V Gland	0		0.00
574	stainer flange	0		0.00
575	Drain line 2nd l/V Gland	0		0.00
576	Suction line Flange	0		0.00
577	Pump Seal	0		0.00
578	Discharge line Flange	0		0.00
579	Drain line l/V Gland	0		0.00

580	Drain line safety Gland	0		0.00
581	Meter line l/V Gland	0		0.00
582	NRV U/S Flange	0		0.00
583	NRV Top Flange	0		0.00
584	NRV D/S Flange	0		0.00
585	Drain line 1st l/V Gland	0		0.00
586	Drain line 2nd l/V Gland	0		0.00
587	OWS Point	0		0.00
588	Suction line Outlet line to 1st l/V	0		0.00
589	Suction line Outlet line to 1st l/V	0		0.00
590	Suction line Outlet line to 1st l/V	0		0.00
591	Drain line l/V Gland	0		0.00
592	Drain line safety Flange	0		0.00
593	Suction line Outlet line to 2nd l/V	0		0.00
594	Suction line Outlet line to 2nd l/V	0		0.00
595	Suction line Outlet line to 2nd l/V	0		0.00
596	16-PA-CF-0011B Suction line l/V	0		0.00
597	16-PA-CF-0011B Suction line l/V	0		0.00
598	16-PA-CF-0011B Suction line l/V	0		0.00
599	stainer Top Flange	0		0.00
600	Drain line 1st l/V Gland	0		0.00
601	stainer flange	0		0.00
602	Drain line 2nd l/V Gland	0		0.00
603	Suction line Flange	0		0.00
604	Pump Seal	0		0.00
605	Discharge line Flange	0		0.00
606	Drain line l/V Gland	0		0.00
607	Drain line safety Gland	0		0.00
608	P.G. Meter l/V Gland	0		0.00
609	NRV U/S Flange	0		0.00
610	NRV Top Flange	0		0.00
611	NRV D/S Flange	0		0.00
612	Drain line 1st l/V Gland	0		0.00
613	Drain line 2nd l/V Gland	0		0.00
614	OWS Point	0		0.00
615	Discharge line l/V U/S Flange	0		0.00
616	Discharge line l/V Gland	0		0.00
617	Discharge line l/V D/S Flange	0		0.00
618	Discharge line to outlet line l/V	0		0.00
619	Discharge line to outlet line Top	0		0.00
620	Drain line l/V Gland	0		0.00
621	Drain line safety Flange	0		0.00
622	16-PA-CF-013A	0		0.00
623	Suction line l/V U/S Flange	0		0.00
624	Suction line l/V Gland	0		0.00
625	Suction line l/V D/S Flange	0		0.00
626	stainer Top Flange	0		0.00
627	Suction line To Outlet line 1st l/V	0		0.00
628	Suction line To Outlet line 1st l/V	0		0.00
629	Suction line To Outlet line 1st l/V	0		0.00
630	Suction line To Outlet line 2nd l/V	0		0.00
631	Suction line To Outlet line 2nd l/V	0		0.00
632	Suction line To Outlet line 2nd l/V	0		0.00
633	Suction line To Outlet line 3rd l/V	0		0.00
634	Suction line To Outlet line 3rd l/V	0		0.00
635	Suction line To Outlet line 3rd l/V	0		0.00
636	OWS Point	0		0.00
637	Drain line 1st l/V Gland	0		0.00
638	Steamer Flange	0		0.00

639	Drain line 2nd l/V Gland	0		0.00
640	Suction line Flange	0		0.00
641	Discharge line Flange	0		0.00
642	P.G. Meter l/V Gland	0		0.00
643	NRV U/S Flange	0		0.00
644	NRV Top Flange	0		0.00
645	NRV D/S Flange	0		0.00
646	Drain line 1st l/V Gland	0		0.00
647	Drain line 2nd l/V Gland	0		0.00
648	OWS Point	0		0.00
649	Discharge line l/V U/S Flange	0		0.00
650	Discharge line l/V Gland	0		0.00
651	Discharge line l/V D/S Flange	0		0.00
652	16-PA-CF-013B	0		0.00
653	Suction line l/V U/S Flange	0		0.00
654	Suction line l/V Gland	0		0.00
655	Suction line l/V D/S Flange	0		0.00
656	stainer Top Flange	0		0.00
657	Drain line 1st l/V Gland	0		0.00
658	Steamer Flange	0		0.00
659	Drain line 2nd l/V Gland	0		0.00
660	Suction line Flange	0		0.00
661	Discharge line Flange	0		0.00
662	P.G. Meter l/V Gland	0		0.00
663	NRV U/S Flange	0		0.00
664	NRV Top Flange	0		0.00
665	NRV D/S Flange	0		0.00
666	Drain line 1st l/V Gland	0		0.00
667	Drain line 2nd l/V Gland	0		0.00
668	OWS Point	0		0.00
669	Discharge line l/V U/S Flange	0		0.00
670	Discharge line l/V Gland	0		0.00
671	Discharge line l/V D/S Flange	0		0.00
672	16-FV-2201 U/S line l/V U/S Flange	0		0.00
673	16-FV-2201 U/S line l/V Gland	0		0.00
674	16-FV-2201 U/S line l/V D/S Flange	0		0.00
675	Drain line l/V Gland	0		0.00
676	16-FV-2201 C/V line U/S Flange	0		0.00
677	16-FV-2201 C/V line Gland	0		0.00
678	16-FV-2201 C/V line D/S Flange	0		0.00
679	Drain line l/V Gland	0		0.00
680	16-FV-2201 D/S line l/V U/S Flange	0		0.00
681	16-FV-2201 D/S line l/V Gland	0		0.00
682	16-FV-2201 D/S line l/V D/S Flange	0		0.00
683	Bypass line l/V U/S Flange	0		0.00
684	Bypass line l/V Gland	0		0.00
685	Bypass line l/V D/S Flange	0		0.00
686	16-FV-2103 U/S LINE I/V U/S Flange	0		0.00
687	16-FV-2103 U/S LINE I/V Gland	0		0.00
688	16-FV-2103 U/S LINE I/V D/S Flange	0		0.00
689	Drain line l/V Gland	0		0.00
690	16-FV-2103 line C/V U/S Flange	0		0.00
691	16-FV-2103 line C/V Gland	0		0.00
692	16-FV-2103 line C/V D/S Flange	0		0.00
693	Drain line l/V Gland	0		0.00
694	16-FV-2103 D/S LINE I/V U/S Flange	0		0.00
695	16-FV-2103 D/S LINE I/V Gland	0		0.00
696	16-FV-2103 D/S LINE I/V D/S Flange	0		0.00
697	Bypass line l/V U/S Flange	0		0.00

698	Bypass line l/V Gland	0		0.00
699	Bypass line l/V D/S Flange	0		0.00
700	16-FV-2205 U/S LINE I/V U/S Flange	0		0.00
701	16-FV-2205 U/S LINE I/V Gland	0		0.00
702	16-FV-2205 U/S LINE I/V D/S Flange	0		0.00
703	Drain line l/V Gland	0		0.00
704	16-FV-2205 line C/V U/S Flange	0		0.00
705	16-FV-2205 line C/V Gland	0		0.00
706	16-FV-2205 line C/V D/S Flange	0		0.00
707	Drain line l/V Gland	0		0.00
708	16-FV-2205 D/S LINE I/V U/S Flange	0		0.00
709	16-FV-2205 D/S LINE I/V Gland	0		0.00
710	16-FV-2205 D/S LINE I/V D/S Flange	0		0.00
711	Bypass line l/V U/S Flange	0		0.00
712	Bypass line l/V Gland	0		0.00
713	Bypass line l/V D/S Flange	0		0.00
714	**16-PA-CF-010A**	0		0.00
715	Suction line l/V U/S Flange	0		0.00
716	Suction line l/V Gland	0		0.00
717	Suction line l/V D/S Flange	0		0.00
718	stainer Top Flange	0		0.00
719	Suction line To Outlet line 1st l/V	0		0.00
720	Suction line To Outlet line 1st l/V	0		0.00
721	Suction line To Outlet line 1st l/V	0		0.00
722	Suction line To Outlet line 2nd l/V	0		0.00
723	Suction line To Outlet line 2nd l/V	0		0.00
724	Suction line To Outlet line 2nd l/V	0		0.00
725	Suction line To Outlet line 3rd l/V	0		0.00
726	Suction line To Outlet line 3rd l/V	0		0.00
727	Suction line To Outlet line 3rd l/V	0		0.00
728	OWS Point	0		0.00
729	Drain line 1st l/V Gland	0		0.00
730	Steamer Flange	0		0.00
731	Drain line 2nd l/V Gland	0		0.00
732	Suction line Flange	0		0.00
733	Pump Seal	0		0.00
734	Discharge line Flange	0		0.00
735	P.G. Meter l/V Gland	0		0.00
736	NRV U/S Flange	0		0.00
737	NRV Top Flange	0		0.00
738	NRV D/S Flange	0		0.00
739	Drain line 1st l/V Gland	0		0.00
740	Drain line 2nd l/V Gland	0		0.00
741	OWS Point	0		0.00
742	Discharge line l/V U/S Flange	0		0.00
743	Discharge line l/V Gland	0		0.00
744	Discharge line l/V D/S Flange	0		0.00
745	**16-PA-CF-010B**	0		0.00
746	Suction line l/V U/S Flange	0		0.00
747	Suction line l/V Gland	0		0.00
748	Suction line l/V D/S Flange	0		0.00
749	stainer Top Flange	0		0.00
750	Drain line 1st l/V Gland	0		0.00
751	Steamer Flange	0		0.00
752	Drain line 2nd l/V Gland	0		0.00
753	Suction line Flange	0		0.00
754	Pump Seal	0		0.00
755	Discharge line Flange	0		0.00
756	P.G. Meter l/V Gland	0		0.00

757	NRV U/S Flange	0		0.00
758	NRV Top Flange	0		0.00
759	NRV D/S Flange	0		0.00
760	Drain line 1st l/V Gland	0		0.00
761	Drain line 2nd l/V Gland	0		0.00
762	OWS Point	0		0.00
763	Discharge line l/V U/S Flange	0		0.00
764	Discharge line l/V Gland	0		0.00
765	Discharge line l/V D/S Flange	0		0.00
766	**16-PA-CF-012A**	0		0.00
767	Suction line l/V U/S Flange	0		0.00
768	Suction line l/V Gland	0		0.00
769	Suction line l/V D/S Flange	0		0.00
770	stainer Top Flange	0		0.00
771	Drain line 1st l/V Gland	0		0.00
772	Steamer Flange	0		0.00
773	Drain line 2nd l/V Gland	0		0.00
774	Suction line Flange	0		0.00
775	Discharge line Flange	0		0.00
776	Meter line l/V Gland	0		0.00
777	Top Flange	0		0.00
778	Drain line 1st l/V Gland	0		0.00
779	Drain line 2nd l/V Gland	0		0.00
780	OWS Point	0		0.00
781	Discharge line l/V Gland	0		0.00
782	**16-PA-CF-012B**	0		0.00
783	Suction line l/V U/S Flange	0		0.00
784	Suction line l/V Gland	0		0.00
785	Suction line l/V D/S Flange	0		0.00
786	stainer Top Flange	0		0.00
787	Drain line 1st l/V Gland	0		0.00
788	Steamer Flange	0		0.00
789	Drain line 2nd l/V Gland	0		0.00
790	Suction line Flange	0		0.00
791	Discharge line Flange	0		0.00
792	Meter line l/V Gland	0		0.00
793	Top Flange	0		0.00
794	Drain line 1st l/V Gland	0		0.00
795	Drain line 2nd l/V Gland	0		0.00
796	OWS Point	0		0.00
797	Discharge line l/V Gland	0		0.00
798	16-FV-2204 D/S line l/V Gland	0		0.00
799	Drain line 1st l/V Gland	0		0.00
800	stainer Flange	0		0.00
801	Drain line 2nd l/V Gland	0		0.00
802	16-FV-2204 line C/V U/S Flange	0		0.00
803	16-FV-2204 line C/V Gland	0		0.00
804	16-FV-2204 line C/V D/S Flange	0		0.00
805	Drain line l/V Gland	0		0.00
806	D/S line l/V Gland	0		0.00
807	Bypass line l/V Gland	0		0.00
808	16-FV-2206 U/S line l/V Gland	0		0.00
809	Drain line 1st l/V Gland	0		0.00
810	stainer Flange	0		0.00
811	Drain line 2nd l/V Gland	0		0.00
812	16-FV-2206 C/V U/S Flange	0		0.00
813	16-FV-2206 C/V Gland	0		0.00
814	16-FV-2206 C/V D/S Flange	0		0.00
815	Drain line l/V Gland	0		0.00

816	D/S line l/V Gland	0		0.00
817	Bypass line stainer Flange	0		0.00
818	Bypass line l/V Gland	0		0.00
819	**16-PA-CF-006A**	0		0.00
820	Suction line l/V U/S Flange	0		0.00
821	Suction line l/V Gland	0		0.00
822	Suction line l/V D/S Flange	0		0.00
823	stainer Top Flange	0		0.00
824	Drain line 1st l/V Gland	0		0.00
825	Steamer Flange	0		0.00
826	Drain line 2nd l/V Gland	0		0.00
827	Suction line Flange	0		0.00
828	Pump Seal	0		0.00
829	Discharge line Flange	0		0.00
830	Vrain line l/V Gland	0		0.00
831	Vrain line safety Gland	0		0.00
832	Meter line l/V Gland	0		0.00
833	NRV U/S Flange	0		0.00
834	NRV Top Flange	0		0.00
835	NRV D/S Flange	0		0.00
836	Drain line 1st l/V Gland	0		0.00
837	Drain line 2nd l/V Gland	0		0.00
838	OWS Point	0		0.00
839	Discharge line l/V U/S Flange	0		0.00
840	Discharge line l/V Gland	0		0.00
841	Discharge line l/V D/S Flange	0		0.00
842	**16-PA-CF-006B**	0		0.00
843	Suction line l/V U/S Flange	0		0.00
844	Suction line l/V Gland	0		0.00
845	Suction line l/V D/S Flange	0		0.00
846	stainer Top Flange	0		0.00
847	Drain line 1st l/V Gland	0		0.00
848	Steamer Flange	0		0.00
849	Drain line 2nd l/V Gland	0		0.00
850	Suction line Flange	0		0.00
851	Pump Seal	0		0.00
852	Discharge line Flange	0		0.00
853	Vrain line l/V Gland	0		0.00
854	Vrain line safety Gland	0		0.00
855	Meter line l/V Gland	0		0.00
856	NRV U/S Flange	0		0.00
857	NRV Top Flange	0		0.00
858	NRV D/S Flange	0		0.00
859	Drain line 1st l/V Gland	0		0.00
860	Drain line 2nd l/V Gland	0		0.00
861	OWS Point	0		0.00
862	Discharge line l/V U/S Flange	0		0.00
863	Discharge line l/V Gland	0		0.00
864	Discharge line l/V D/S Flange	0		0.00
865	MIN FLOW to 16 VV-06 U/S line	0		0.00
866	MIN FLOW to 16 VV-06 U/S line	0		0.00
867	MIN FLOW to 16 VV-06 U/S line	0		0.00
868	NRV U/S Flange	0		0.00
869	NRV Top Flange	0		0.00
870	NRV D/S Flange	0		0.00
871	Drain line l/V Gland	0		0.00
872	Drain line safety flange	0		0.00
873	Heavy Reformate to Storage U/S	0		0.00
874	Top Flange	0		0.00

875	Drain line l/V Gland	0		0.00
876	Drain line safety flange	0		0.00
877	D/S line stainer Flange	0		0.00
878	D/S line l/V Gland	0		0.00
879	16-PV-2102 U/S line l/V Flange	0		0.00
880	Drain line l/V Gland	0		0.00
881	16-PV-2102 line C/V U/S Flange	0		0.00
882	16-PV-2102 line C/V Gland	0		0.00
883	16-PV-2102 line C/V D/S Flange	0		0.00
884	Drain line l/V Gland	0		0.00
885	D/S line l/V Gland	0		0.00
886	Bypass line stainer Flange	0		0.00
887	Bypass line l/V Gland	0		0.00
888	**16-PA-CF-003A**	0		0.00
889	Suction line l/V U/S Flange	0		0.00
890	Suction line l/V Gland	0		0.00
891	Suction line l/V D/S Flange	0		0.00
892	stainer Top Flange	0		0.00
893	Suction line To Outlet line 1st l/V	0		0.00
894	Suction line To Outlet line 1st l/V	0		0.00
895	Suction line To Outlet line 1st l/V	0		0.00
896	Suction line To Outlet line 2nd l/V	0		0.00
897	Suction line To Outlet line 2nd l/V	0		0.00
898	Suction line To Outlet line 2nd l/V	0		0.00
899	Vrain line l/V Gland	0		0.00
900	Vrain line safety Gland	0		0.00
901	Suction line To Outlet line 3rd l/V	0		0.00
902	Suction line To Outlet line 3rd l/V	0		0.00
903	Suction line To Outlet line 3rd l/V	0		0.00
904	Drain line 1st l/V Gland	0		0.00
905	Drain line 2nd l/V Gland	0		0.00
906	Steamer Flange	0		0.00
907	Suction line Flange	0		0.00
908	Discharge line Flange	0		0.00
909	P.G. Meter l/V Gland	0		0.00
910	Meter line to Drain line l/V Gland	0		0.00
911	Meter line to Drain line Safety Flange	0		0.00
912	NRV U/S Flange	0		0.00
913	NRV Top Flange	0		0.00
914	NRV D/S Flange	0		0.00
915	Drain line 1st l/V Gland	0		0.00
916	Drain line 2nd l/V Gland	0		0.00
917	OWS Point	0		0.00
918	Discharge line l/V U/S Flange	0		0.00
919	Discharge line l/V Gland	0		0.00
920	Discharge line l/V D/S Flange	0		0.00
921	**16-PA-CF-003B**	0		0.00
922	Suction line l/V U/S Flange	0		0.00
923	Suction line l/V Gland	0		0.00
924	Suction line l/V D/S Flange	0		0.00
925	stainer Top Flange	0		0.00
926	Drain line 1st l/V Gland	0		0.00
927	Steamer Flange	0		0.00
928	Drain line 2nd l/V Gland	0		0.00
929	Suction line Flange	0		0.00
930	Discharge line Flange	0		0.00
931	Meter line l/V Gland	0		0.00
932	Meter line to Drain line l/V Gland	0		0.00
933	Meter line to Drain line Safety Flange	0		0.00

934	NRV U/S Flange	0		0.00
935	NRV Top Flange	0		0.00
936	NRV D/S Flange	0		0.00
937	Drain line 1st l/V Gland	0		0.00
938	Drain line 2nd l/V Gland	0		0.00
939	OWS Point	0		0.00
940	Discharge line l/V U/S Flange	0		0.00
941	Discharge line l/V Gland	0		0.00
942	Discharge line l/V D/S Flange	0		0.00
943	16-FV-1803 U/S line I/V Gland	0		0.00
944	Drain line l/V Gland	0		0.00
945	16-FV-1803 C/V U/S Flange	0		0.00
946	16-FV-1803 C/V Gland	0		0.00
947	16-FV-1803 C/V D/S Flange	0		0.00
948	Drain line l/V Gland	0		0.00
949	D/S line l/V Gland	0		0.00
950	Bypass line l/V Gland	0		0.00
951	16-FV-1802 U/S line I/V U/S Flange	0		0.00
952	16-FV-1802 U/S line I/V Gland	0		0.00
953	16-FV-1802 U/S line I/V D/S Flange	0		0.00
954	Drain line l/V Gland	0		0.00
955	16-FV-1802 C/V U/S Flange	0		0.00
956	16-FV-1802 C/V Gland	0		0.00
957	16-FV-1802 C/V D/S Flange	0		0.00
958	Drain line l/V Gland	0		0.00
959	16-FV-1802 D/S line I/V U/S Flange	0		0.00
960	16-FV-1802 D/S line I/V Gland	0		0.00
961	16-FV-1802 D/S line I/V D/S Flange	0		0.00
962	Bypass line l/V U/S Flange	0		0.00
963	Bypass line l/V Gland	0		0.00
964	Bypass line l/V D/S Flange	0		0.00
965	**16-PA-CF-005A**	0		0.00
966	Suction line l/V U/S Flange	0		0.00
967	Suction line l/V Gland	0		0.00
968	Suction line l/V D/S Flange	0		0.00
969	stainer Top Flange	0		0.00
970	Drain line l/V Gland	0		0.00
971	Suction line Flange	0		0.00
972	Discharge line Flange	0		0.00
973	Meter line l/V Gland	0		0.00
974	Top Flange	0		0.00
975	Drain line 1st l/V Gland	0		0.00
976	Steamer Flange	0		0.00
977	Drain line 2nd l/V Gland	0		0.00
978	OWS Point	0		0.00
979	Discharge line l/V Gland	0		0.00
980	**16-PA-CF-005B**	0		0.00
981	Suction line l/V U/S Flange	0		0.00
982	Suction line l/V Gland	0		0.00
983	Suction line l/V D/S Flange	0		0.00
984	stainer Top Flange	0		0.00
985	Drain line l/V Gland	0		0.00
986	Suction line Flange	0		0.00
987	Discharge line Flange	0		0.00
988	P.G. Meter l/V Gland	0		0.00
989	Drain line 1st l/V Gland	0		0.00
990	Steamer Flange	0		0.00
991	Drain line 2nd l/V Gland	0		0.00
992	OWS Point	0		0.00

993	Top Flange	0		0.00
994	Discharge line l/V Gland	0		0.00
995	16-PV-2301 U/S line I/V U/S Flange	0		0.00
996	16-PV-2301 U/S line I/V Glnad	0		0.00
997	16-PV-2301 U/S line I/V D/S Flange	0		0.00
998	Drain line 1st l/V Gland	0		0.00
999	stainer Flange	0		0.00
1000	Drain line 2nd l/V Gland	0		0.00
1001	Drain line 3rd l/V Gland	0		0.00
1002	16-PV-2301 C/V U/S Flange	0		0.00
1003	16-PV-2301 C/V Glnad	0		0.00
1004	16-PV-2301 C/V D/S Flange	0		0.00
1005	Drain line l/V Gland	0		0.00
1006	16-PV-2301 D/S line I/V U/S Flange	0		0.00
1007	16-PV-2301 D/S line I/V Glnad	0		0.00
1008	16-PV-2301 D/S line I/V D/S Flange	0		0.00
1009	Bypass line l/V U/S Flange	0		0.00
1010	Bypass line l/V Gland	0		0.00
1011	Bypass line l/V D/S Flange	0		0.00
1012	16-FV-1701 U/S line I/V U/S Flange	0		0.00
1013	16-FV-1701 U/S line I/V Gland	0		0.00
1014	16-FV-1701 U/S line I/V D/S Flange	0		0.00
1015	16-FV-1701 C/V U/S Flange	0		0.00
1016	16-FV-1701 C/V Gland	0		0.00
1017	16-FV-1701 C/V D/S Flange	0		0.00
1018	16-FV-1701 D/S line I/V U/S Flange	0		0.00
1019	16-FV-1701 D/S line I/V Gland	0		0.00
1020	16-FV-1701 D/S line I/V D/S Flange	0		0.00
1021	Bypass line l/V U/S Flange	0		0.00
1022	Bypass line l/V Gland	0		0.00
1023	Bypass line l/V D/S Flange	0		0.00
1024	16-FV-1102 U/S line I/V U/S Flange	0		0.00
1025	16-FV-1102 U/S line I/V Gland	0		0.00
1026	16-FV-1102 U/S line I/V D/S Flange	0		0.00
1027	Drain line 1st l/V Gland	0		0.00
1028	stainer Flange	0		0.00
1029	Drain line 2nd l/V Gland	0		0.00
1030	16-FV-1102 C/V U/S Flange	0		0.00
1031	16-FV-1102 C/V Gland	0		0.00
1032	16-FV-1102 C/V D/S Flange	0		0.00
1033	Drain line l/V Gland	0		0.00
1034	16-FV-1102 D/S line I/V U/S Flange	0		0.00
1035	16-FV-1102 D/S line I/V Gland	0		0.00
1036	16-FV-1102 D/S line I/V D/S Flange	0		0.00
1037	Bypass line l/V U/S Flange	0		0.00
1038	Bypass line l/V Gland	0		0.00
1039	Bypass line l/V D/S Flange	0		0.00
1040	16-FV-1703 U/S line I/V Gland	0		0.00
1041	Drain line l/V Gland	0		0.00
1042	16-FV-1703 C/V U/S Flange	0		0.00
1043	16-FV-1703 C/V Gland	0		0.00
1044	16-FV-1703 C/V D/S Flange	0		0.00
1045	Drain line 1st l/V Gland	0		0.00
1046	stainer Flange	0		0.00
1047	Drain line 2nd l/V Gland	0		0.00
1048	16-FV-1703 D/S line I/V Gland	0		0.00
1049	Bypass line l/V Gland	0		0.00
1050	**16-PA-CF-001A**	0		0.00
1051	Suction line l/V U/S Flange	0		0.00

1052	Suction line l/V Gland	0		0.00
1053	Suction line l/V D/S Flange	0		0.00
1054	stainer Top Flange	0		0.00
1055	Drain line 1st l/V Gland	0		0.00
1056	Drain line 2nd l/V Gland	0		0.00
1057	OWS Point	0		0.00
1058	Suction line Flange	0		0.00
1059	Pump Seal	0		0.00
1060	Discharge line Flange	0		0.00
1061	P.G. Meter l/V Gland	0		0.00
1062	NRV U/S Flange	0		0.00
1063	NRV Top Flange	0		0.00
1064	NRV D/S Flange	0		0.00
1065	Steamer Flange	0		0.00
1066	Drain line 1st l/V Gland	0		0.00
1067	Steamer Flange	0		0.00
1068	Drain line 2nd l/V Gland	0		0.00
1069	Discharge line l/V U/S Flange	0		0.00
1070	Discharge line l/V Gland	0		0.00
1071	Discharge line l/V D/S Flange	0		0.00
1072	**16-PA-CF-001B**	0		0.00
1073	Suction line l/V U/S Flange	0		0.00
1074	Suction line l/V Gland	0		0.00
1075	Suction line l/V D/S Flange	0		0.00
1076	stainer Top Flange	0		0.00
1077	Drain line 1st l/V Gland	0		0.00
1078	Drain line 2nd l/V Gland	0		0.00
1079	OWS Point	0		0.00
1080	Suction line Flange	0		0.00
1081	Pump Seal	0		0.00
1082	Discharge line Flange	0		0.00
1083	P.G. Meter l/V Gland	0		0.00
1084	NRV U/S Flange	0		0.00
1085	NRV Top Flange	0		0.00
1086	NRV D/S Flange	0		0.00
1087	Drain line 1st l/V Gland	0		0.00
1088	Steamer Flange	0		0.00
1089	Drain line 2nd l/V Gland	0		0.00
1090	Discharge line l/V U/S Flange	0		0.00
1091	Discharge line l/V Gland	15		0.00
1092	Discharge line l/V D/S Flange	0		0.00
1093	From FEED DRYER line D/S l/V U/S	0		0.00
1094	Top Flange	0		0.00
1095	stainer Flange	0		0.00
1096	D/S line l/V Gland	0		0.00
1097	Drain line l/V Gland	0		0.00
1098	Drain line safety flange	0		0.00
1099	From 16-C-01 Bottom line 1st l/V	0		0.00
1100	From 16-C-01 Bottom line 1st l/V	0		0.00
1101	From 16-C-01 Bottom line 1st l/V	0		0.00
1102	NRV U/S Flange	0		0.00
1103	NRV Top Flange	0		0.00
1104	From 16-C-01 Bottom line 1st l/V	0		0.00
1105	From 16-C-01 Bottom line 1st l/V	0		0.00
1106	From 16-C-01 Bottom line 1st l/V	0		0.00
1107	NRV U/S Flange	0		0.00
1108	NRV Top Flange	0		0.00
1109	16-FV-1804 U/S line I/V U/S Flange	0		0.00
1110	16-FV-1804 U/S line I/V Gland	0		0.00

1111	16-FV-1804 U/S line I/V D/S Flange	0		0.00
1112	Drain line 1st l/V Gland	0		0.00
1113	stainer Flange	0		0.00
1114	Drain line 2nd l/V Gland	0		0.00
1115	16-FV-1804 C/V U/S Flange	0		0.00
1116	16-FV-1804 C/V Gland	0		0.00
1117	16-FV-1804 C/V D/S Flange	0		0.00
1118	Drain line l/V Gland	0		0.00
1119	16-FV-1804 D/S line I/V U/S Flange	0		0.00
1120	16-FV-1804 D/S line I/V Gland	0		0.00
1121	16-FV-1804 D/S line I/V D/S Flange	0		0.00
1122	Bypass line l/V U/S Flange	0		0.00
1123	Bypass line l/V Gland	0		0.00
1124	Bypass line l/V D/S Flange	0		0.00
1125	ISOMER From DRYER DEGASSER	0		0.00
1126	ISOMER From DRYER DEGASSER	0		0.00
1127	ISOMER From DRYER DEGASSER	0		0.00
	Unit: WAX			
Area:pump-18PA109A Wax Scripper Bottom Pump				
1	Suction line l/V U/S Flange	0	0	0.00
2	l/V Gland	0	0	0.00
3	l/V D/S Flange	0	0	0.00
4	Drain line l/V Gland	0	0	0.00
5	Drain line Safety Flange	0	0	0.00
6	Discharge line l/V U/S Flange	0	0	0.00
7	l/V Gland	0	0	0.00
8	l/V D/S Flange	0	0	0.00
9	Pump seal	0	0	0.00
10	Meter line l/V Gland	0	0	0.00
11	OWS point	0	0	0.00
12	18PA109B Suction line l/V U/S Flange	0	0	0.00
13	l/V Gland	0	0	0.00
14	l/V D/S Flange	0	0	0.00
15	Drain line l/V Gland	0	0	0.00
16	Drain line Safety Flange	0	0	0.00
17	Discharge line l/V U/S Flange	0	0	0.00
18	l/V Gland	0	0	0.00
19	l/V D/S Flange	0	0	0.00
20	Pump seal	0	0	0.00
21	Meter line 1st l/V Gland	0	0	0.00
22	Meter line 2nd l/V Gland	0	0	0.00
23	OWS point	0	0	0.00
24	18PA105A Suction line l/V U/S Flange	0	0	0.00
25	l/V Gland	0	0	0.00
26	l/V D/S Flange	0	0	0.00
27	Drain line l/V Gland	0	0	0.00
28	Drain line Safety Flange	0	0	0.00
29	Meter line 1st l/V Gland	0	0	0.00
30	Meter line 2nd l/V Gland	0	0	0.00
31	OWS point	0	0	0.00
32	18PA105B Suction line l/V U/S Flange	0	0	0.00
33	l/V Gland	0	0	0.00
34	l/V D/S Flange	0	0	0.00
35	Discharge line l/V Gland	0	0	0.00
36	l/V D/S Flange	0	0	0.00
37	Drain line l/V Gland	0	0	0.00
38	Drain line Safety Flange	0	0	0.00
39	Meter line 1st l/V Gland	0	0	0.00
40	Meter line 2nd l/V Gland	0	0	0.00

41	OWS point	0	0	0.00
42	18PA105C Suction line l/V U/S Flange	0	0	0.00
43	l/V Gland	0	0	0.00
44	l/V D/S Flange	0	0	0.00
45	Discharge line l/V U/S Flange	0	0	0.00
46	l/V Gland	0	0	0.00
47	l/V D/S Flange	0	0	0.00
48	Pump seal	0	0	0.00
49	Drain line l/V Gland	0	0	0.00
50	Drain line Safety Flange	0	0	0.00
51	Meter line 1st l/V Gland	0	0	0.00
52	Meter line 2nd l/V Gland	0	0	0.00
53	OWS point	0	0	0.00
54	18PA105D Suction line l/V U/S Flange	0	0	0.00
55	l/V Gland	0	0	0.00
56	l/V D/S Flange	0	0	0.00
57	Pump seal	0	0	0.00
58	Drain line l/V Gland	0	0	0.00
59	Drain line Safety Flange	0	0	0.00
60	Meter line 1st l/V Gland	0	0	0.00
61	Meter line 2nd l/V Gland	0	0	0.00
62	OWS point	0	0	0.00
63	LV1902 Suction line l/V U/S Flange	0	0	0.00
64	l/V Gland	0	0	0.00
65	l/V D/S Flange	0	0	0.00
66	Drain line l/V Gland	0	0	0.00
67	Drain line Safety Flange	0	0	0.00
68	1902CV Gland	0	0	0.00
69	Discharge line l/V Gland	0	0	0.00
70	Discharge line Drain line l/V Gland	0	0	0.00
71	Drain line Safety Flange	0	0	0.00
72	LV2002 Suction line l/V U/S Flange	0	0	0.00
73	l/V Gland	0	0	0.00
74	l/V D/S Flange	0	0	0.00
75	Drain line l/V Gland	0	0	0.00
76	Drain line Safety Flange	0	0	0.00
77	LV2002 CV Gland	0	0	0.00
78	Discharge line l/V Gland	0	0	0.00
79	Discharge line Drain line l/V Gland	0	0	0.00
80	Drain line Safety Flange	0	0	0.00
81	LV1802 Suction line l/V Gland	0	0	0.00
82	LV1802 CV Gland	0	0	0.00
83	Discharge line l/V Gland	0	0	0.00
84	Drain line l/V Gland	0	0	0.00
85	Drain line Safety Flange	0	0	0.00
86	PV2401 Suction line l/V U/S Flange	0	0	0.00
87	l/V Gland	0	0	0.00
88	l/V D/S Flange	0	0	0.00
89	Drain line l/V Gland	0	0	0.00
90	Drain line Safety Flange	0	0	0.00
91	PV2401 Suction line l/V U/S Flange	0	0	0.00
92	PV2401 CV Gland	0	0	0.00
93	CV D/S Flange	0	0	0.00
94	Discharge line l/V U/S Flange	0	0	0.00
95	l/V Gland	0	0	0.00
96	l/V D/S Flange	0	0	0.00
97	Drain line l/V Gland	0	0	0.00
98	Drain line Safety Flange	0	0	0.00
99	NRV U/S Flange	0	0	0.00

100	NRV D/S Flange	0	0	0.00
101	Meter line 1st I/V Gland	0	0	0.00
102	Meter line 2nd I/V Gland	0	0	0.00
103	LV1702 Suction line I/V Gland	0	0	0.00
104	Drain line I/V Gland	0	0	0.00
105	Drain line Safety Flange	0	0	0.00
106	LV1702 CV Gland	0	0	0.00
107	CV D/S Flange	0	0	0.00
108	Discharge line I/V Gland	0	0	0.00
109	Discharge line flange	0	0	0.00
110	Drain line I/V Gland	0	0	0.00
111	Drain line Safety Flange	0	0	0.00
112	LV1602 Suction line I/V Gland	0	0	0.00
113	Drain line I/V Gland	0	0	0.00
114	Drain line Safety Flange	0	0	0.00
115	LV1602 CV Gland	0	0	0.00
116	CV D/S Flange	0	0	0.00
117	Discharge line I/V Gland	0	0	0.00
118	Drain line I/V Gland	0	0	0.00
119	Drain line Safety Flange	0	0	0.00
120	18PA114A Suction line I/V U/S Flange	0	0	0.00
121	I/V Gland	0	0	0.00
122	I/V D/S Flange	0	0	0.00
123	Discharge line I/V U/S Flange	0	0	0.00
124	I/V Gland	0	0	0.00
125	I/V D/S Flange	0	0	0.00
126	NRV U/S Flange	0	0	0.00
127	NRV D/S Flange	0	0	0.00
128	Pump seal	0	0	0.00
129	Meter line 1st I/V Gland	0	0	0.00
130	Meter line 2nd I/V Gland	0	0	0.00
131	18PA114B Suction line I/V U/S Flange	0	0	0.00
132	I/V Gland	0	0	0.00
133	I/V D/S Flange	0	0	0.00
134	Discharge line I/V U/S Flange	0	0	0.00
135	I/V Gland	0	0	0.00
136	I/V D/S Flange	0	0	0.00
137	NRV U/S Flange	0	0	0.00
138	NRV D/S Flange	0	0	0.00
139	Pump seal	0	0	0.00
140	Meter line 1st I/V Gland	0	0	0.00
141	Meter line 2nd I/V Gland	0	0	0.00
142	18PA104A Suction line I/V U/S Flange	0	0	0.00
143	I/V Gland	0	0	0.00
144	I/V D/S Flange	0	0	0.00
145	Drain line I/V Gland	0	0	0.00
146	Drain line Safety Flange	0	0	0.00
147	Discharge line I/V U/S Flange	0	0	0.00
148	I/V Gland	0	0	0.00
149	I/V D/S Flange	0	0	0.00
150	Pump seal	0	0	0.00
151	Meter line 1st I/V Gland	0	0	0.00
152	Meter line 2nd I/V Gland	0	0	0.00
153	18PA104B Suction line I/V U/S Flange	0	0	0.00
154	I/V Gland	0	0	0.00
155	I/V D/S Flange	0	0	0.00
156	Drain line I/V Gland	0	0	0.00
157	Drain line Safety Flange	0	0	0.00
158	Discharge line I/V U/S Flange	0	0	0.00

159	I/V Gland	0	0	0.00
160	I/V D/S Flange	0	0	0.00
161	Pump seal	0	0	0.00
162	Meter line 1st I/V Gland	0	0	0.00
163	Meter line 2nd I/V Gland	0	0	0.00
164	18PA104C Suction line I/V U/S Flange	0	0	0.00
165	I/V Gland	0	0	0.00
166	I/V D/S Flange	0	0	0.00
167	Drain line I/V Gland	0	0	0.00
168	Drain line Safety Flange	0	0	0.00
169	Discharge line I/V U/S Flange	0	0	0.00
170	I/V Gland	0	0	0.00
171	I/V D/S Flange	0	0	0.00
172	Pump seal	0	0	0.00
173	Meter line 1st I/V Gland	0	0	0.00
174	Meter line 2nd I/V Gland	0	0	0.00
175	18PA104D Suction line I/V U/S Flange	0	0	0.00
176	I/V Gland	0	0	0.00
177	I/V D/S Flange	0	0	0.00
178	Drain line I/V Gland	0	0	0.00
179	Drain line Safety Flange	0	0	0.00
180	Discharge line I/V U/S Flange	0	0	0.00
181	I/V Gland	0	0	0.00
182	I/V D/S Flange	0	0	0.00
183	Pump seal	0	0	0.00
184	Meter line 1st I/V Gland	0	0	0.00
185	Meter line 2nd I/V Gland	0	0	0.00
186	18PA104E Suction line I/V U/S Flange	0	0	0.00
187	I/V Gland	0	0	0.00
188	I/V D/S Flange	0	0	0.00
189	Drain line I/V Gland	0	0	0.00
190	Drain line Safety Flange	0	0	0.00
191	Discharge line I/V U/S Flange	0	0	0.00
192	I/V Gland	0	0	0.00
193	I/V D/S Flange	0	0	0.00
194	Pump seal	0	0	0.00
195	Meter line 1st I/V Gland	0	0	0.00
196	Meter line 2nd I/V Gland	0	0	0.00
197	18PA104F Suction line I/V U/S Flange	0	0	0.00
198	I/V Gland	0	0	0.00
199	I/V D/S Flange	0	0	0.00
200	Drain line I/V Gland	0	0	0.00
201	Drain line Safety Flange	0	0	0.00
202	Discharge line I/V U/S Flange	0	0	0.00
203	I/V Gland	0	0	0.00
204	I/V D/S Flange	0	0	0.00
205	Pump seal	0	0	0.00
206	Meter line 1st I/V Gland	0	0	0.00
207	Meter line 2nd I/V Gland	0	0	0.00
T.No.43TTCR101A (Service MVGO)				
208	Level Indicator connecting Point	0	0	0.00
209	US line IV gland	0	0	0.00
210	US line IV flange	0	0	0.00
211	Drain line I/V Gland	0	0	0.00
212	Drain line Safety Flange	0	0	0.00
213	D/S line IV gland	0	0	0.00
214	D/S line IV Flange	0	0	0.00
215	Meter line I/V Gland	0	0	0.00
T.No.43TTCR101B(Service MVGO)				

216	Level Indicator connecting Point	0	0	0.00
217	US line IV gland	0	0	0.00
218	US line IV flange	0	0	0.00
219	Drain line I/V Gland	0	0	0.00
220	Drain line Safety Flange	0	0	0.00
221	D/S line IV gland	0	0	0.00
222	D/S line IV Flange	0	0	0.00
223	Meter line I/V Gland	0	0	0.00
T.No.43TTCR102(Service HVGO)				
224	Level Indicator connecting Point	0	0	0.00
225	US line IV gland	0	0	0.00
226	US line IV flange	0	0	0.00
227	Drain line I/V Gland	0	0	0.00
228	Drain line Safety Flange	0	0	0.00
229	D/S line IV gland	0	0	0.00
230	D/S line IV Flange	0	0	0.00
231	Meter line I/V Gland	0	0	0.00