



हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड
(भारत सरकार का उपक्रम) रजिस्टर्ड ऑफिस : 17, जमशेदजी टाटा रोड, मुंबई - 400 020
HINDUSTAN PETROLEUM CORPORATION LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE : 17, JAMSHEDJI TATA ROAD, MUMBAI- 400 020

2 जी इथेनॉल बायो-रिफाइनरी प्रोजेक्ट: बठिण्डा रिटेल क्षेत्रीय कार्यालय : अर्बन एस्टेट, फेस - II, पार्ट - II, बठिण्डा - 151001
2G Ethanol Bio-Refinery Project : BATHINDA RETAIL REGIONAL OFFICE : URBAN ESTATE, PHASE-II, PART-II, BATHINDA-151001
website : www.hindustanpetroleum.com

To,
The Deputy Director / Scientist 'C'
Ministry of Environment, Forests & Climate Change,
Northern Regional Office
Bays No. 24-25, Sector-31A,
Dakshin Marg, Chandigarh-160030
(Email: chdmoefenv@gmail.com)

Sub: Submission of six-monthly compliance report of stipulated conditions of Environmental Clearance for setting up 2G Ethanol Bio-refinery plant of capacity 100KLPD at Village- Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab) for the period of December 2022.

Ref: F.No. J-11011/221/2017-IA II (I) Dated- 23.09.2020

Sir/ Madam

This has reference to the EC vide letter no. **J-11011/221/2017-IA II (I) Dated- 23.09.2020**. In this regard, we are submitting hereby status report of compliance with the specific and general conditions for period December 2022. Documents enclosed along with report are mentioned below as

1. Point- wise compliance of stipulated environmental conditions & safeguards
2. Analysis Reports
3. Supporting Documents

Thanking You

For M/s Hindustan Petroleum Corporation Limited

(Authorized Signatory)

Name - Akhlaque Ahmad
Designation - Deputy General Manager-Projects
E-mail - akhlaqueahmad@hpcl.in
Contact No. - +91-8689975959

Copy to:

1. The Director, Ministry of Environment, Forest & Climate Change, Govt of India, Sector 31, Chandigarh.
2. The Member Secretary, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar Delhi-32
3. The Member Secretary, Punjab Pollution Control Board, Vataran Bhawan, Nabha Road, Patiala, 147001 (Punjab)

1

PURPOSE OF THE REPORT

1.0 Introduction

1.1 About Project: M/s Hindustan petroleum Corporation Limited has proposed to set up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab).

This Project has obtained Environmental Clearance vide letter dated 14th August, 2018 for setting up 2G Bio-refinery Plant of capacity 100 KLD and now has granted amended Environmental Clearance from Ministry of Environment, Forests and Climate Change Delhi, with certain conditions.

1.2 Purpose of the Report

As per the "Sub Para (i)" of "Para 10" of EIA Notification 2006, it is stated that *"It shall be mandatory for the project proponent to submit half-yearly compliance report in respect of the stipulated prior environmental clearance terms and conditions in hard and soft copies to the concerned regulatory authority, on 1st June and 1st December of each calendar year"* and as per compliance condition mentioned in Environment Clearance Letter.

The regulatory authorities in this case are MoEF& CC Delhi, MoEF& CC, Chandigarh and SPCB, Punjab. Various scheduled Site Visits were conducted by a team of Experts to Monitor Pollution related parameters as defined by CPCB / HSPCB. Samples for water and soil were also collected by NABL/ MoEF approved laboratory for analysis.

Based on the Specific and General Conditions mentioned in the EC Letter, a Compliance Report has been prepared and submitted regularly to the authority.

The Environmental assessment has been carried out to verify:

- 1) The proposed project does not have any adverse effect on the project site as well as its surrounding.
- 2) There is compliance with the conditions stipulated in the Environmental Clearance Letter.
- 3) The Project proponent is implementing the environmental safeguards in true spirit.
- 4) The project proponent is implementing the environmental pollution mitigative measures as suggested in approved EIA report.

1.3 Methodology for Preparation of Report is as follows:

- 1) Study of EC Letter & Related Documents,
- 2) Monitoring of Environment Parameters, viz. Ambient Air, Water, Noise & Soil by the NABL/MoEF labs.
- 3) Interpretation of Monitoring Results.
- 4) Preparation of half yearly Environmental Compliance Report.

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

1.4 Generic Structure of Report:

- 1) Purpose of the Report, explaining the need of a Compliance Report and Methodology Adopted for preparation of Report.
- 2) Compliance Report, explaining the entire General & specific conditions in the EC Letter and providing details w.r.t. each condition/ guideline.
- 3) Monitoring Reports & Analysis, showing the level of emission within the project site for various Environment Parameters.
- 4) Photographs showing sample collection for environmental monitoring.
- 5) Supporting Documents which are mandatory for the project.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

2

ADHERENCE TO SPECIFIC AND GENERAL CONDITIONS

PART A- SPECIFIC CONDITION

S. No.	Conditions of Environmental Clearance	Status of Compliance
[A]	The final product (Ethanol) shall be used exclusively for fuel blending only.	<i>Noted.</i>
[B]	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	<i>Consent to Establish (CTE) was obtained from PPCB valid till 31.12.2021 as per the amended EC.</i>
[C]	As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises	<i>As proposed zero discharge of waste water will be met during operational phase.</i>
[D]	Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.	<i>Authorization required for hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid waste Management Rules, 2016 will be obtained as per the requirement.</i>
[E]	To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines	<i>Measures will be taken to control fugitive emission, pollution control devices will be installed as per the requirement. Stack of adequate height as per the guidelines will be installed for the gaseous emission dispersion.</i>
[F]	Total fresh water requirement shall not exceed 2280 cum/day, proposed to be met from canal supply.	<i>Prescribed water requirement will not be exceeded.</i>
[G]	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through a separate conveyance system.	<i>We will ensure that process water is not mixed with storm water.</i>
[H]	The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.	<i>Noted.</i>

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

[I]	<p>The company shall undertake waste minimization measures as below:-</p> <ol style="list-style-type: none"> i. Metering and control of quantities of active ingredients to minimize waste. ii. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. iii. Use of automated filling to minimize spillage. iv. Use of Close Feed system into batch reactors. v. Venting equipment through vapour recovery system vi. Use of high pressure hoses for equipment clearing to reduce wastewater generation. 	<p><i>We will comply with the condition as per the requirement to minimize waste generation in the plant-</i></p> <ol style="list-style-type: none"> <i>i. Metering and control of quantities of active ingredients will be done regularly.</i> <i>ii. By products will be reused as raw material as much as possible according to requirement.</i> <i>iii. Automated filling will be carried out to minimize spillage</i> <i>iv. Close feed system will be used into batch reactors.</i> <i>v. Water scrubber, vent bottle & flame arrestors will be provided as per requirement.</i> <i>vi. High pressure hoses for equipment clearing will be used to reduce waste water generation.</i>
[J]	<p>The green belt of 5-10 m width shall be developed in more than 33% of the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.</p>	<p><i>We have submitted Green belt development plan to the MoEF&CC in the EIA report and same will be developed as per the EC requirement.</i></p>
[K]	<p>All the commitments made regarding issues raised during the public hearing/ consultation meeting shall be satisfactorily implemented.</p>	<p><i>Noted.</i></p>
[L]	<p>At least 1% of the total project cost shall be allocated for Corporate Environment Responsibility (CER) and the details along with time bound action plan shall be submitted to the Ministry's Regional Office.</p>	<p><i>The project is in initial stage and construction is yet to be commenced. CER details will be submitted to the authority in due course of time. .</i></p>
[M]	<p>For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.</p>	<p><i>Acoustically enclosed DG sets will be installed and Stack height will be kept as per the CPCB guidelines.</i></p>
[N]	<p>The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.</p>	<p><i>Fire Fighting system will be installed as per the condition.</i></p>
[O]	<p>Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.</p>	<p><i>Regular Health Check-up arrangement will be provided for the workers A qualified doctor will be appointed.</i></p>
[P]	<p>There shall be adequate space inside the plant premises earmarked for parking of vehicles for raw materials and finished products, and no parking to be allowed outside on public places.</p>	<p><i>No parking will be done outside on public places. Plan in this regard has already been submitted to authority.</i></p>
[Q]	<p>Storage of raw materials shall be either stored in silos or in covered areas to prevent dust pollution and other fugitive emissions.</p>	<p><i>During operation phase, raw materials will be stored properly in covered areas</i></p>
[R]	<p>Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow</p>	<p><i>We will comply.</i></p>

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

	meters in the channel/drain carrying effluent within the premises.	
[S]	CO ₂ generated from the process shall be bottled/made solid ice/value added products and sold to authorize vendors.	<i>Noted.</i>

11.1 Other Generic Conditions:-

S. No.	Conditions of Environmental Clearance	Status of Compliance
i.	The project authorities must strictly adhere to the stipulations made by the state Pollution Control Board (SPCB), State Government and/ or any other statutory authority.	<i>We ensure to follow the guidelines strictly.</i>
ii.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	<i>Noted.</i>
iii.	The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated	<i>Noted and same will be complied.</i>
iv.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R No. 826(E) dated 16 th November, 2009 Shall be Complied with.	<i>Noted.</i>
v.	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	<i>We will ensure to keep the noise levels within the standards.</i>
vi.	The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and utilize the same for different industrial operations within the plant.	<i>Noted.</i>
vii.	Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.	<i>Regular training of health & safety will be provided to the employees for chemical handling.</i>

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

viii.	The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, risk mitigation measures and public hearing shall be implemented.	<i>Noted and will be complied as per the requirement.</i>
ix.	The company shall undertake all measures for improving socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villagers, administration and other stake holders. Also eco-developmental measures shall be undertaken for overall improvement of the environment.	<i>CSR activities will be undertaken as per the proposed plan.</i>
x.	A separate Environmental Management Cell equipped with full-fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.	<i>Noted.</i>
xi.	The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Changes well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/Pollution control measures shall not be diverted for any other purpose.	<i>Separate funds will be kept for the implementation of the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government.</i>
xii.	A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zila Parisad/ Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.	<i>Noted.</i>
xiii.	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status reports shall be posted on the website of the company.	<i>Noted. We are complying with the condition.</i>
xiv.	The environmental statement for each financial year ending 31 st March in Form-Vas is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional offices of MoEF&CC by e-mail.	<i>Noted.</i>
xv.	The project proponent shall inform the public that the	<i>Copy of advertisements attached.</i>

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

	<p>project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry at http://moef.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 locality concerned and a copy of the same shall be forwarded to the concerned Regional office of the Ministry.</p>	
xvi.	<p>The Ministry reserves the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the environmental clearance, if implementation of any of the above conditions is not found satisfactory.</p>	<i>Noted.</i>
xvii.	<p>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, the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 read with subsequent amendments therein.</p>	<i>Noted.</i>

3

DETAILS OF ENVIRONMENTAL MONITORING

3.1 AMBIENT AIR QUALITY MONITORING

3.1.1 Ambient Air Quality Monitoring Stations

Ambient air quality monitoring has been carried out at twelve locations on quarterly bases, to assess the ambient air quality of the project site. This will enable to have a comparative analytical understanding about air quality and the changes in the air environment in the study area with respect to the condition prevailing. The locations of the ambient air quality monitoring stations are given in **Table 3.1**.

Table 3.1 Details of Ambient Air Quality Monitoring Stations

S. No.	Location	Location Name/ Description	
		December 2021	March 2022
1.	AAQ1	Near Project site	Near Project site
2.	AAQ2	Jiwan Singh Wala	NasibPura
3.	AAQ3	Maawala	Kot Kashmir
4.	AAQ4	Mahi Nangal	Chathewala
5.	AAQ5	Leleana	KotFatta
6.	AAQ6	Baghi Bandar	Baghi Bandar
7.	AAQ7	Nasibpura	Kothbhara
8.	AAQ8	Kothbhara	Jiwan Singh Wala
9.	AAQ9	Kot Kashmir	GehriBoghi
10.	AAQ10	GehriBoghi	Mahi Nangal
11.	AAQ11	Chathewala	Maanwala
12.	AAQ12	KotFatta	Leleana

3.1.2 Ambient Air Quality Monitoring Methodology

Monitoring was conducted in respect of the following parameters:

- Particulate Matter 2.5 (PM 2.5)
- Particulate Matter 10 (PM 10)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen (NO₂)
- Carbon Monoxide (CO)
- Ammonia (NH₃)
- Lead (Pb)
- Benzene (C₆H₆)
- Benzo(a)pyrene
- Ozone (O₃)

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

- Arsenic (As)
- Nickel (Ni)
- Volatile Organic Carbon (VOCs)
- Hydrocarbon (as Methane)

Installation of Respirable Dust sampler (RDS) & Fine Particulate Sampler (FPS) was done with the attachment for the 24 hourly ambient air qualities monitoring as per Gazette Notification 16th November 2009.

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB) and IS: 5182. The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table 3.2**.

Fine Particulate Sampler instruments have been used for monitoring Particulate Matter 2.5 (PM2.5 i.e. <2.5 microns), and Respirable Dust Sampler was used for sampling Repairable fraction (<10 microns), gaseous pollutants like SO₂, and NO₂. Bladder and Aspirator bags were used for collection Carbon monoxide samples. Gas Chromatography techniques have been used for the estimation of CO.

Table 3.2 Techniques used for Ambient Air Quality Monitoring

S. No.	Parameter	Technique	Technical Protocol
1	Particulate Matter 2.5	Fine Particulate Sampler, Gravimetric Method	#SOP No. VEL/SOP/01, Section No. SP 63
2	Particulate Matter 10	Respirable Dust Sampler, with cyclone separator, Gravimetric Method	IS: 5182 (P-23), 2006
3	Sulphur dioxide	Modified West and Gaeke	IS: 5182 (P-6)
4	Oxides of Nitrogen	Jacob & Hochheiser	IS: 5182 (P-2)
5	Carbon Monoxide	Gas Chromatography	IS:11255(P-6)
6	Ammonia	Distillation Method	IS: 5182 (P-22)
7	Lead	Atomic Absorption Spectro-photometer	IS: 5182 (P-10)
8	Benzene	Gas Chromatography	IS: 5182 (P-11)
9	Benzo(a)pyrene	Gas Chromatography	IS: 5182 (P-12)
10	Ozone	Colorimetry	IS: 5182 (P-9)
11	Arsenic	Atomic Absorption Spectro-photometer	IS: 5182 (P-22)
12	Nickel	Atomic Absorption Spectro-photometer	IS: 5182 (P-22)
13	Volatile Organic Carbon (VOCs)	IS:5182 (P-11)	IS:5182 (P-11)
14	Hydrocarbon (as Methane)	IS:5182 (P-17), 1979	IS:5182 (P-17), 1979

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

3.1.3 Ambient Air Quality Monitoring Results (June-2022)

Table 3.6 Ambient Air Quality Monitoring Results (1-4 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ1	AAQ2	AAQ3	AAQ4	
1	Particulate Matter (PM _{2.5}), µg/m ³	47.23	51.47	41.69	52.46	60
2	Particulate Matter (PM ₁₀), µg/m ³	86.29	81.23	79.84	88.74	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	17.65	23.58	16.58	23.05	80
4	Sulphur Dioxide (SO ₂), µg/m ³	7.41	9.74	7.05	8.76	80
5	Carbon Monoxide (CO) mg/m ³	0.63	0.71	0.68	0.89	4
6	Ammonia (NH ₃), µg/m ³	10.15	7.56	8.42	11.08	400
7	Lead (Pb), µg/m ³	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	05
9	Benzo(a)pyrene, ng/m ³	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	01
10	Ozone (O ₃),µg/m ³	18.56	18.76	20.43	25.16	180
11	Arsenic As, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	6
12	Nickel Ni, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	20
13	Volatile Organic Carbon (VOCs)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	--
14	Hydrocarbon (as Methane)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Table 3.7 Ambient Air Quality Monitoring Results (5-8 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ5	AAQ6	AAQ7	AAQ8	
1	Particulate Matter (PM _{2.5}), µg/m ³	44.29	53.24	50.26	42.15	60
2	Particulate Matter (PM ₁₀), µg/m ³	80.47	86.42	84.19	79.54	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	21.54	15.09	25.74	19.05	80
4	Sulphur Dioxide (SO ₂), µg/m ³	9.37	7.69	8.46	8.81	80
5	Carbon Monoxide (CO) mg/m ³	0.83	0.75	0.82	0.80	4

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

6	Ammonia (NH ₃), µg/m ³	7.21	8.46	9.87	9.43	400
7	Lead (Pb), µg/m ³	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	05
9	Benzo(a)pyrene, ng/m ³	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	01
10	Ozone (O ₃),µg/m ³	18.79	22.09	22.04	19.85	180
11	Arsenic As, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	6
12	Nickel Ni, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	20
13	Volatile Organic Carbon (VOCs)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	--
14	Hydrocarbon (as Methane)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Table 3.8 Ambient Air Quality Monitoring Results (9-12 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM _{2.5}) µg/m ³	53.84	48.41	43.29	45.26	60
2	Particulate Matter (PM ₁₀) µg/m ³	87.26	82.74	82.41	84.10	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	21.41	19.48	24.63	19.85	80
4	Sulphur Dioxide (SO ₂), µg/m ³	9.84	9.53	8.46	10.25	80
5	Carbon Monoxide (CO) mg/m ³	0.69	0.79	0.81	0.79	4
6	Ammonia (NH ₃), µg/m ³	8.14	8.10	9.54	9.26	400
7	Lead (Pb), µg/m ³	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	*BDL (**DL 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	*BDL (**DL 0.1)	05
9	Benzo(a)pyrene, ng/m ³	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	*BDL (**DL 1.0)	01
10	Ozone (O ₃),µg/m ³	19.82	22.04	19.21	20.14	180
11	Arsenic As, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	6
12	Nickel Ni, ng/ m ³	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	20
13	Volatile Organic	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	*BDL (**DL 5.0)	--
14	Hydrocarbon (as Methane)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	*BDL(**DL 0.2)	--

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

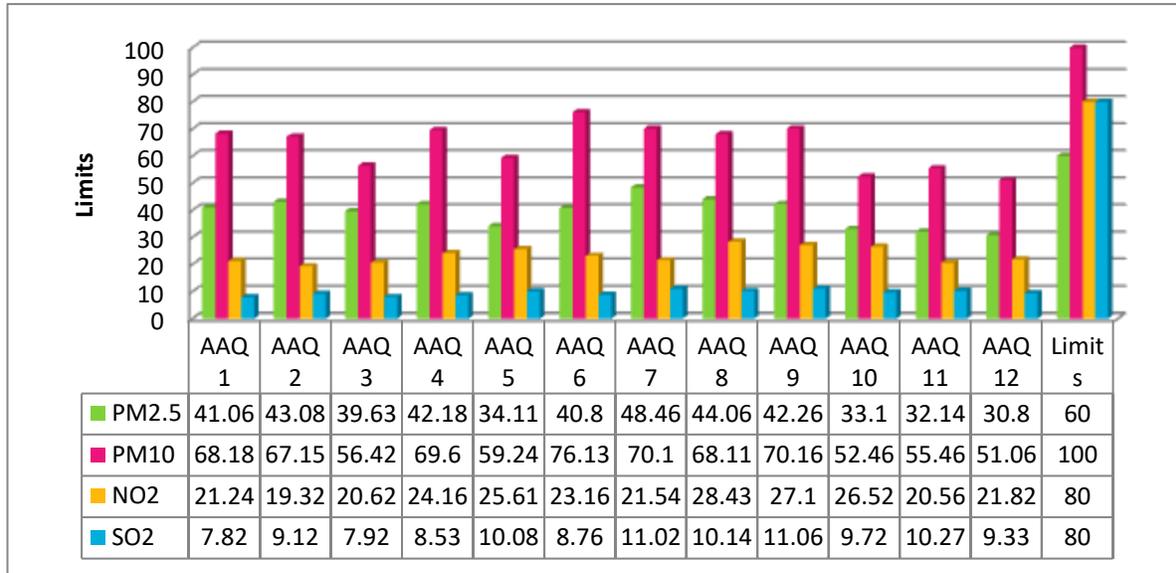


Figure 3.3 Location-wise Variation of Ambient Air Quality (June 2022)

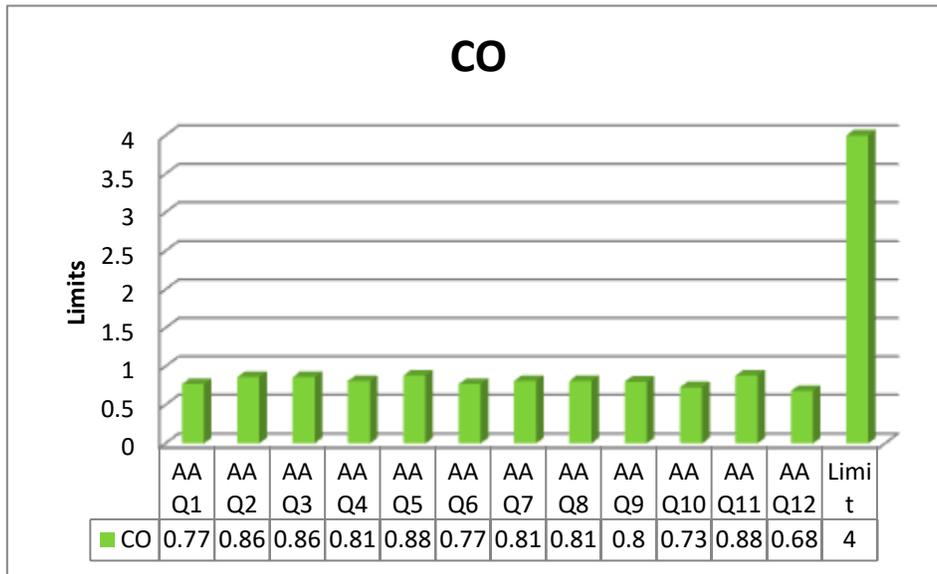


Figure 3.4 Location-wise Variation of CO in Ambient Air Quality (June 2022)

3.1.4 Discussion on Ambient Air Quality in the Study Area

PM₁₀ and PM_{2.5} levels at the project site are within the permissible limit of 100µg/m³ and 60 µg/m³ respectively (for residential, rural and other areas as stipulated in the National Ambient Air Quality Standards). SO₂, NO_x and CO was observed within the corresponding stipulated limits (Limit for SO₂ and NO_x: 80 µg/m³ and limit for CO: 4.0 mg/m³) at all monitoring locations. Station wise variation of ambient air quality parameters has been pictorially shown in **Figure 3.1, 3.2, 3.3 & 3.4**.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

3.1.5 Ambient Air Quality Monitoring Results (September-2022)

Table 3.3 Ambient Air Quality Monitoring Results (1-4 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ1	AAQ2	AAQ3	AAQ4	
1	Particulate Matter (PM _{2.5}), µg/m ³	41.06	43.08	39.63	42.18	60
2	Particulate Matter (PM ₁₀), µg/m ³	68.18	67.15	56.42	69.60	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	21.24	19.32	20.62	24.16	80
4	Sulphur Dioxide (SO ₂), µg/m ³	7.82	9.12	7.92	8.53	80
5	Carbon Monoxide (CO) mg/m ³	0.77	0.86	0.86	0.81	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	01
10	Ozone (O ₃),µg/m ³	17.42	19.03	22.38	20.76	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic Carbon	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.4 Ambient Air Quality Monitoring Results (5-8 Location)

S. No	Parameter	Test Result				NAAQS*
		AAQ5	AAQ6	AAQ7	AAQ8	
1	Particulate Matter (PM _{2.5}), µg/m ³	34.11	40.80	48.46	44.06	60
2	Particulate Matter (PM ₁₀), µg/m ³	59.24	76.13	70.10	68.11	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	25.61	23.16	21.54	28.43	80
4	Sulphur Dioxide (SO ₂), µg/m ³	10.08	8.76	11.02	10.14	80
5	Carbon Monoxide (CO) mg/m ³	0.88	0.77	0.81	0.81	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	01
10	Ozone (O ₃),µg/m ³	21.86	22.03	19.02	24.00	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic Carbon (VOCs)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.5 Ambient Air Quality Monitoring Results (9-12 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM _{2.5}), µg/m ³	42.26	33.10	32.14	30.80	60
2	Particulate Matter (PM ₁₀), µg/m ³	70.16	52.46	55.46	51.06	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	27.10	26.52	20.56	21.82	80
4	Sulphur Dioxide (SO ₂), µg/m ³	11.06	9.72	10.27	9.33	80
5	Carbon Monoxide (CO) mg/m ³	0.80	0.73	0.88	0.68	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	BLQ(LOQ20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	BLQ(LOQ 1.0)	01
10	Ozone (O ₃),µg/m ³	21.34	21.04	21.15	19.43	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	BLQ(LOQ 0.2)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

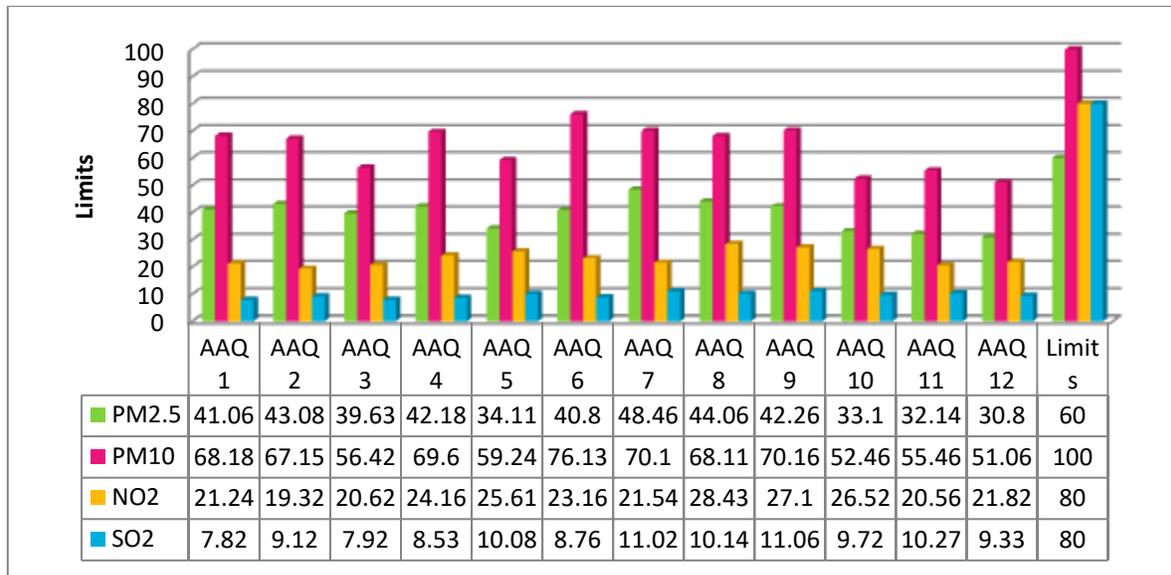


Figure 3.1 Location-wise Variation of Ambient Air Quality (September 2022)

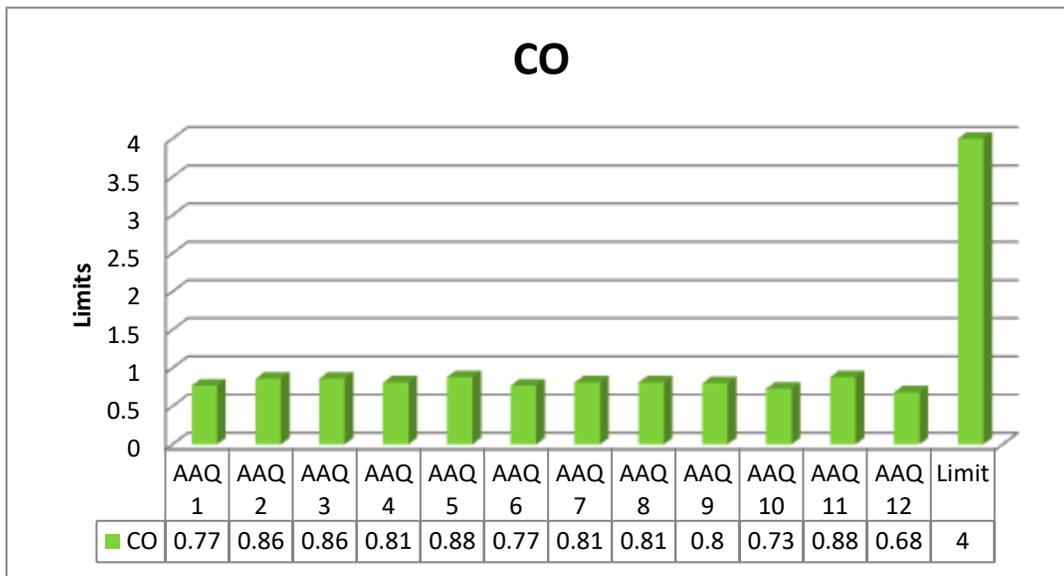


Figure 3.2 Location-wise Variation of CO in Ambient Air Quality (September 2022)

3.1.6 Discussion on Ambient Air Quality in the Study Area

PM₁₀ and PM_{2.5} levels at the project site are within the permissible limit of 100µg/m³ and 60 µg/m³ respectively (for residential, rural and other areas as stipulated in the National Ambient Air Quality Standards). SO₂, NO_x and CO was observed within the corresponding stipulated limits (Limit for SO₂ and NO_x: 80 µg/m³ and limit for

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

CO: 4.0 mg/m³) at all monitoring locations. Station wise variation of ambient air quality parameters has been pictorially shown in **Figure 3.1, 3.2. 3.3 & 3.4.**

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

3.2 AMBIENT NOISE MONITORING

3.2.1 Ambient Noise Monitoring Locations

The main objective of noise monitoring in the study area is to assess the present ambient noise levels in near front gate due to various construction allied activities and increased vehicular movement. A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Ambient noise monitoring was conducted at 12 locations in and around the project site on quarterly bases as given in **Table 3.9**.

Table 3.9 Details of Ambient Noise Monitoring Stations

S. No.	Location Code	Location Name/ Description		Present Land use
		December 2021	March 2022	
1.	N1	Near Project site	Near Project site	Industrial
2.	N2	Jiwan Singh Wala	NasibPura	Residential
3.	N3	Maawala	Kot Kashmir	Residential
4.	N4	Mahi Nangal	Chathewala	Residential
5.	N5	Leleana	KotFatta	Residential
6.	N6	Baghi Bandar	Baghi Bandar	Residential
7.	N7	Nasibpura	Kothbhara	Residential
8.	N8	Kothbhara	Jiwan Singh Wala	Residential
9.	N9	Kot Kashmir	GehriBoghi	Residential
10.	N10	GehriBoghi	Mahi Nangal	Residential
11.	N11	Chathewala	Maanwala	Residential
12.	N12	KotFatta	Leleana	Residential

3.2.2 Methodology of Noise Monitoring

Noise levels were measured using sound level meter. Noise level monitoring was carried out continuously for 24-hours with one hour interval starting at 06:00hrs to 06:00hrs next day. The noise levels were monitored on working days only. During each hour Leq were directly computed by the instrument based on the sound pressure levels. Monitoring was carried out at 'A' response and fast mode.

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

3.2.3 Ambient Noise Monitoring Results (June -2022)

The location wise ambient noise monitoring results is summarized in **Table 3.13, 3.14& 3.15**. The location-wise variation of noise levels are graphically presented in **Figure**

Table 3.13 Ambient Noise Monitoring Results (1-4 Location)

Parameter	N1		N2		N3		N4	
	Day Time	Night Time						
Lmax	70.6	61.7	62.5	47.5	57.4	46.1	55.1	44.2
Lmin	51.2	42.3	40.1	33.6	34.9	29.5	32.8	27.8
Leq	62.40	52.90	49.50	39.40	45.60	36.80	43.60	34.90
CPCB Limit (Leq in dB(A) Industrial Limit& Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.00	45.00

Note *A “decibel” is a unit in which noise is measured.

Table 3.14 Ambient Noise Monitoring Results (5-8 Location)

Parameter	N5		N6		N7		N8	
	Day Time	Night Time						
Lmax	54.2	45.3	54.2	41.7	57.2	50.3	56.3	51.7
Lmin	32.6	27.7	35.3	30.8	35.1	31.6	33.9	31.0
Leq	43.10	39.40	42.50	35.70	46.70	35.20	44.20	37.30
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note *A “decibel” is a unit in which noise is measured.

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

Table 3.15 Ambient Noise Monitoring Results (9-12 Location)

Parameter	N9		N10		N11		N12	
	Day Time	Night Time						
Lmax	55.2	43.7	51.7	39.8	54.6	42.6	59.5	45.3
Lmin	34.6	29.2	30.8	25.6	33.7	28.1	36.7	30.9
Leq	45.20	33.60	41.70	32.90	44.80	32.90	47.10	35.60
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured

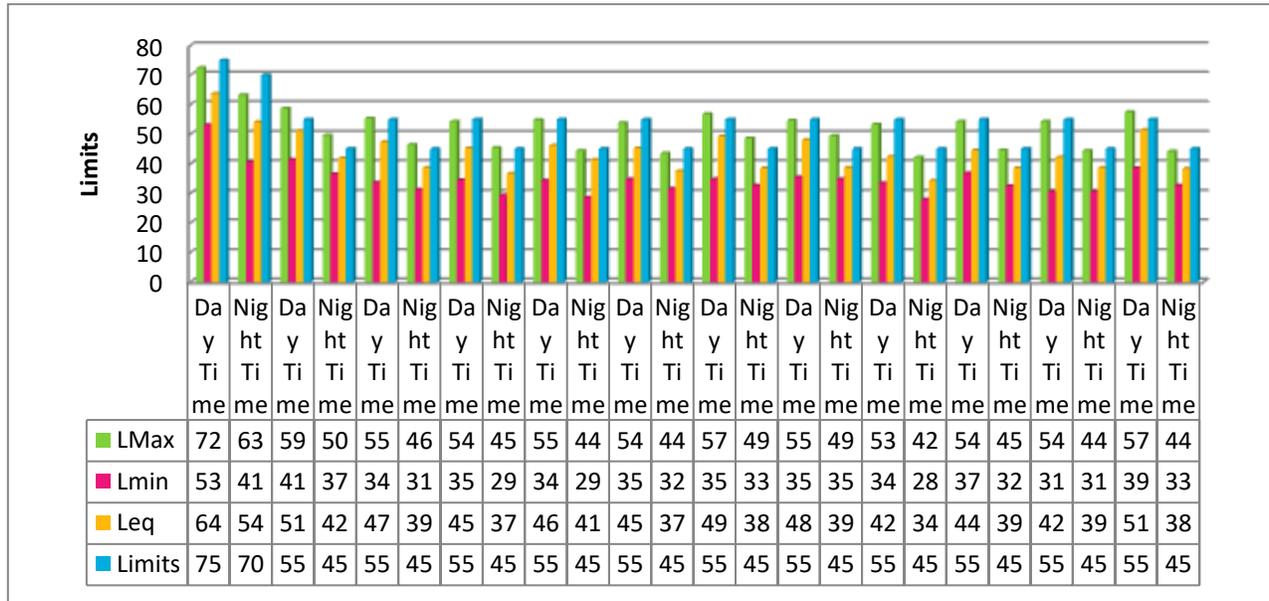


Figure 3.6 Location-wise Variation of Ambient Noise Levels (June 2022)

3.2.4 Ambient Noise Monitoring Results (September-2022)

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

The location wise ambient noise monitoring results is summarized in **Table 3.10, 3.11 & 3.12**. The location-wise variation of noise levels are graphically presented in **Figure**

Table 3.10 Ambient Noise Monitoring Results (1-4 Location)

Parameter	N1		N2		N3		N4	
	Day Time	Night Time						
Lmax	72.4	63.2	58.7	49.6	55.3	46.4	54.2	45.4
Lmin	53.1	40.5	41.3	36.5	33.6	31.2	34.5	29.3
Leq	63.66	54.16	51.14	41.82	47.33	38.56	45.24	36.68
CPCB Limit (Leq in dB(A) Industrial Limit & Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured.

Table 3.11 Ambient Noise Monitoring Results (5-8 Location)

Parameter	N5		N6		N7		N8	
	Day Time	Night Time						
Lmax	54.8	44.4	53.8	43.5	56.8	48.6	54.6	49.4
Lmin	34.3	28.5	34.7	31.6	34.7	32.5	35.4	34.8
Leq	46.27	41.26	45.18	37.42	49.25	38.41	48.03	38.66
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured.

Table 3.12 Ambient Noise Monitoring Results (9-12 Location)

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

Parameter	N9		N10		N11		N12	
	Day Time	Night Time						
Lmax	53.2	42.1	54.3	44.6	54.2	44.3	57.4	44.2
Lmin	33.5	27.8	36.8	32.4	30.5	30.5	38.5	32.5
Leq	42.26	34.26	44.45	38.52	42.18	38.63	51.35	38.27
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured

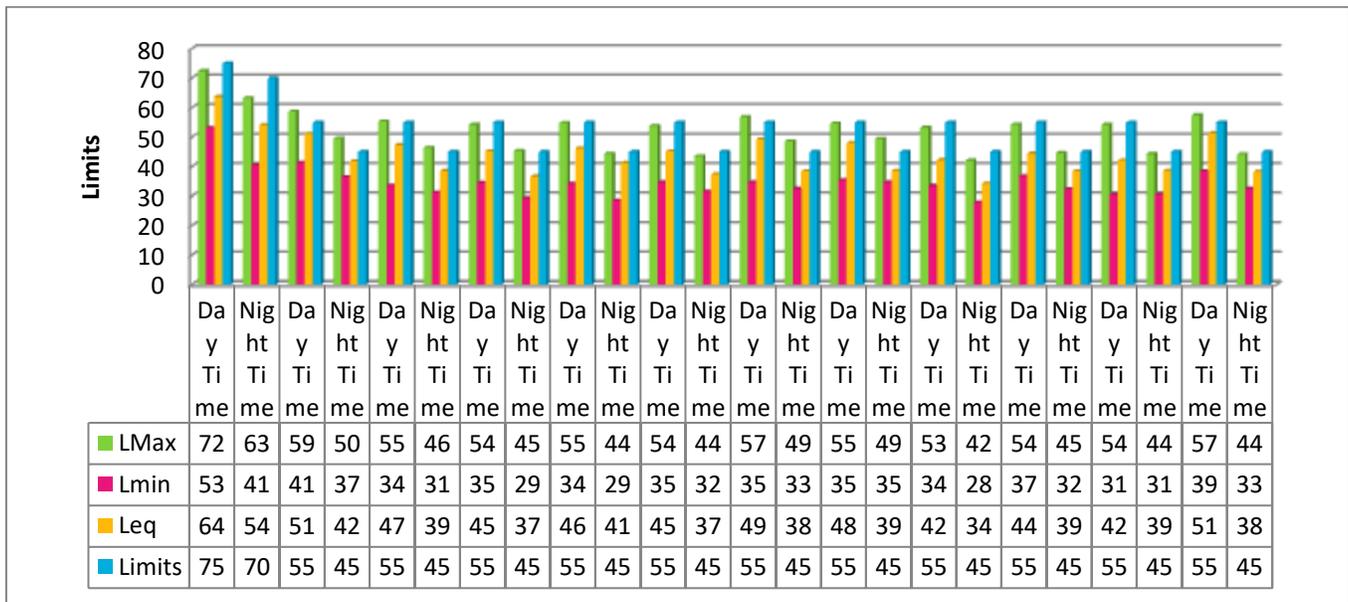


Figure 3.6 Location-wise Variation of Ambient Noise Levels (September 2022)

3.2.4 Discussion on Ambient Noise Levels in the Study Area

Day Time Noise Levels (L_{day}):

The day time noise level at all the locations were found to within limits prescribed for Industrial area i.e. 75 dB (A) and for residential are 55 dB (A).

Night Time Noise Levels (L_{night}):

The night time noise level at all the locations were found to within limit prescribed for Industrial area i.e. 70 dB (A) and for residential are 45

3.3 WATER QUALITY MONITORING

3.3.1 Ground Water Quality Monitoring Locations

Keeping in view the importance of Ground water & Surface water as an important source of water to the local population, sample of ground water & surface water was collected from the project site for the assessment of impacts of the project on the ground water quality & surface water quality.

Water sample was collected from the project site and nearby villages. The sample was analyzed for various parameters to compare with the standards for water as per IS: 10500 for water sources. The details of water sampling locations are given in **Table 3.16**

Table 3.16 Details of Water Quality Monitoring Station

S. No.	Location Code	Location Name/ Description	
		December 2021	March 2022
1.	W 1	Ground Water (Near Project Site)	Ground Water (Near Project Site)
2.	W 2	Ground Water (Jiwan Singh Wala)	Ground Water (Jiwan Singh Wala)
3.	W 3	Ground Water (Maanwala)	Ground Water (Maanwala)
4.	W 4	Ground Water (Mahi Nangal)	Ground Water (Mahi Nangal)
5.	W 5	Ground Water (Kot Kashmir)	Ground Water (Kot Kashmir)
6.	W 6	Ground Water (NasibPura)	Ground Water (NasibPura)
7.	W 7	Ground Water (Baghi Bandar)	Ground Water (Baghi Bandar)
8.	W 8	Surface Water (KotFatta)	Surface Water (KotFatta)
9.	W 9	Surface Water (Chathewala)	Surface Water (Chathewala)

3.3.2 Methodology of Groundwater & Surface water Quality Monitoring

Sampling of water was carried out on **December 2021 & March 2022**. Samples were collected as grab sample and sampling forms are filled in as per the sampling plan. The preservative sample were properly added to preserve as per standard operating procedures (SOP) and stored immediately in ice boxes, which were ensured for appropriate temperatures. Sample for chemical analysis was collected in polyethylene carboys. Sample collected for metal content were acidified to <2 pH with 1 ml HNO₃. A sample for bacteriological analysis was collected in sterilized glass bottles.

Soon after the completion of sampling, chain of custody sheets for the samples are filled in and then they were transported to laboratory for further analysis. Proper care was taken during packing and transportation of samples. All the samples reached the central laboratory within the holding times for different parameters. After ensuring the same the samples were forwarded immediately for analysis.

The samples were analyzed as per the standard procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA) and CPCB. The analytical techniques and the test methods adopted for testing of water are given in **Table 3.17-3.34**.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

3.3.3 Ground Water & Surface Water Quality Monitoring Results (June 2022)

The detailed ground water & surface water quality monitoring results are presented in **Table 3.26-3.34**

Table 3.26 Ground water Quality Monitoring Result (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.26	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	271.08	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	73.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	238.41	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	48.62	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	21.32	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	659.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	22.06	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.68	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	7.13	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.11	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.25	mg/L	5.0	15.0

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1016	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	18.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	4.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.27 Ground water Quality Monitoring Result (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.82	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	184.06	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	53.41	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	168.18	mg/L	200	600

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	36.29	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	12.34	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	396.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	10.05	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.61	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	5.23	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.04	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.27	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	613	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	15.3	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample
-----	---------	---------------	--------	-----------	--

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.28 Ground water Quality Monitoring Result (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.46	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	216.23	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	78.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	189.05	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	65.29	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	4.96	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	523.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	47.52	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.71	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	6.25	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.08	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.25	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	812	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	23.0	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	5.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.29 Ground water Quality Monitoring Result (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.51	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	192.54	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	47.36	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	179.61	mg/L	200	600

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	39.58	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	18.07	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	463.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	23.06	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.56	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	5.13	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.07	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.21	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	708	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	26.8	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample
-----	---------	---------------	--------	-----------	--

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.30 Ground water Quality Monitoring Result (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.71	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	255.39	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	78.41	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	239.85	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	66.12	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	14.52	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	635.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	47.12	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.75	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	7.58	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.10	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.36	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B, Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	978	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	19.5	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	4.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.31 Ground water Quality Monitoring Result (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.36	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 BNephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	205.63	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	69.87	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	216.52	mg/L	200	600

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	62.04	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	7.61	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	562.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	38.71	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.59	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic Method	5.62	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.08	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.37	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	865	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	21.9	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	5.2	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample
-----	---------	---------------	--------	-----------	--

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.32 Ground water Quality Monitoring Result (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.53	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 BNephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	281.36	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	87.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	298.73	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	82.37	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	15.32	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	698.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	52.04	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.81	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic	7.95	mg/L	45	No
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.09	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents as	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.42	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1074	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	29.1	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	7.6	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.33 Surface water Quality Monitoring Result (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.62	--
2.	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	15	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	None	--
6.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	49.87	mg/L
7.	Conductivity	APHA 2510 B, Conductivity Meter Method	824	µS/cm
8.	Nitrate as NO ₃	IS 3025 (P-34) Chromotropic Method	5.63	mg/L
9.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.25	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	536.00	mg/L
11.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.16	mg/L
13.	Sulphate as SO ₄	APHA 4500 ETurbidimetric Method	23.58	mg/L
14.	Fluoride as F	APHA 4500-F- D SPADNS Method	0.41	mg/L

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

15.	BOD (3 Days at 20°C)	APHA 5210 C Ultimate BOD Test	5.12	mg/L
16.	COD	APHA 5220 B Open Reflux Method	27.89	mg/L
17.	Free Ammonia as N	IS 3025 (P-34)	8.19	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	175.42	mg/L
21.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	63.25	mg/L
22.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	189.20	mg/L
23.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	6.23	mg/L
24.	Copper as Cu	APHA 3111 B, Air Acetylene Flame Method	4.19	mg/L
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	79.4	mg/L
26.	Potassium	APHA, 3500 K Flame Photometric Method	31.6	mg/L
27.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.34 Surface water Quality Monitoring Result (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.43	--
2	Colour	APHA 2120 B, Visual Comparison Method	BDL (DL 1.0)	Hazen
3	Turbidity	APHA 2130 B Nephelometric Method	18	NTU
4	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5	Taste	APHA 2160 B Threshold Test Method	None	--
6	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	65.23	mg/L
7	Conductivity	APHA 2510 B, Conductivity Meter Method	662	µS/cm
8	Nitrate as NO ₃	IS 3025 (P-34) Chromotropic Method	13.58	mg/L
9	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.23	mg/L
10	Total Dissolved Solids	APHA 2540 C Gravimetric Method	429.00	mg/L
11	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12	Boron	APHA 4500 C Carmine Method	0.18	mg/L
13	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	15.63	mg/L
14	Fluoride as F	APHA 4500-F- D SPADNS Method	0.52	mg/L
15	BOD (3 Days at 20°C)	APHA 5210 C Ultimate BOD Test	6.13	mg/L
16	COD	APHA 5220 B Open Reflux Method	26.58	mg/L

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

17	Free Ammonia as	IS 3025 (P-34)	12.05	mg/L
18	Total Coliform	IS 15185:2016	Absent	Per 100ml
19	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	168.74	mg/L
21	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	59.82	mg/L
22	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	178.54	mg/L
23	Magnesium as Mg	APHA 3500 Mg B Calculation Method	6.25	mg/L
24	Copper as Cu	APHA 3111 B, Air Acetylene Flame Method	3.12	mg/L
25	Sodium	APHA, 3500 Na B Flame Photometric Method	71.9	mg/L
26	Potassium	APHA, 3500 K Flame Photometric Method	25.4	mg/L
27	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

3.3.4 Ground Water & Surface Water Quality Monitoring Results (September 2022)

The detailed ground water & surface water quality monitoring results are presented in **Table 3.17-3.25**

Table 3.17 Ground water Quality Monitoring Result (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.32	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	296.76	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	82.26	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	269.00	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	64.20	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	22.24	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	569.00	mg/L	500	2000

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	24.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.65	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	6.11	mg/L	45	No
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.21	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents (as	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.38	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	940	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	21.9	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	2.9	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

® Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli)

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.18 Ground water Quality Monitoring Result (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.28	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	204.72	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	56.44	mg/L	75	200
8.	Alkalinity (as)	APHA 2320 B Titrimetric Method	172.21	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	49.31	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.53	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	399.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	13.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.52	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	4.26	mg/L	45	No
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.14	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents (as)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.30	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	623	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	12.6	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	1.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

©Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli)

Table 3.19 Ground water Quality Monitoring Result (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.42	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	219.26	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	80.51	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	191.07	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	67.32	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	4.48	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	526.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	49.54	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.74	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	6.28	mg/L	45	No
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.10	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents (as)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.27	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	822	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	25.0	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

© Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli)

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.20 Ground water Quality Monitoring Result (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.62	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 BNephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	173.50	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	44.33	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	184.28	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	37.59	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.28	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	448.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	27.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.58	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	4.15	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.13	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-Reduction Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as CaCO ₃)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.23	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	718	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	24.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli)

Table 3.21 Ground water Quality Monitoring Result (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.43	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	260.42	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	73.49	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	224.40	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	73.18	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	18.73	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	645	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	52.23	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.52	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	5.62	mg/L	45	No
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.21	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents (as	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.36	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	988	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	35.8	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

® Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.22 Ground water Quality Monitoring Result (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.33	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 BNephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	227.63	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	72.89	mg/L	75	200
8.	Alkalinity (as)	APHA 2320 B Titrimetric Method	232.50	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	53.10	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	11.12	mg/L	30	100
12.	Total Dissolved	APHA 2540 C Gravimetric Method	543.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	36.74	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.56	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	4.64	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.16	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.26	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	875	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	38.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	2.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

® Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli

Table 3.23 Ground water Quality Monitoring Result (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric	7.43	--	6.5 to 8.5	No
2.	Colour	APHA2120 B Visual Comparison	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	304.22	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	93.06	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	286.00	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	84.35	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.09	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	695.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	APHA 4500 E Turbidimetric Method	54.07	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.83	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic	7.98	mg/L	45	No
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.07	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	APHA 3111 D Direct Nitrous Oxide-	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents (as	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.44	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1084	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	27.3	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - This Report Complies as per IS 10500:2012 (RA: 2018)

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

*BDL-Below Detection Limit, **DL- Detection Limit. #These parameter are not covered in our NABL scope.

©Amendment No.1 in June .2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018(Limit of Boron & IS method of Total Coliform & E.Coli)

Table 3.24 Surface water Quality Monitoring Result (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.58	--
2.	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	12	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	NR	--
6.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	44.84	mg/L
7.	Conductivity	APHA 2510 B, Conductivity Meter Method	832	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34) Chromotropic Method	6.61	mg/L
9.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.28	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	540.00	mg/L
11.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.19	mg/L
13.	Sulphate(as SO ₄)	APHA 4500 ETurbidimetric Method	25.61	mg/L
14.	Fluoride (as F)	APHA 4500-F- D SPADNS Method	0.44	mg/L
15.	BOD (5 Days at 20°C)	APHA 5210 C Ultimate BOD Test	4.16	mg/L
16.	COD	APHA 5220 B Open Reflux Method	21.06	mg/L
17.	Free Ammonia (as N)	IS 3025 (P-34)	7.17	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	163.20	mg/L
21.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	60.22	mg/L
22.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	192.20	mg/L
23.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	3.15	mg/L
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	5.14	mg/L
25.	Sodium (as Na)	APHA, 3500 Na B Flame Photometric Method	43.9	mg/L
26.	Potassium (as K)	APHA, 3500 K Flame Photometric Method	2.0	mg/L
27.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.25 Surface water Quality Monitoring Result (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.62	--
2	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3	Turbidity	APHA 2130 B Nephelometric Method	10.0	NTU
4	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5	Taste	APHA 2160 B Threshold Test Method	NR	--
6	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	67.10	mg/L
7	Conductivity	APHA 2510 B, Conductivity Meter Method	698	µS/cm
8	Nitrate (as NO ₃)	IS 3025 (P-34) Chromotropic Method	12.55	mg/L
9	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.26	mg/L
10	Total Dissolved Solids	APHA 2540 C Gravimetric Method	442.00	mg/L
11	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12	Boron	APHA 4500 C Carmine Method	0.16	mg/L
13	Sulphate(as SO ₄)	APHA 4500 ETurbidimetric Method	13.60	mg/L
14	Fluoride (as F)	APHA 4500-F- D SPADNS Method	0.54	mg/L
15	BOD (5 Days at 20°C)	APHA 5210 C Ultimate BOD Test	5.16	mg/L
16	COD	APHA 5220 B Open Reflux Method	24.55	mg/L
17	Free Ammonia (as N)	IS 3025 (P-34)	10.03	mg/L
18	Total Coliform	IS 15185:2016	Absent	Per 100ml
19	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	143.00	mg/L
21	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	47.20	mg/L
22	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	172.52	mg/L
23	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	6.13	mg/L
24	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	4.16	mg/L
25	Sodium (as Na)	APHA, 3500 Na B Flame Photometric Method	54.12	mg/L
26	Potassium (as K)	APHA, 3500 K Flame Photometric Method	7.8	mg/L
27	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

3.4 SOIL MONITORING

3.4.1 Soil Monitoring Locations

The objective of the soil monitoring is to identify the impacts of ongoing project activities on soil quality and also predict impacts, which have arisen due to execution of various constructions allied activities. Accordingly, a study of assessment of the soil quality has been carried out.

To assess impacts of ongoing project activities on the soil in the area, the physico-chemical characteristics of soils were examined by obtaining soil samples from selected points and analysis of the same. Single sample of soil was collected from the project site for studying soil characteristics, the location of which is listed in **Table 3.35**.

Table 3.35 Details of Soil Quality Monitoring Location

S. No.	Location Code	Location Name/ Description	
		December 2021	March 2022
1.	S1	Near Project Site	Near Project Site
2.	S2	Jiwan Singh wala	Jiwan Singh wala
3.	S3	MaanWala	MaanWala
4.	S4	Mahi Nangal	Mahi Nangal
5.	S5	Leleana	Leleana
6.	S6	Baghi Bandar	Baghi Bandar
7.	S7	NasibPura	NasibPura
8.	S8	Kotbhara	Kotbhara
9.	S9	Kot Kashmir	Kot Kashmir
10.	S10	GehriBoghi	GehriBoghi
11.	S11	Chathewala	Chathewala
12.	S12	KotFatta	KotFatta

3.4.2 Methodology of Soil Monitoring

The sampling has been done in line with IS: 2720 & Methods of Soil Analysis, Part-1, 2nd edition, 1986 of American Society for Agronomy and Soil Science Society of America. The homogenized samples were analyzed for physical and chemical characteristics (physical, chemical and heavy metal concentrations). The soil samples were collected in the month of **December 2021 & March 2022**.

The samples have been analyzed as per the established scientific methods for physico-chemical parameters. The heavy metals have been analyzed by using Atomic Absorption Spectrophotometer.

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi
Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

3.4.3 Soil Monitoring Results (June 2022)

Single sample of soil is collected from the site to check the quality of soil of the study area .The physio-chemical characteristics of the soil, as obtained from the analysis of the soil sample, are presented in **Table 3.48-3.59**.

Table 3.48 Physico-Chemical Characteristics of Soil in the Study Area (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.53	--
2.	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	29.81	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.14	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	48.76	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	27.13	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	31.68	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	124.16	%
11.	Iron as (Fe)	USEPA 3050B	2.79	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.84	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	17.40	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	177.43	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	16.79	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.81	%
17.	Organic Carbon	USEPA 3050B	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.68	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.57	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.71	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.24	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	14.80	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.49 Physico-Chemical Characteristics of Soil in the Study Area (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.48	--
2.	Conductivity	IS:14767 by Conductivity meter	0.322	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	31.54	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.21	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	44.98	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	38.76	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	47.28	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	143.52	%
11.	Iron as (Fe)	USEPA 3050B	2.41	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.87	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	24.56	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	226.51	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.79	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.43	%
17.	Organic Carbon	USEPA 3050B	0.63	%
18.	Lead (as Pb)	USEPA 3050B	0.75	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.39	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.51	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.35	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	10.60	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.50 Physico-Chemical Characteristics of Soil in the Study Area (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.41	--
2.	Conductivity	IS:14767 by Conductivity meter	0.315	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	35.61	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.33	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	43.16	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	53.69	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.09	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	134.26	%
11.	Iron as (Fe)	USEPA 3050B	2.34	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.66	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	21.46	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.87	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.69	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	11.25	%
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.51	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.43	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.05	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.47	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.10	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.51 Physico-Chemical Characteristics of Soil in the Study Area (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.56	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	31.26	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.25	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	51.46	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	40.18	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	62.41	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	138.28	%
11.	Iron as (Fe)	USEPA 3050B	2.86	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.68	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	33.15	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	214.05	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	20.49	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.84	%
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.62	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.34	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.49	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.82	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	18.60	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.52 Physico-Chemical Characteristics of Soil in the Study Area (Leleana)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.69	--
2.	Conductivity	IS:14767 by Conductivity meter	0.352	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	29.41	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.28	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	66.87	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	47.46	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	49.75	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	162.14	%
11.	Iron as (Fe)	USEPA 3050B	2.73	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	31.58	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	245.69	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	29.87	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	10.25	%
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.87	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.75	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.22	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.53	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	19.80	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.53 Physico-Chemical Characteristics of Soil in the Study Area (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.72	--
2.	Conductivity	IS:14767 by Conductivity meter	0.312	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	40.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.19	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	52.16	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	46	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	78	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	163.08	%
11.	Iron as (Fe)	USEPA 3050B	2.39	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.81	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	38.64	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	246.52	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.13	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	11.25	%
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.67	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.77	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.46	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.53	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.39	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	17.30	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.54 Physico-Chemical Characteristics of Soil in the Study Area (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.67	--
2.	Conductivity	IS:14767 by Conductivity meter	0.343	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	43.64	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.22	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	41.39	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	61.32	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	49.67	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	118.34	%
11.	Iron as (Fe)	USEPA 3050B	3.66	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.77	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	21.04	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	242.68	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.43	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	16.63	%
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.55	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.70	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.69	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.86	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.48	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	1.60	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.55 Physico-Chemical Characteristics of Soil in the Study Area (Kotbhara)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.84	--
2.	Conductivity	IS:14767 by Conductivity meter	0.358	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	34.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.44	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	38.46	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	43.57	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.46	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	127.81	%
11.	Iron as (Fe)	USEPA 3050B	1.77	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.48	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	29.56	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	211.58	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	17.63	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.78	%
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.5	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.31	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.88	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.60	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.56 Physico-Chemical Characteristics of Soil in the Study Area (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.46	--
2.	Conductivity	IS:14767 by Conductivity meter	0.359	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	30.38	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.56	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	51.37	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	31.89	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	40.80	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	141.73	%
11.	Iron as (Fe)	USEPA 3050B	2.40	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.42	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	19.31	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	27.32	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	10.17	%
17.	Organic Carbon	USEPA 3050B	0.39	%
18.	Lead (as Pb)	USEPA 3050B	0.70	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.81	mg/kg
21.	Copper (as Cu)	USEPA 3050B	6.43	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.31	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.30	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.57 Physico-Chemical Characteristics of Soil in the Study Area (GehriBoghi)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.61	--
2.	Conductivity	IS:14767 by Conductivity meter	0.305	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty Loam	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	36.52	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.92	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	49.17	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	42.58	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.32	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	149.85	%
11.	Iron as (Fe)	USEPA 3050B	2.57	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	29.53	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	253.69	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	27.84	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	15.43	%
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.74	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.56	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.28	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.26	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	16.20	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.58 Physico-Chemical Characteristics of Soil in the Study Area (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.52	--
2.	Conductivity	IS:14767 by Conductivity meter	0.286	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty Loam	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	15.63	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.19	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	53.24	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	38.74	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	41.05	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	98.72	%
11.	Iron as (Fe)	USEPA 3050B	2.71	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.59	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	14.53	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	184.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	24.06	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.85	%
17.	Organic Carbon	USEPA 3050B	0.31	%
18.	Lead (as Pb)	USEPA 3050B	0.79	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.64	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.72	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.13	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.28	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	13.50	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.59 Physico-Chemical Characteristics of Soil in the Study Area (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767 by Conductivity meter	0.31	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01& Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	25.41	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.14	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	40.39	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	51.74	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	42.59	%
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	109.87	%
11.	Iron as (Fe)	USEPA 3050B	3.1	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.67	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	15.82	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	186.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	13.05	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.84	%
17.	Organic Carbon	USEPA 3050B	0.41	%
18.	Lead (as Pb)	USEPA 3050B	0.5	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.57	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.01	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.31	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	10.20	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

3.4.3 Soil Monitoring Results (September 2022)

Single sample of soil is collected from the site to check the quality of soil of the study area .The physio-chemical characteristics of the soil, as obtained from the analysis of the soil sample, are presented in **Table 3.36-3.47**.

Table 3.36 Physico-Chemical Characteristics of Soil in the Study Area (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.68	--
2.	Conductivity	IS:14767,2000	0.342	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	27.83	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.17	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	46.79	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	24.11	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	28.70	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	110.76	%
11.	Iron as (Fe)	USEPA 3050B	3.10	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.80	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	19.44	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	163.70	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	14.74	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	6.84	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.55	%
18.	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.59	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.68	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.29	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.30	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.83	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.37 Physico-Chemical Characteristics of Soil in the Study Area (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	6.98	--
2.	Conductivity	IS:14767,2000	0.309	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	29.56	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.19	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	42.96	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	36.74	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	45.26	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	133.66	%
11.	Iron as (Fe)	USEPA 3050B	2.61	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.78	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	19.44	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	223.54	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	16.76	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	14.04	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.68	%
18.	Lead (as Pb)	USEPA 3050B	0.71	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.62	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.35	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.33	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.37	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.58	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.38 Physico-Chemical Characteristics of Soil in the Study Area (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.33	--
2.	Conductivity	IS:14767,2000	0.319	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	37.64	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.37	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	46.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	55.71	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	36.40	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	148.76	%
11.	Iron as (Fe)	USEPA 3050B	2.24	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.69	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	23.48	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	243.78	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	14.26	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.22	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.54	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.36	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.22	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.42	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	13.77	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.39 Physico-Chemical Characteristics of Soil in the Study Area (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.42	--
2.	Conductivity	IS:14767,2000	0.339	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	30.63	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.43	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.42	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	38.16	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	60.44	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	136.26	%
11.	Iron as (Fe)	USEPA 3050B	2.84	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.66	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	30.13	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	217.02	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	23.46	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	8.87	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.64	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.37	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.47	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.85	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	16.63	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.40 Physico-Chemical Characteristics of Soil in the Study Area (Leleana)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.66	--
2.	Conductivity	IS:14767,2000	0.356	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	26.43	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.33	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	69.89	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	51.49	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	46.77	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	153.76	%
11.	Iron as (Fe)	USEPA 3050B	2.20	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.76	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	29.55	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	238.76	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	27.85	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.28	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.89	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.84	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.79	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.98	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.56	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	17.83	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.41 Physico-Chemical Characteristics of Soil in the Study Area (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.40	--
2.	Conductivity	IS:14767,2000	0.325	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	35.44	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.22	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	44.23	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	75.12	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	161.06	%
11.	Iron as (Fe)	USEPA 3050B	2.35	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.84	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	36.61	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	242.56	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	27.15	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	13.29	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.49	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.56	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.36	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	20.06	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.42 Physico-Chemical Characteristics of Soil in the Study Area (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.43	--
2.	Conductivity	IS:14767,2000	0.349	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	41.66	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.20	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	39.36	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	64.34	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	47.69	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	121.32	%
11.	Iron as (Fe)	USEPA 3050B	2.64	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.74	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	25.09	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	239.65	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	21.40	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	19.60	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.73	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.72	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.89	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.51	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	14.62	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.43 Physico-Chemical Characteristics of Soil in the Study Area (Kotbhara)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.44	--
2.	Conductivity	IS:14767,2000	0.360	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	32.10	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.46	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	36.44	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	41.59	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	53.44	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	129.83	%
11.	Iron as (Fe)	USEPA 3050B	1.79	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.45	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	31.59	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	213.56	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	19.66	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	8.76	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.33	%
18.	Lead (as Pb)	USEPA 3050B	0.55	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.66	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.3	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.33	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.86	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	14.76	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.44 Physico-Chemical Characteristics of Soil in the Study Area (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.40	--
2.	Conductivity	IS:14767,2000	0.362	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	32.40	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.59	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.39	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	33.87	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	42.83	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	144.76	%
11.	Iron as (Fe)	USEPA 3050B	2.63	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.45	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	20.36	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	222.10	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	25.30	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.15	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.65	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.83	mg/kg
21.	Copper (as Cu)	USEPA 3050B	7.45	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	17.33	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.45 Physico-Chemical Characteristics of Soil in the Study Area (GehriBoghi)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.43	--
2.	Conductivity	IS:14767,2000	0.286	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty Loam	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	33.76	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.86	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	47.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	40.55	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	54.30	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	133.68	%
11.	Iron as (Fe)	USEPA 3050B	2.46	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.72	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	27.50	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	236.76	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	25.87	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.40	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.54	%
18.	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.53	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.25	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.24	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	23.15	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.46 Physico-Chemical Characteristics of Soil in the Study Area (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767,2000	0.301	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty Loam	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	17.66	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.17	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	51.21	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	36.72	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	39.03	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	96.70	%
11.	Iron as (Fe)	USEPA 3050B	2.42	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.57	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	18.55	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	179.66	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	22.04	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	6.87	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.33	%
18.	Lead (as Pb)	USEPA 3050B	0.77	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.66	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.75	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.17	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.16	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	16.77	%

*SOP-Laboratory Standard Operating Procedure.

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

Table 3.47 Physico-Chemical Characteristics of Soil in the Study Area (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 ⁰ C)	IS : 2720 (P-26) by pH Meter	7.59	--
2.	Conductivity	IS:14767,2000	0.29	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	23.38	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.11	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	43.36	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	53.76	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	40.57	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	123.16	%
11.	Iron as (Fe)	USEPA 3050B	2.40	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.64	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	17.84	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	173.18	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	11.02	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.44	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.44	%
18.	Lead (as Pb)	USEPA 3050B	0.64	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.70	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.59	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.66	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.44	%

*SOP-Laboratory Standard Operating Procedure.

3.4.5 Discussion on Soil Characteristics in the Study Area

The soil in study area is characterized by moderate organic content. The soil quality in the project area has not been affected by the project activities.

3.5 Site Photographs



**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



Ambient Noise Monitoring



Ambient Air Monitoring

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



Soil Sampling





PUNJAB POLLUTION CONTROL BOARD

Zonal Office, Power House Road, Street No. 12, Bathinda.

Website:- www.ppcb.gov.in

Office Dispatch No :

Registered/Speed Post

Date:

Industry Registration ID: R19BTI356560

Application No : 14320137

To,

Shri Sanjay Kumar
Hindustan Petroleum Corporation Limited, 6th Floor, Core-ii North Tower, Scope Minar, Laxmi Nagar
Delhi, Delhi-110092

Subject: Grant of "Consent to Establish"(NOC) for an industrial unit u/s 25 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981.

With reference to your application for obtaining fresh 'Consent to Establish'(NOC) an industrial plant u/s 25 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981, you are, hereby, permitted to establish the industrial unit to discharge the effluent(s) & emission(s) arising out of your premises subject to the Terms and Conditions as specified in this Certificate.

1. Particulars of Consent to Establish (NOC) granted to the Industry

Certificate No.	CTE/Fresh/BTI/2021/14320137
Date of issue :	04/01/2021
Date of expiry :	31/12/2021
Certificate Type :	Fresh

2. Particulars of the Industry

Name & Designation of the Applicant	Sanjay Kumar, (Cheif Manager Bio Fuels)
Address of Industrial premises	Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda-151001
Capital Investment of the Industry	109625.0 lakhs
Category of Industry	Red
Type of Industry	1060-Distillery (molasses / grain / yeast based)
Scale of the Industry	Large
Office District	Bathinda
Consent Fee Details	Rs. 10,80,000/- vide R.No. 362293229 dt. 14.12.2020.
Raw Materials (Name with quantity per day)	<ul style="list-style-type: none">• Bio-mass @ 500 TPD.• Yeast @ .05 TPD• Acid @ 10 TPD• Enzymes @ 3.5 TPD• Nutrients @ 4 TPD• Chemicals @ 23 TPD

"This is computer generated document from OCMMS by PPCB"

Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda, 151001

Page1

Products (Name with quantity per day)	<i>Ethanol @ 100 KLD</i>
By-Products, if any,(Name with quantity per day)	<ul style="list-style-type: none"> • <i>CO2 @ 75 TPD.</i> • <i>Fuel Oil @ 0.3 TPD.</i> • <i>Technical Alcohol @ 2.0 TPD.</i> • <i>Ash @ 125 TPD.</i>
Details of the machinery and processes	<i>2G ethanol generation from lingo-cellulosic biomass</i>
Details of the Effluent Treatment Plant	<ul style="list-style-type: none"> • <i>Stream I – Trade Effluent @ 512 KLD to be generated from boiler blow down, DM plant and cooling tower blow down will be treated through reverse osmosis followed by MEE treatment. The treated effluent will be utilized as cooling tower makeup water.</i> • <i>Stream II – Effluent generated from process condensate is proposed to be treated through anaerobic followed by aerobic biological process and thereafter the effluent will be utilized as utility makeup water.</i> • <i>Domestic Effluent @ 10 KLD to be treated in the sewage treatment plant based on MBR technology.</i>
Mode of Disposal of Effluent	<ul style="list-style-type: none"> • <i>Trade Effluent – It has been proposed to achieve Zero Liquid discharge.</i> • <i>Domestic Effluent @ 10 KLD – discharged onto land for plantation after treatment in the STP.</i>
Standards to be achieved under Water (Prevention & Control of Pollution) Act, 1974	<i>As prescribed by the PPCB/CPCB/MOEF.</i>
Sources of emissions and type of pollutants	<ul style="list-style-type: none"> • <i>Two boilers of capacity 42 TPH each has been proposed.</i> • <i>Two DG sets of capacity 2000 KVA each has been proposed.</i>
Mode of disposal of emissions with stack height	<ul style="list-style-type: none"> • <i>Separate stacks of adequate height have been proposed with boiler furnaces.</i> • <i>Separate stacks of adequate height have been proposed with DG sets.</i>
Quantity of fuel required in TPD	<ul style="list-style-type: none"> • <i>Paddy Straw / Wet Cake as fuel proposed to be used in both the boilers of capacity 42 TPH each.</i> • <i>HSD for DG sets.</i>
Type of Air Pollution Control Devices to be installed	<ul style="list-style-type: none"> • <i>Separate Electrostatic Precipitators (ESP) as APCD with both the boilers of capacity 42 TPH each.</i> • <i>Separate Canopies with both the DG sets of capacity 2000 KVA each.</i>
Standards to be achieved under Air (Prevention & Control of Pollution) Act, 1981	<i>As prescribed by the PPCB/CPCB/MOEF.</i>



04/01/2021

"This is computer generated document from OCMMS by PPCB"

Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda, 151001

Page2

(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)

Endst. No.:

Dated:

A copy of the above is forwarded to the following for information and necessary action please:

Environmental Engineer, Punjab Pollution Control Board, Regional Office, Bathinda.



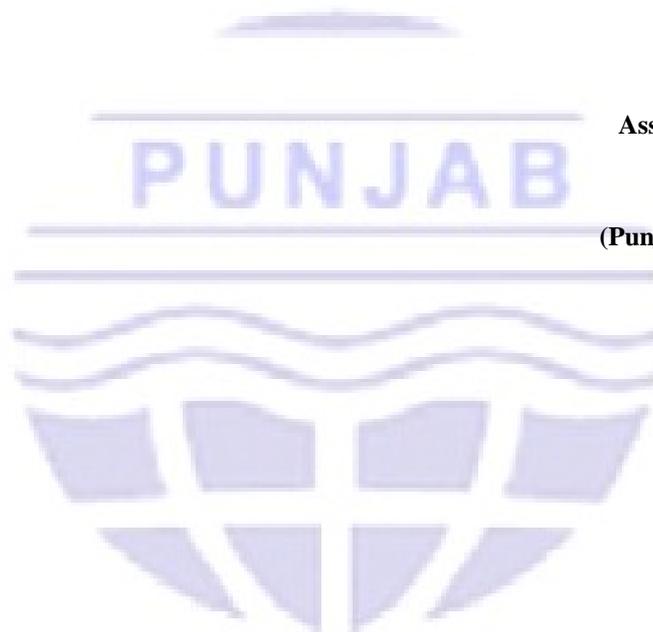
04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)



A. GENERAL CONDITIONS

1. The industry shall apply for consent of the Board as required under the provision of Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Pollution) Act, 1981 & Authorization under Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016, two months before the commissioning of the industry.
2. The industry shall provide adequate arrangements for fighting the accidental leakages/ discharge of any air pollutant/gas/liquids from the vessels, mechanical equipments etc. which are likely to cause environmental pollution.
3. The Industry shall apply for further extension in the validity of the CTE atleast two months before the expiry of this CTE, if applicable.
4. The industry shall comply with any other conditions laid down or directions issued by the Board under the provisions of the Water (Prevention & Control of Pollution) Act, 1974 and the Air (Prevention & Control of Pollution) Act,1981 from time to time.
5. The project has been approved by the Board from pollution angle and the industry shall obtain the approval of site from other concerned departments, if need be.
6. The industry shall get its building plans approved under the provisions of section 3-A of Punjab Factory Rules, 1952.
7. The industry shall put up display board indicating the Environment data in the prescribed format at the main entrance gate.
8. The industry shall provide port-holes, platforms and/or other necessary facilities as may be required for collecting samples of emissions from any chimney, flue or duct or any other outlets.

Specifications of the port-holes shall be as under:-

- i) The sampling ports shall be provided atleast 8 times chimney diameter downstream and 2 times upstream from the flow disturbance. For a rectangular cross section the equivalent diameter (D_e) shall be calculated from the following equation to determine upstream, downstream distance:-
$$D_e = 2 LW / (L+W)$$

Where L= length in mts. W= Width in mts.
 - ii) The sampling port shall be 7 to 10 cm in diameter
9. The industry shall discharge all gases through a stack of minimum height as specified in the following standards laid down by the Board.

(i) Stack height for boiler plants

S.NO.	Boiler with Steam Generating Capacity	Stack heights
1.	Less than 2 ton/hr.	9 meters or 2.5 times the height of neighboring building which ever is more
2.	More than 2 ton/hr. to 5 ton/hr.	12 meters
3.	More than 5 ton/hr. to 10 ton/hr	15 meters
4.	More than 10 ton/hr. to 15 ton/hr	18 meters
5.	More than 15 ton/hr. to 20 ton/hr	21 meters
6.	More than 20 ton/hr. to 25 ton/hr.	24 meters
7.	More than 25 ton/hr. to 30 ton/hr.	27 meters
8.	More than 30 ton/hr.	30 meters or using the formula $H = 14 Q_g^{0.3}$ or $H = 74 (Q_p)^{0.24}$ Where Q_g = Quantity of SO ₂ in Kg/hr. Q_p = Quantity of particulate matter in Ton/day.

Note : Minimum Stack height in all cases shall be 9.0 mtr. or as calculated from relevant formula whichever is more.

(ii) For industrial furnaces and kilns, the criteria for selection of stack height would be based on fuel used for the corresponding steam generation.

(iii) Stack height for diesel generating sets:

Capacity of diesel generating set	Height of the Stack	
0-50 KVA	Height of the building	+ 1.5 mt
50-100 KVA	-do-	+ 2.0 mt.
100-150 KVA	-do-	+ 2.5 mt.
150-200 KVA	-do-	+ 3.0 mt.
200-250 KVA	-do-	+ 3.5 mt.
250-300 KVA	-do-	+ 3.5 mt.

For higher KVA rating stack height H (in meter) shall be worked out according to the formula:

$$H = h + 0.2 (KVA)^{0.5}$$

where h = height of the building in meters where the generator set is installed.

10. The industry shall put up canopy on its DG sets and also provide stack of adequate height as per norms prescribed by the Board and shall ensure the compliance of instructions issued by the Board vide office order no. Admin./SA-2/F.No.783/2011/448 dated 8/6/2010.
11. The industry shall put up canopy on its DG sets and also provide stack of adequate height as per norms prescribed by the Board and shall ensure the compliance of instructions issued by the Board vide office order no. Admin./SA-2/F.No.783/2011/448 dated 8/6/2010.
 - (i) Once in Year for Small Scale Industries.
 - (ii) Four in a Year for Large/Medium Scale Industries.
 - (iii) The industry will submit monthly reading/ data of the separate energy meter installed for running of effluent treatment plant/re-circulation system to the concerned Regional Office of the Board by the 5th of the following month.
12. The industry shall provide flow meters at the source of water supply, at the outlet of effluent treatment plant and shall maintain the record of the daily reading and submit the same to the concerned Regional Office by the 5th day of the following month.
13. The industry shall make necessary arrangements for the monitoring of stack emissions and shall get its emissions analyzed from lab approved / authorized by the Board:-
 - (i) Once in Year for Small Scale Industries.
 - (ii) Twice/thrice/four time in a Year for Large/Medium Scale Industries.
14. The pollution control devices shall be interlocked with the manufacturing process of the industry.
15. The Board reserves the right to revoke this "consent to establish" (NOC) at any time, in case the industry is found violating any of the conditions of this "consent to establish" and/or the provisions of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 as amended from time to time.
16. The industry shall plant minimum of three suitable varieties of trees at the density of not less than 1000 trees per acre along the boundary of the industrial premises.
17. The issuance of this consent does not convey any property right in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or Local Laws or Regulations.
18. The consent does not authorize or approve the construction of any physical structures or facilities for undertaking of any work in any natural watercourse.
19. Nothing in this NOC shall be deemed to neither preclude the institution of any legal action nor relieve the applicant from any responsibilities, liabilities or penalties to which the applicant is or may be subjected under this or any other Act.
20. The diversion or bye pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this consent is prohibited except.
 - (i) Where unavoidable to prevent loss of life or some property damage or
 - (ii) Where excessive storm drainage or run off would damage facilities necessary for compliance with terms and conditions of this consent. The applicant shall immediately notify the consent issuing authority in writing of each such diversion or bye-pass.
21. The industry shall ensure that no water pollution problem is created in the area due to discharge of effluents from its industrial premises.

"This is computer generated document from OCMMS by PPCB"

Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda, 151001

22. The industry shall comply with the conditions imposed if any by the SEIAA/MOEF in the Environmental Clearance granted to it as required under EIA notification dated 14/9/06, if applicable.
23. The industry shall earmark a land within their premises for disposal of boiler ash in an environmentally sound manner, and / or the industry shall make necessary arrangements for proper disposal of fuel ash in a scientific manner and shall maintain proper record for the same, if applicable.
24. The industry shall obtain and submit Insurance cover as required under the Public Liability Insurance Act, 1991.
25. The industry shall submit a site emergency plan approved by the Chief Inspector of Factories, Punjab as applicable.
26. The industry shall provide proper and adequate air pollution control arrangements for control emission from its coal/fuel handling area, if applicable.
27. The Industry shall comply with the code of practice as notified by the Government / Board for the type of Industries where the siting guidelines / code of practice have been notified
28. Solids, sludge, filter backwash or other pollutant removed from or resulting from treatment or control of waste waters shall be disposed off in such a manner so as to prevent any pollutants from such materials from entering into natural water.
29. The industry shall submit a detailed plan showing therein, the distribution system for conveying waste-waters for application on land for irrigation along with the crop pattern to be adopted throughout the year.
30. The industry shall not irrigate the vegetable crops with the treated effluents which are used/ consumed as raw.
31. The industry shall ensure that its production capacity & quantity of trade effluent do not exceed the quantity mentioned in the NOC and shall not carry out any expansion without the prior permission/NOC of the Board.
32. All amendments/revisions made by the Board in the emission/stack height standards shall be applicable to the industry from the date of such amendments/revisions.
33. The industry shall not cause any nuisance/traffic hazard in vicinity of the area.
34. The industry shall maintain the following record to the satisfaction of the Board :-
 - (i) Log books for running of air pollution control devices or pumps/motors used for it.
 - (ii) Register showing the result of various tests conducted by the industry for monitoring of stack emissions and ambient air.
 - (iii) Register showing the stock of absorbents and other chemicals to be used for scrubbers.
35. The industry shall ensure that there will not be significant visible dust emissions beyond the property line.
36. The industry shall establish sufficient number of piezometer wells in consultation with the concerned Regional Office, of the Board to monitor the impact on the Ground Water Quantity due to the industrial operations, if applicable.
37. The industry shall provide adequate and appropriate air pollution control devices to contain emissions from handling, transportation and processing of raw material & product of the industry



04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer
For & on behalf
of
(Punjab Pollution Control Board)

"This is computer generated document from OCMMS by PPCB"

Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda, 151001

Page6

B. SPECIAL CONDITIONS

1. The industry shall comply with the conditions of the Environmental Clearance granted to it from MoEF vide F.No. J-11011/221/2017-IA II (I) dated 14.08.2018 & further amendment issued vide letter dated 23.09.2020.
2. The industry will ensure to achieve zero liquid discharge and it shall be further ensured that no waste / treated water is discharged, without prior permission of the Board.
3. The industry shall develop thick green belt all along the boundary wall covering 33% of the total project area as per the karnal technology in compliance to the conditions of the Environmental Clearance.
4. The industry shall manage and transport the fuel ash to be generated from its boilers in a scientific manner.
5. The industry will install pollution control devices as proposed simultaneously with the commissioning of the main project.



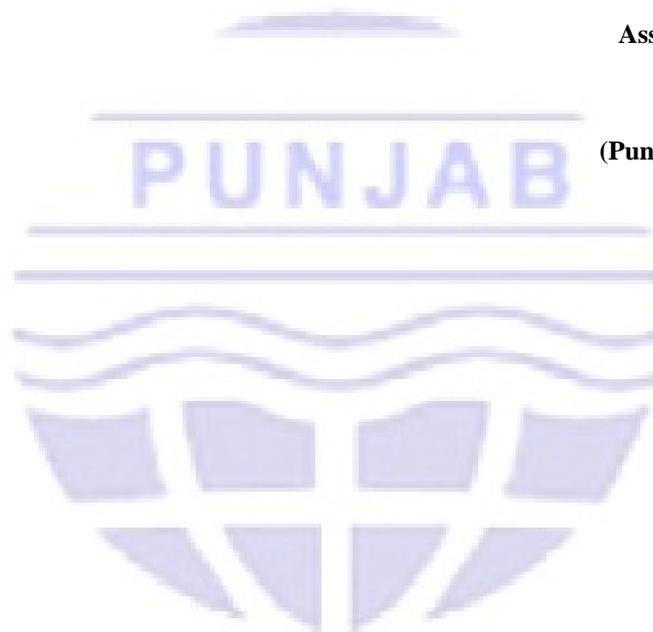
04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'45.69" N
Longitude: 75°01'00.81" E

Report No.: VEL/AA/2206/11/001
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Near Project Site
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/07 & VEL/FPS/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 12:00 PM to 12:00 PM
Ambient Temperature (°C) : Min. 30.0°C. Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^{at} Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	47.23	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) , Gravimetric Method	86.29	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	17.65	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	7.41	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.63	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP,SP-207,Issue No.01 & Based on CPCB Guidelines	10.15	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22). Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	18.56	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22). Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17). 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII. [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviro.net, bd@vardanenviro.net



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°07'91.97" N
Longitude: 75°00'20.12" E

Report No.: VEL/AA/2206/11/002
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Nasibpura
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/08 & VEL/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 12:15 PM to 12:15 PM
Ambient Temperature (°C) : Min. 30.0°C. Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

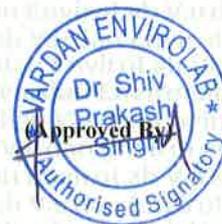
TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^{at} Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	51.47	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) . Gravimetric Method	81.23	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) .Jacob & Hochheiser	23.58	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) .Modified West and Gaeke	9.74	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.71	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP,SP-207,Issue No.01 & Based on CPCB Guidelines	7.56	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	18.76	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit. **DL- Detection Limit

ANIL
(Checked By)
ANIL INDOLIA
Sr. Analyst



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°10'19.14" N
Longitude: 75°00'71.02" E

Report No.: VEL/AA/2206/11/003
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Kashmir
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/09 & VEL/FPS/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 12:30 PM to 12:30 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [@] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01. Section No. SP 63	41.69	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) , Gravimetic Method	79.84	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	16.58	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	7.05	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.68	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP,SP-207.Issue No.01 & Based on CPCB Guidelines	8.42	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	20.43	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII. [Rule 3 (3B)], [Part-II-sec -3(i)] 18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°09'85.19" N
Longitude: 75°07'07.17" E

Report No.: VEL/AA/2206/11/004
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kotbhara
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/10 & VEL/FPS/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 12:45 PM to 12:45 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [@] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	52.46	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) , Gravimetic Method	88.74	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	23.05	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	8.76	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.89	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP,SP-207,Issue No.01 & Based on CPCB Guidelines	11.08	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	25.16	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvirolab.com, bd@vardanenvirolab.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°11'08.66" N
Longitude: 75°08'46.58" E

Report No.: VEL/AA/2206/11/005
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Fatta
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/07 & VEL/FPS/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 12:00 PM to 12:00 PM
Ambient Temperature (°C) : Min. 30.0°C. Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	44.29	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) , Gravimetric Method	80.47	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	21.54	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	9.37	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.83	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP.SP-207.Issue No.01 & Based on CPCB Guidelines	7.21	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	18.79	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :- @ NAAQS – National Ambient Air Quality Standards; Schedule-VII. [Rule 3 (3B)], [Part-II-sec -3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvirolab.com, bd@vardanenvirolab.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'29.86" N
Longitude: 75°06'60.43" E

Report No.: VEL/AA/2206/11/006
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Chathewala
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/08 & VEL/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 12:15 PM to 12:15 PM
Ambient Temperature (°C) : Min. 30.0°C. Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [@] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	53.24	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	86.42	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	15.09	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	7.69	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.75	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP, SP-207, Issue No.01 & Based on CPCB Guidelines	8.46	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	22.09	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :- @ NAAQS – National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)] 18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit. **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviro.net, bd@vardanenviro.net



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°03'74.49" N
Longitude: 74°95'03.56" E

Report No.: VEL/AA/2206/11/007
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Maanwala
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/09 & VEL/FPS/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 12:30 PM to 12:30 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	50.26	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	84.19	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	25.74	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	8.46	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.82	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP.SP-207.Issue No.01 & Based on CPCB Guidelines	9.87	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	22.04	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :- @ NAAQS – National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°02'56.54" N
Longitude: 75°06'43.21" E

Report No.: VEL/AA/2206/11/008
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : **Baghi Bandar**
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/10 & VEL/FPS/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : **08/06/2022 to 09/06/2022**
Time of Monitoring : 12:45 PM to 12:45 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

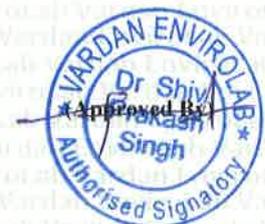
S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	42.15	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	79.54	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	19.05	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	8.81	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.80	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP, SP-207, Issue No.01 & Based on CPCB Guidelines	9.43	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	19.85	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :- (a) NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)] 18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°02'11.32" N
Longitude: 75°01'53.33" E

Report No.: VEL/AA/2206/11/009
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Mahi Nangal
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/07 & VEL/FPS/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 12:00 PM to 12:00 PM
Ambient Temperature (°C) : Min. 30.0°C. Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	53.84	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	87.26	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	21.41	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	9.84	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.69	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP.SP-207.Issue No.01 & Based on CPCB Guidelines	8.14	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	19.82	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(**DL 0.2)	ppm(v/v)	--

Note :- (a) NAAQS – National Ambient Air Quality Standards: Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)]18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit. **DL- Detection Limit

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'67.90" N
Longitude: 75°03'50.95" E

Report No.: VEL/AA/2206/11/010
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Jiwan Singh Wala
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/08 & VEL/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 12:15 PM to 12:15 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

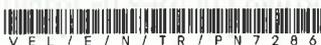
TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	48.41	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	82.74	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	19.48	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	9.53	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.79	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP, SP-207, Issue No.01 & Based on CPCB Guidelines	8.10	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	22.04	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :- @ NAAQS – National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 29°99'04.45" N
Longitude: 75°01'90.13" E

Report No.: VEL/AA/2206/11/011
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Leleana
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/09 & VEL/FPS/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 12:30 PM to 12:30 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	43.29	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23), Gravimetric Method	82.41	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	24.63	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	8.46	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.81	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP, SP-207, Issue No.01 & Based on CPCB Guidelines	9.54	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9), Colorimetric Method	19.21	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :- (a) NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)] 18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BDL- Below Detection Limit. **DL- Detection Limit

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/12
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°11'09.27" N
Longitude: 74°96'10.78" E

Report No.: VEL/AA/2206/11/012
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Period of Analysis: 11/06/2022 to 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Gehri Boghi
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/10 & VEL/FPS/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 12:45 PM to 12:45 PM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^{aa} Limit
1.	Particulate Matter (as PM _{2.5})	SOP No. VEL/SOP/01, Section No. SP 63	45.26	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P 23) , Gravimetic Method	84.10	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	19.85	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	10.25	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.79	mg/m ³	4
6.	Ammonia (as NH ₃)	SOP,SP-207.Issue No.01 & Based on CPCB Guidelines	9.26	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11)	*BDL (**DL 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12)	*BDL (**DL 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9),Colorimetric Method	20.14	µg/m ³	180
11.	Arsenic (as As)	IS 5182 (P-22)	*BDL (**DL 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Air Acetylene Method	*BDL (**DL 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	*BDL (**DL 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL (**DL 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec -3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure *BDL- Below Detection Limit, **DL- Detection Limit

(Checked By)
ANJU INDRIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/001
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Near Project Site
Latitude: 30°05'45.69" N
Longitude: 75°01'00.81" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	70.6	61.7	dB(A)
2.	L _{min}	IS 9989	51.2	42.3	dB(A)
3.	L _{eq}	IS 9989	62.40	52.90	dB(A)
4.	CPCB Limits in dB(A) Leq (Industrial Area)	-	75.00	70.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/002
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Nasibpura
Latitude: 30°07'91.97" N
Longitude: 75°00'20.12" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	62.5	47.5	dB(A)
2.	L _{min}	IS 9989	40.1	33.6	dB(A)
3.	L _{eq}	IS 9989	49.50	39.40	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/003
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Kashmir
Latitude: 30°10'19.14" N
Longitude: 75°00'71.02" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 07/06/2022 to 08/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	57.4	46.1	dB(A)
2.	L _{min}	IS 9989	34.9	29.5	dB(A)
3.	L _{eq}	IS 9989	45.60	36.80	dB(A)
4.	CPCB Limits in dB(A) [*] Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)

ANJU INDOLIA
Sr. Analyst

(Approved By)

Dr. Shiyu Prakash Singh

Authorised Signatory



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/AN/04	Report No.:	VEL/AN/2206/11/004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	15/06/2022
		Receipt Date:	11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Kotbhara
Latitude:	30°09'85.19" N
Longitude:	75°07'07.17" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/10
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 07/06/2022 to 08/06/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 30.0°C, Max. 41.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	55.1	44.2	dB(A)
2.	L _{min}	IS 9989	32.8	27.8	dB(A)
3.	L _{eq}	IS 9989	43.60	34.90	dB(A)
4.	CPCB Limits in dB(A) [*] Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/05 **Report No.:** VEL/AN/2206/11/005
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab **Format No.:** 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

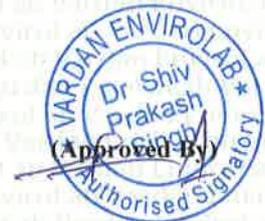
Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Fatta
Latitude: 30°11'08.66" N
Longitude: 75°08'46.58" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	54.2	45.3	dB(A)
2.	L _{min}	IS 9989	32.6	27.7	dB(A)
3.	L _{eq}	IS 9989	43.10	39.40	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/006
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Chathewala
Latitude: 30°05'29.86" N
Longitude: 75°06'60.43" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	54.2	41.7	dB(A)
2.	L _{min}	IS 9989	35.3	30.8	dB(A)
3.	L _{eq}	IS 9989	42.50	35.70	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/007
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Maanwala
Latitude: 30°03'74.49" N
Longitude: 74°95'03.56" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 08/06/2022 to 09/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	57.2	50.3	dB(A)
2.	L _{min}	IS 9989	35.1	31.6	dB(A)
3.	L _{eq}	IS 9989	46.70	35.20	dB(A)
4.	CPCB Limits in dB(A) [*] Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOJIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/AN/08	Report No.:	VEL/AN/2206/11/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	15/06/2022
		Receipt Date:	11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

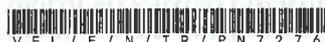
Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Baghi Bandar
Latitude:	30°02'56.54" N
Longitude:	75°06'43.21" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/10
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 08/06/2022 to 09/06/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 30.0°C, Max. 41.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	56.3	51.7	dB(A)
2.	L _{min}	IS 9989	33.9	31.0	dB(A)
3.	L _{eq}	IS 9989	44.20	37.30	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
Anju Indolia
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/09 Report No.: VEL/AN/2206/11/009
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Mahi Nangal
Latitude: 30°02'11.32" N
Longitude: 75°01'53.33" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	55.2	43.7	dB(A)
2.	L _{min}	IS 9989	34.6	29.2	dB(A)
3.	L _{eq}	IS 9989	45.20	33.60	dB(A)
4.	CPCB Limits in dB(A) ¹ Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/010
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Jiwan Singh Wala
Latitude: 30°05'67.90" N
Longitude: 75°03'50.95" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	51.7	39.8	dB(A)
2.	L _{min}	IS 9989	30.8	25.6	dB(A)
3.	L _{eq}	IS 9989	41.70	32.90	dB(A)
4.	CPCB Limits in dB(A) [*] Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/011
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Leleana
Latitude: 29°99'04.45" N
Longitude: 75°01'90.13" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

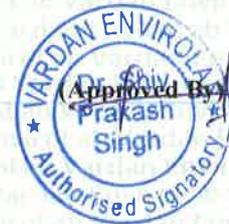
TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	54.6	42.6	dB(A)
2.	L _{min}	IS 9989	33.7	28.1	dB(A)
3.	L _{eq}	IS 9989	44.80	32.90	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)

ANJUL INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/12
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2206/11/012
Format No.: 7.8 F-01
Party Reference No.: NIL
Reporting Date: 15/06/2022
Receipt Date: 11/06/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Gehri Boghi
Latitude: 30°11'09.27" N
Longitude: 74°96'10.78" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/06/2022 to 10/06/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 30.0°C, Max. 41.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	59.5	45.3	dB(A)
2.	L _{min}	IS 9989	36.7	30.9	dB(A)
3.	L _{eq}	IS 9989	47.10	35.60	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

(Checked By)

AN.IJ INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvirolab.com, bd@vardanenvirolab.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/01	Report No.:	VEL/W/2206/11/001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'45.69" N	Party Reference No.:	NIL
Longitude:	75°01'00.81" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Near Project Site	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.26	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	271.08	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	73.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	238.41	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	48.62	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	21.32	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	659.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	22.06	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.68	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic Method	7.13	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.11	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)
ANJU KHOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/01					Report No.: VEL/W/2206/11/001	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428. IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.25	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B.Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1016	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	18.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	4.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

(Checked By)
ANUSINDOLIA
Sr. Analyst

P. Kumar
15/06/2022

RAVI KUMAR
Microbiologist

VARDAN ENVIROLAB
Mohammad Shafi
Technical Manager
Authorized Signatory

Keef
15.06.2022

VARDAN ENVIROLAB
Dr Shiv
Singh
Authorized Signatory



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

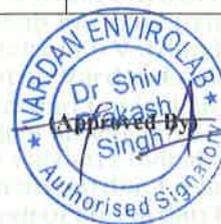
Test Report

Sample Number:	VEL/HPCL/W/02	Report No.:	VEL/W/2206/11/002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°07'91.97" N	Party Reference No.:	NIL
Longitude:	75°00'20.12" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Nasibpura	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.36	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	205.63	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	69.87	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	216.52	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	62.04	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	7.61	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	562.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	38.71	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.59	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34). Chromotropic Method	5.62	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1.10 Phenanthroline Method	0.08	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/02					Report No.: VEL/W/2206/11/002	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.37	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B.Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	865	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	21.9	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	5.2	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil)

(Checked By)
ANJU INDOLIA
Sr. Analyst

Prom on
15/06/2022

RAVI KUMAR
Microbiologist



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/03	Report No.:	VEL/W/2206/11/003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°10'19.14" N	Party Reference No.:	NIL
Longitude:	75°00'71.02" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Kot Kashmir	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.71	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	255.39	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	78.41	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	239.85	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	66.12	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	14.52	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	635.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	47.12	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.75	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34). Chromotropic Method	7.58	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.10	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/03					Report No.: VEL/W/2206/11/003	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.36	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	978	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	19.5	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	4.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

(Checked By)

ANJU INDORIA
Sr. Analyst

RAVI KUMAR
Microbiologist

(Approved By)

Dr. Shiv Prakash Singh
Authorised Signatory

Mohammad Shauq
Technical Manager
Authorised Signatory



VEL/E/N/TR/PN7301

www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

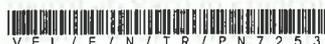
Test Report

Sample Number:	VEL/HPCL/W/04	Report No.:	VEL/W/2206/11/004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°02'56.54" N	Party Reference No.:	NIL
Longitude:	75°06'43.21" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Baghi Bandar	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.53	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	281.36	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	87.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	298.73	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	82.37	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	15.32	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	698.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	52.04	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.81	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic Method	7.95	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.09	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

ADH
(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/04					Report No.: VEL/W/2206/11/004	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.42	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B.Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1074	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	29.1	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	7.6	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No 1 in June 2015 (Limits of Iron & Arsenic) and Amendment No 2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No 3 in Feb. 2021 (Limit of Mineral Oil).

(Checked By)

ANJU INDORIA
Sr. Analyst

15/06/2022
RAVI KUMAR
Microbiologist



VEL/E/N/TR/PN7300

www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/05	Report No.:	VEL/W/2206/12/005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°3'74.49" N	Party Reference No.:	NIL
Longitude:	75°9'53.56" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Maanwala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.46	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	216.23	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	78.49	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	189.05	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	65.29	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	4.96	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	523.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	47.52	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.71	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic Method	6.25	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.08	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvirolab.com, bd@vardanenvirolab.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/05					Report No.: VEL/W/2206/11/005	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.25	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	812	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	23.0	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	5.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

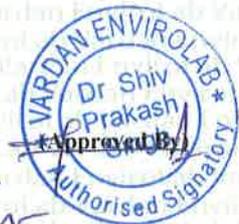
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

(Checked By)
ANJU INDORIA
Sr. Analyst

15/06/2022

RAVI KUMAR
Microbiologist



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

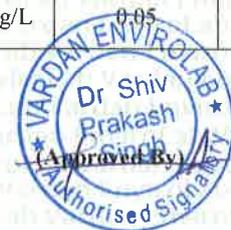
Test Report

Sample Number:	VEL/HPCL/W/06	Report No.:	VEL/W/2206/11/006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°2'11.32" N	Party Reference No.:	NIL
Longitude:	75°1'53.33" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Mahi Nangal	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.51	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	192.54	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	47.36	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	179.61	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	39.58	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	18.07	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	463.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	23.06	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.56	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34), Chromotropic Method	5.13	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1.10 Phenanthroline Method	0.07	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)
ANJU INDIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/06					Report No.: VEL/W/2206/11/006	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.21	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	708	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	26.8	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

*Amendment No 1 in June 2015 (Limits of Iron & Arsenic) and Amendment No 2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No 3 in Feb. 2021 (Limit of Mineral Oil)

(Checked By)

ANJLI INDOIA
Sr. Analyst

Ravi Kumar
15/06/2022
RAVI KUMAR
Microbiologist



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/07	Report No.:	VEL/W/2206/11/007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'67.90" N	Party Reference No.:	NIL
Longitude:	75°03'50.95" E	Reporting Date:	15/06/2022
Sample Description:	Ground Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Jiwan Singh Wala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.82	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	184.06	mg/L	200	600
7.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	53.41	mg/L	75	200
8.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	168.18	mg/L	200	600
9.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	36.29	mg/L	250	1000
10.	Cyanide as CN	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	12.34	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	396.00	mg/L	500	2000
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	10.05	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D SPADNS Method	0.61	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34). Chromotropic Method	5.23	mg/L	45	No Relaxation
16.	Iron as Fe	APHA 3500 Fe B 1.10 Phenanthroline Method	0.04	mg/L	1.0	No Relaxation
17.	Aluminium as Al	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/07					Report No.: VEL/W/2206/11/007	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	APHA 3111B Air Acetylene Method	0.27	mg/L	5.0	15.0
24.	Copper as Cu	APHA 3111 B.Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	613	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	15.3	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note:- This Report Complies as per IS: 10500:2012 (RA: 2018)

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

"Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil)

(Checked By)
ANJU KIDOLIA
Sr. Analyst

Ravi Kumar
12/06/2022
RAVI KUMAR
Microbiologist

(Approved By)
Prakash Singh
Authorized Signatory
Mohammed Shariq
Technical Manager
12/06/2022



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/08	Report No.:	VEL/W/2206/11/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'29.86" N	Party Reference No.:	NIL
Longitude:	75°06'60.43" E	Reporting Date:	15/06/2022
Sample Description:	Surface Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Chathewala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.43	--
2.	Colour	APHA 2120 B. Visual Comparison Method	BDL (DL 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	18	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	None	--
6.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	65.23	mg/L
7.	Conductivity	APHA 2510 B. Conductivity Meter Method	662	µS/cm
8.	Nitrate as NO ₃	IS 3025 (P-34) Chromotropic Method	13.58	mg/L
9.	Iron as Fe	APHA 3500 Fe B I.10 Phenanthroline Method	0.23	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	429.00	mg/L
11.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.18	mg/L
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	15.63	mg/L
14.	Fluoride as F	APHA 4500-F- D SPADNS Method	0.52	mg/L
15.	BOD (3 Days at 27°C)	APHA 5210 C Ultimate BOD Test	6.13	mg/L
16.	COD	APHA 5220 B Open Reflux Method	26.58	mg/L
17.	Free Ammonia as NH ₃	IS 3025 (P-34)	12.05	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	168.74	mg/L
21.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	59.82	mg/L
22.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	178.54	mg/L
23.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	6.25	mg/L
24.	Copper as Cu	APHA 3111 B. Air Acetylene Flame Method	3.12	mg/L
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	71.9	mg/L
26.	Potassium	APHA, 3500 K Flame Photometric Method	25.4	mg/L
27.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note:- *BLQ-Below Limit of Quantification, **LOQ-Limit of Quantification.

(Checked By)
ANJU INDORIA
Sr. Analyst

15/06/2022
RAVI KUMAR
Microbiologist



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvironet.com, bd@vardanenvironet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/W/09	Report No.:	VEL/W/2206/11/009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°11'08.66" N	Party Reference No.:	NIL
Longitude:	75°08'46.58" E	Reporting Date:	15/06/2022
Sample Description:	Surface Water Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Kot Fatta	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Parameter Required:	As per Work Order	Sample Quantity:	2.0 Ltr. + 250 ml
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025	Sampling Type:	Grab
		Preservation:	Refrigerated

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.62	--
2.	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	15	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	None	--
6.	Chloride as Cl	APHA 4500-Cl- B Argentometric Method	49.87	mg/L
7.	Conductivity	APHA 2510 B, Conductivity Meter Method	824	µS/cm
8.	Nitrate as NO ₃	IS 3025 (P-34) Chromotropic Method	5.63	mg/L
9.	Iron as Fe	APHA 3500 Fe B 1,10 Phenanthroline Method	0.25	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	536.00	mg/L
11.	Lead as Pb	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.16	mg/L
13.	Sulphate as SO ₄	APHA 4500 E Turbidimetric Method	23.58	mg/L
14.	Fluoride as F	APHA 4500-F- D SPADNS Method	0.41	mg/L
15.	BOD (3 Days at 27°C)	APHA 5210 C Ultimate BOD Test	5.12	mg/L
16.	COD	APHA 5220 B Open Reflux Method	27.89	mg/L
17.	Free Ammonia as NH ₃	IS 3025 (P-34)	8.19	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic as As	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness as CaCO ₃	APHA 2340 C EDTA Titrimetric Method	175.42	mg/L
21.	Calcium as Ca	APHA 3500 Ca B EDTA Titrimetric Method	63.25	mg/L
22.	Alkalinity as CaCO ₃	APHA 2320 B Titrimetric Method	189.20	mg/L
23.	Magnesium as Mg	APHA 3500 Mg B Calculation Method	6.23	mg/L
24.	Copper as Cu	APHA 3111 B, Air Acetylene Flame Method	4.19	mg/L
25.	Sodium	APHA. 3500 Na B Flame Photometric Method	79.4	mg/L
26.	Potassium	APHA. 3500 K Flame Photometric Method	31.6	mg/L
27.	Total Chromium as Cr	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note:- *BLQ-Below Limit of Quantification. **LOQ-Limit of Quantification.

(Checked By)
ANJU INDORIA
Sr. Analyst

RAVI KUMAR
Microbiologist



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

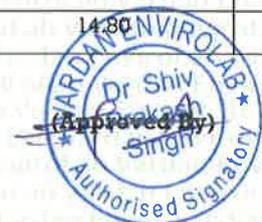
Sample Number:	VEL/HPCL/S/01	Report No.:	VEL/S/2206/11/001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'45.69" N	Party Reference No.:	NIL
Longitude:	75°01'00.81" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Near Project Site	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.53	--
2.	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	29.81	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.14	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	48.76	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	27.13	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	31.68	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	124.16	%
11.	Iron as (Fe)	USEPA 3050B	2.79	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.84	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	17.40	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	177.43	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	16.79	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.81	%
17.	Organic Carbon	USEPA 3050B	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.68	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.57	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.71	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.24	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	14.80	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/02	Report No.:	VEL/S/2206/11/002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°07'91.97" N	Party Reference No.:	NIL
Longitude:	75°00'20.12" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Nasibpura	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.67	--
2.	Conductivity	IS:14767 by Conductivity meter	0.343	mS/cm
3.	Soil Texture	SOP , SP-87, Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78, Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81, Issue No.-01 & Issue Date-14/02/2013	43.64	%
6.	Bulk density	SOP , SP-80, Issue No.-01 & Issue Date-14/02/2013	1.22	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No.-01 & Issue Date-14/02/2013	41.39	%
8.	Calcium as Ca	SOP , SP-82, Issue No.-01 & Issue Date-14/02/2013	61.32	%
9.	Sodium as Na	SOP , SP-84, Issue No.-01 & Issue Date-14/02/2013	49.67	%
10.	Potassium as K	SOP , SP-84, Issue No.-01 & Issue Date-14/02/2013	118.34	%
11.	Iron as (Fe)	USEPA 3050B	3.66	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.77	%
13.	Magnesium as Mg	SOP , SP-83, Issue No.-01 & Issue Date-14/02/2013	21.04	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	242.68	kg./hec.
15.	Available Phosphorus	SOP , SP-86, Issue No.-01 & Issue Date-14/02/2013	25.43	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	16.63	%
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.55	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.70	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.69	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.86	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.48	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	1.60	%

Note- SOP- Standard Operating Procedure.

(Checked By)

AN.IJ INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/03	Report No.:	VEL/S/2206/11/003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°10'19.14" N	Party Reference No.:	NIL
Longitude:	75°00'71.02" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Kot Kashmir	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.46	--
2.	Conductivity	IS:14767 by Conductivity meter	0.359	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	30.38	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.56	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	51.37	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	31.89	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	40.80	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	141.73	%
11.	Iron as (Fe)	USEPA 3050B	2.40	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.42	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	19.31	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	27.32	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	10.17	%
17.	Organic Carbon	USEPA 3050B	0.39	%
18.	Lead (as Pb)	USEPA 3050B	0.70	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.81	mg/kg
21.	Copper (as Cu)	USEPA 3050B	6.43	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.31	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.30	%

Note- SOP- Standard Operating Procedure.

(Checked By)

AN.IJ INDOLIA
Sr. Analyst

(Approved By)

Dr Shiv Prakash Singh
Authorised Signatory



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/04	Report No.:	VEL/S/2206/11/004
Name & Address of the Project:	MI/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°09'85.19" N	Party Reference No.:	NIL
Longitude:	75°07'07.17" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Kotbhara	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	07/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.84	--
2.	Conductivity	IS:14767 by Conductivity meter	0.358	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	34.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.44	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	38.46	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	43.57	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	51.46	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	127.81	%
11.	Iron as (Fe)	USEPA 3050B	1.77	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.48	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	29.56	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	211.58	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	17.63	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.78	%
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.5	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.31	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.88	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.60	%

Note- SOP- Standard Operating Procedure.

(Checked By)

ANJUL INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/05	Report No.:	VEL/S/2206/11/005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'29.86" N	Party Reference No.:	NIL
Longitude:	75°06'60.43" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Chathewala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.52	--
2.	Conductivity	IS:14767 by Conductivity meter	0.286	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty Loam	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	15.63	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.19	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	53.24	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	38.74	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	41.05	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	98.72	%
11.	Iron as (Fe)	USEPA 3050B	2.71	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.59	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	14.53	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	184.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	24.06	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.85	%
17.	Organic Carbon	USEPA 3050B	0.31	%
18.	Lead (as Pb)	USEPA 3050B	0.79	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.64	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.72	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.13	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.28	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	13.50	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/06	Report No.:	VEL/S/2206/11/006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°11'08.66" N	Party Reference No.:	NIL
Longitude:	75°08'46.58" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Kot Fatta	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767 by Conductivity meter	0.31	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	25.41	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.14	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	40.39	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	51.74	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	42.59	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	109.87	%
11.	Iron as (Fe)	USEPA 3050B	3.1	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.67	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	15.82	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	186.79	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	13.05	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.84	%
17.	Organic Carbon	USEPA 3050B	0.41	%
18.	Lead (as Pb)	USEPA 3050B	0.5	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.57	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.01	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.31	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	10.20	%

Note- SOP- Standard Operating Procedure.

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/07	Report No.:	VEL/S/2206/11/007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°02'56.54" N	Party Reference No.:	NIL
Longitude:	75°06'43.21" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Baghi Bandar	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.72	--
2.	Conductivity	IS:14767 by Conductivity meter	0.312	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	40.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.19	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	52.16	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	46	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	78	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	163.08	%
11.	Iron as (Fe)	USEPA 3050B	2.39	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.81	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	38.64	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	246.52	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	25.13	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	11.25	%
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.67	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.77	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.46	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.53	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.39	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	17.30	%

Note- SOP- Standard Operating Procedure.

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

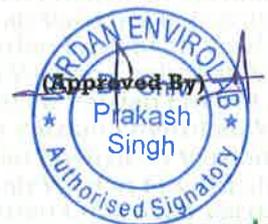
Sample Number:	VEL/HPCL/S/08	Report No.:	VEL/S/2206/11/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°03'74.49" N	Party Reference No.:	NIL
Longitude:	74°95'03.56" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Maanwala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	08/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.41	--
2.	Conductivity	IS:14767 by Conductivity meter	0.315	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	35.61	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.33	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	43.16	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	53.69	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	51.09	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	134.26	%
11.	Iron as (Fe)	USEPA 3050B	2.34	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.66	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	21.46	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.87	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	25.69	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	11.25	%
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.51	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.43	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.05	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.47	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	15.10	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJU INDOLIA
Sr. Analyst





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

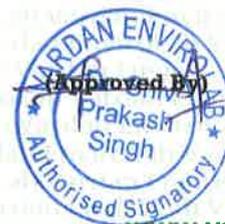
Sample Number:	VEL/HPCL/S/09	Report No.:	VEL/S/2206/11/009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°05'67.90" N	Party Reference No.:	NIL
Longitude:	75°03'50.95" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Jiwan Singh Wala	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.48	--
2.	Conductivity	IS:14767 by Conductivity meter	0.322	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	31.54	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.21	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	44.98	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	38.76	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	47.28	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	143.52	%
11.	Iron as (Fe)	USEPA 3050B	2.41	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.87	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	24.56	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	226.61	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	18.79	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.43	%
17.	Organic Carbon	USEPA 3050B	0.63	%
18.	Lead (as Pb)	USEPA 3050B	0.75	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.39	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.51	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.35	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	10.60	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJUL INDOLIA
Sr. Analyst



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/10	Report No.:	VEL/S/2206/11/010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°11'09.27" N	Party Reference No.:	NIL
Longitude:	74°96'10.78" E	Reporting Date:	15/06/2022
Sample Description:	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Gehri Boghi	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.61	--
2.	Conductivity	IS:14767 by Conductivity meter	0.305	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty Loam	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	36.52	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.92	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	49.17	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	42.58	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	51.32	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	149.85	%
11.	Iron as (Fe)	USEPA 3050B	2.57	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	29.53	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	253.69	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	27.84	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	15.43	%
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.74	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.56	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.28	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.26	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	16.20	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenvirolab.com, bd@vardanenvirolab.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/11	Report No.:	VEL/S/2206/11/011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	30°02'11.32" N	Party Reference No.:	NIL
Longitude:	75°01'53.33" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Mahi Nangal	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.56	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish Red	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	31.26	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.25	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	51.46	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	40.18	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	62.41	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	138.28	%
11.	Iron as (Fe)	USEPA 3050B	2.86	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.68	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	33.15	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	214.05	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	20.49	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.84	%
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.62	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.34	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.49	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.82	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	18.60	%

Note- SOP- Standard Operating Procedure.

(Checked By)
ANJU INDOLIA
Sr. Analyst



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/12	Report No.:	VEL/S/2206/11/012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-01
Latitude:	29°99'04.45" N	Party Reference No.:	NIL
Longitude:	75°01'90.13" E	Reporting Date:	15/06/2022
Sample Description;	Soil Sample	Period of Analysis:	11/06/2022 to 15/06/2022
Sample Location:	Leleana	Receipt Date:	11/06/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	09/06/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.69	--
2.	Conductivity	IS:14767 by Conductivity meter	0.352	mS/cm
3.	Soil Texture	SOP , SP-87,Issue No.-01 & Issue Date-14/02/2013	Silty	--
4.	Color	SOP , SP-78,Issue No.-01 & Issue Date-14/02/2013	Yellowish	--
5.	Water holding capacity	SOP , SP-81,Issue No.-01 & Issue Date-14/02/2013	29.41	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.28	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	66.87	%
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	47.46	%
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	49.75	%
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	162.14	%
11.	Iron as (Fe)	USEPA 3050B	2.73	mg/kg
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	31.58	%
14.	Available Nitrogen as N	IS:14684 Distillation Method	245.69	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	29.87	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	10.25	%
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.87	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.75	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.22	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.53	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	*BDL	mg/kg
24.	Moisture Content	SOP, SP-79, Issue No.-01 & Issue Date-14/02/2013	19.80	%

Note- SOP- Standard Operating Procedure.

(Checked By)

ANJU INDOLIA
Sr. Analyst



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardanenviromet.com, bd@vardanenviromet.com



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'75.12" N
Longitude: 75°01'12.76" E
Report No.: VEL/AA/2209260001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Near Project Site
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 19/09/2022 to 20/09/2022
Time of Monitoring : 09:30 AM to 09:30 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	41.06	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	68.18	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	21.24	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	7.82	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.77	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	17.42	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- (a) NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°04'40.53" N
Longitude: 75°00'12.22" E

Report No.: VEL/AA/2209260002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Nasibpura
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 10:00 AM to 10:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ²⁾ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	43.08	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	67.15	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	19.32	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	9.12	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.86	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	19.03	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 953147258 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°10'24.14" N
Longitude: 75°00'52.26" E

Report No.: VEL/AA/2209260003
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Shamir
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 10:30 AM to 10:30 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	39.63	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	56.42	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	20.62	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	7.92	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.86	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	22.38	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°03'58.53" N
Longitude: 75°03'55.45" E

Report No.: VEL/AA/2209260004
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Chathewala
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 11:00 AM to 11:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	42.18	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	69.60	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	24.16	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	8.53	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.81	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	20.76	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- (a) NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'52.23" N
Longitude: 75°04'12.03" E

Report No.: VEL/AA/2209260005
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Bhara
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 11:45 AM to 11:45 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ² Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	34.11	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	59.24	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	25.61	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	10.08	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.88	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	21.86	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :-@ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure, *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°06'52.49" N
Longitude: 75°04'42.32" E

Report No.: VEL/AA/2209260006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Fatta
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 12:30 PM to 12:30 PM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ^(a) Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	40.80	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	76.13	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	23.16	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	8.76	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.77	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	22.03	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°04'18.09" N
Longitude: 75°01'40.11" E

Report No.: VEL/AA/2209260007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Jiwan Singh Wala
Instrument Used	: RDS & FPS Sampler with all Accessories
Instrument Code	: VEL/RDS/FPS/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 21/09/2022 to 22/09/2022
Time of Monitoring	: 10:00 AM to 10:00 AM
Ambient Temperature (°C)	: Min. 26.0°C, Max. 36.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [@] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	48.46	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	70.10	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	21.54	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	11.02	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.81	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	19.02	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :-@ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°20'45.02" N
Longitude: 75°53'06.28" E

Report No.: VEL/AA/2209260008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Manwala
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 21/09/2022 to 22/09/2022
Time of Monitoring : 11:10 AM to 11:10 AM
Ambient Temperature (°C) : Min. 26.0°C, Max. 36.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ⁽²⁾ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	44.06	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	68.11	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	28.43	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	10.14	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.81	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	24.00	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- @NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°02'56.54" N
Longitude: 75°06'43.21" E

Report No.: VEL/AA/2209260009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : **Baghi Bandar**
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 21/09/2022 to 22/09/2022
Time of Monitoring : 11:45 AM to 11:45 AM
Ambient Temperature (°C) : Min. 26.0°C, Max. 36.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ⁽²⁾ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	42.26	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	70.16	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6) ,Jacob & Hochheiser	27.10	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ,Modified West and Gaeke	11.06	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.80	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	21.34	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :- @NAAQS -- National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 29°59'49.83" N
Longitude: 75°01'15.53" E

Report No.: VEL/AA/2209260010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : **Leleana**
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Intermittent Rain
Date of Monitoring : 22/09/2022 to 23/09/2022
Time of Monitoring : 10:00 AM to 10:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	33.10	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	52.46	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	26.52	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	9.72	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.73	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	21.04	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :-@ NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 8.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°02'32.01" N
Longitude: 75°01'63.12" E

Report No.: VEL/AA/2209260011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Mahi Nangal
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Intermittent Rain
Date of Monitoring : 22/09/2022 to 23/09/2022
Time of Monitoring : 10:45 AM to 10:45 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	32.14	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	55.46	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	20.56	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2), Modified West and Gaeke	10.27	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.88	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	21.15	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AA/12
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°08'22.64" N
Longitude: 75°57'43.82" E

Report No.: VEL/AA/2209260012
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Gehri Bhagi
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Intermittent Rain
Date of Monitoring : 22/09/2022 to 23/09/2022
Time of Monitoring : 11:30 AM to 11:30 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS nd Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24), Gravimetric Method	30.80	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23), Gravimetric Method	51.06	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P 6), Jacob & Hochheiser	21.82	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P 2) ;Modified West and Gaeke	9.33	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10) Gas Chromatography	0.68	mg/m ³	4
6.	Ammonia (as NH ₃)	IS: 5182 (P-25), 2018	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS: 5182 (P-22), Reaffirmed-2009	BLQ(LOQ 0.05)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS: 5182 (P-11), 2004	BLQ(LOQ 0.1)	µg/m ³	05
9.	Benzo(a)pyrene	IS: 5182 (P-12), 2004	BLQ(LOQ 1.0)	ng/m ³	01
10.	Ozone (as O ₃)	IS: 5182 (P-9), Reaffirmed-2014	19.43	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110 Issue No.-01	BLQ(LOQ 5.0)	ng/m ³	6
12.	Nickel (as Ni)	IS: 5182 (P-22), Reaffirmed-2014	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	BLQ(LOQ 5.0)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	BLQ(LOQ 0.2)	ppm(v/v)	--

Note :-@ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/01 Report No.: VEL/AN/2209260001
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-03
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Near Project Site
Latitude: 30°05'75.12" N
Longitude: 75°01'12.76" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 19/09/2022 to 20/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	72.4	63.2	dB(A)
2.	L _{min}	IS 9989, By Calculation	53.1	40.5	dB(A)
3.	L _{eq}	IS 9989, By Calculation	63.66	54.16	dB(A)
4.	CPCB Limits in dB(A) Leq (Industrial Area)	-	75.00	70.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Nasibpura
Latitude: 30°04'40.53" N
Longitude: 75°00'12.22" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989, By Calculation	58.7	49.6	dB(A)
2.	L_{min}	IS 9989, By Calculation	41.3	36.5	dB(A)
3.	L_{eq}	IS 9989, By Calculation	51.14	41.82	dB(A)
4.	CPCB Limits in dB(A)* Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260003
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Shamir
Latitude: 30°10'24.14" N
Longitude: 75°00'52.26" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	55.3	46.4	dB(A)
2.	L _{min}	IS 9989, By Calculation	33.6	31.2	dB(A)
3.	L _{eq}	IS 9989, By Calculation	47.33	38.56	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Test Report

Sample Number: VEL/HPCL/AN/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260004
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Bhara
Latitude: 30°05'52.23" N
Longitude: 75°04'12.03" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	54.2	45.4	dB(A)
2.	L _{min}	IS 9989, By Calculation	34.5	29.3	dB(A)
3.	L _{eq}	IS 9989, By Calculation	45.24	36.68	dB(A)
4.	CPCB Limits in dB(A ⁺) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260005
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Fatta
Latitude: 30°06'52.49" N
Longitude: 75°04'42.32" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 20/09/2022 to 21/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 37.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	54.8	44.4	dB(A)
2.	L _{min}	IS 9989, By Calculation	34.3	28.5	dB(A)
3.	L _{eq}	IS 9989, By Calculation	46.27	41.26	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/AN/06	Report No.:	VEL/AN/2209260006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	30/09/2022
		Receipt Date:	26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Chathewala
Latitude:	: 30°03'58.53" N
Longitude:	: 75°03'55.45" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/10
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 20/09/2022 to 21/09/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 25.0°C, Max. 37.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	53.8	43.5	dB(A)
2.	L _{min}	IS 9989, By Calculation	34.7	31.6	dB(A)
3.	L _{eq}	IS 9989, By Calculation	45.18	37.42	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Manwala
Latitude: 30°20'45.02" N
Longitude: 75°53'06.28" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 21/09/2022 to 22/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 26.0°C, Max. 36.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	56.8	48.6	dB(A)
2.	L _{min}	IS 9989, By Calculation	34.7	32.5	dB(A)
3.	L _{eq}	IS 9989, By Calculation	49.25	38.41	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



The results reported relate only to the samples tested.

In case sample is not drawn the results apply to the sample as received.

This report in full or in part shall not be reproduced in any court of law without the written consent of the laboratory.

The laboratory is not responsible for the authenticity of photocopied test report.

Test samples will be retained only for specific period stipulated in guidelines of state government.

The report no. with Suffix-A-Axix-A is reported.

To confirm the authenticity of this certificate of analysis, please contact us through www.vardan.co.in or email us the scanned copy of the certificate at lab@vardan.co.in

This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Baghi Bandar
Latitude: 30°02'32.12" N
Longitude: 75°06'12.76" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 21/09/2022 to 22/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 26.0°C, Max. 36.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	54.6	49.4	dB(A)
2.	L _{min}	IS 9989, By Calculation	35.4	34.8	dB(A)
3.	L _{eq}	IS 9989, By Calculation	48.03	38.66	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received. This test is in full on in part, shall not be reproduced in any court of law without the prior written permission of the laboratory. The test samples will be retained only for specific period stipulated in the report. The report no. with Suffix-A amended Report. To confirm the authenticity of this certificate of analysis, please contact us through www.vardan.co.in or email us the scanned copy of the certificate at lab@vardan.co.in. This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.



www.vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Jiwan Singh Wala
Latitude: 30°04'18.09" N
Longitude: 75°01'40.11" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/09
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 21/09/2022 to 22/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 26.0°C, Max. 36.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	53.2	42.1	dB(A)
2.	L _{min}	IS 9989, By Calculation	33.5	27.8	dB(A)
3.	L _{eq}	IS 9989, By Calculation	42.26	34.26	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Mahi Nangal
Latitude: 30°02'32.01" N
Longitude: 75°01'63.12" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 22/09/2022 to 23/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	54.3	44.6	dB(A)
2.	L _{min}	IS 9989, By Calculation	36.8	32.4	dB(A)
3.	L _{eq}	IS 9989, By Calculation	44.45	38.52	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		58.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.

The results reported relate only to the samples tested.

In case sample is not drawn the results apply to the sample as received.

This test report in full on in part, shall not be reproduced in any form without the prior approval of the laboratory.

Laboratory is not responsible for the authenticity of photocopied test report.

The test samples will be retained only for specific period stipulated in guidelines or statutory requirements.

The report no. with Suffix A-A-mended Report.

To confirm the authenticity of this certificate of analysis, please contact us through www.vardan.co.in or email us the scanned copy of the certificate at lab@vardan.co.in or bd@vardan.co.in

This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/AN/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/AN/2209260011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Receipt Date: 26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Leleana
Latitude: 29°59'49.83" N
Longitude: 75°01'15.53" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/07
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Intermittent Rain
Date of Monitoring : 22/09/2022 to 23/09/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 25.0°C, Max. 38.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	54.2	44.3	dB(A)
2.	L _{min}	IS 9989, By Calculation	30.5	30.5	dB(A)
3.	L _{eq}	IS 9989, By Calculation	42.18	38.63	dB(A)
4.	CPCB Limits in dB(A*) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/AN/12	Report No.:	VEL/AN/2209260012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	30/09/2022
		Receipt Date:	26/09/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Gehri Bhagi
Latitude:	30°08'22.64" N
Longitude:	75°57'43.82" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/08
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Intermittent Rain
Date of Monitoring	: 22/09/2022 to 23/09/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 25.0°C, Max. 38.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989, By Calculation	57.4	44.2	dB(A)
2.	L _{min}	IS 9989, By Calculation	38.5	32.5	dB(A)
3.	L _{eq}	IS 9989, By Calculation	51.35	38.27	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)		55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 19/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Near Project Site
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.32	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	296.76	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	82.26	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	269.00	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	64.20	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	22.24	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	569.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	24.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.65	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	6.11	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.21	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



VEL/E-03/1/TR/PN9065

www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/01				Report No.: VEL/GW/2209260001		
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.38	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	940	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	21.9	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	2.9	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 20/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Nasibpura
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.33	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	227.63	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	72.89	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	232.50	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	53.10	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	11.12	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	543.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	36.74	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.56	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	4.64	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.16	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/02			Report No.: VEL/GW/2209260002			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.26	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	875	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	38.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	2.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification,

⁶⁶Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

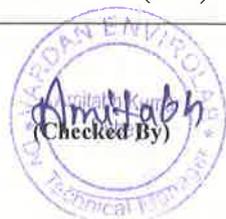
Sample Number: VEL/HPCL/GW/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260003
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 20/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Kot Shamir
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.43	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	260.42	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	73.49	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	224.40	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	73.18	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	18.73	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	645	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	52.23	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.52	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	5.62	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.21	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Test Report

Sample No.: VEL/HPCL/GW/03			Report No.: VEL/GW/2209260003			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.36	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	988	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	35.8	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

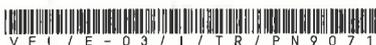
Sample Number: VEL/HPCL/GW/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2202260004
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 21/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Baghi Bandar
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.43	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	304.22	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	93.06	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	286.00	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	84.35	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.09	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	695.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	54.07	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.83	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	7.98	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.07	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation





Test Report

Sample No.: VEL/HPCL/GW/04			Report No.: VEL/GW/2209260004			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.44	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Methiod	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	1084	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	27.3	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

®Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).





Test Report

Sample Number: VEL/HPCL/GW/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260005
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 21/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Maanwala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.42	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	219.26	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	80.51	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	191.07	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	67.32	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	4.48	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	526.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	49.54	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.74	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	6.28	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.10	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/05			Report No.: VEL/GW/2209260005			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.27	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B,Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Methiod	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	822	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	25.0	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	6.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 21/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Jiwan Singh Wala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.28	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	204.72	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	56.44	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	172.21	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	49.31	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.53	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	399.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	13.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.52	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	4.26	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B I,10 Phenanthroline Method	0.14	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/06				Report No.: VEL/GW/2209260006		
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.30	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	623	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	12.6	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	1.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Test Report

Sample Number: VEL/HPCL/W/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2209260007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 21/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Mahi Nangal
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	APHA4500-H ⁺ B Electrometric Method	7.62	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA 2120 B Visual Comparison Method	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	APHA 2130 B Nephelometric Method	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA 2160 B Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	173.50	mg/L	200	600
7.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	44.33	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	184.28	mg/L	200	600
9.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	37.59	mg/L	250	1000
10.	Cyanide (as CN)	APHA 4500 CN D Titrimetric Method	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	15.28	mg/L	30	100
12.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	448.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	27.08	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D SPADNS Method	0.58	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34), Chromotropic Method	4.15	mg/L	45	No Relaxation
16.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.13	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	APHA 3111 D Direct Nitrous Oxide-Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	APHA 4500 C Carmine Method	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/07			Report No.: VEL/GW/2209260007			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	APHA 5520-C Partition Infra Red	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	APHA 5540 C MBAS Method	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	APHA 3111B Air Acetylene Method	0.23	mg/L	5.0	15.0
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	APHA 3112 B Cold Vapor AAS Method	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA 2510 B Conductivity Meter Method	718	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	APHA 3500 Na B Flame Photometric Method	24.7	mg/L	--	--
34.	Potassium	APHA 3500 K Flame Photometric Method	3.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/SW/08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/SW/2209260008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 20/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Surface Water Sample
Sample Location: Chathewala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.62	--
2.	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	10.0	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	NR	--
6.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	67.10	mg/L
7.	Conductivity	APHA 2510 B, Conductivity Meter Method	698	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34) Chromotropic Method	12.55	mg/L
9.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.26	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	442.00	mg/L
11.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.16	mg/L
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	13.60	mg/L
14.	Fluoride (as F)	APHA 4500-F- D SPADNS Method	0.54	mg/L
15.	BOD (5 Days at 20°C)	APHA 5210 C Ultimate BOD Test	5.16	mg/L
16.	COD	APHA 5220 B Open Reflux Method	24.55	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	10.03	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	143.00	mg/L
21.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	47.20	mg/L
22.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	172.52	mg/L
23.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	6.13	mg/L
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	4.16	mg/L
25.	Sodium (as Na)	APHA, 3500 Na B Flame Photometric Method	54.12	mg/L
26.	Potassium (as K)	APHA, 3500 K Flame Photometric Method	7.8	mg/L
27.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/SW/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/SW/2209260009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 20/09/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Surface Water Sample
Sample Location: Kot Fatta
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	APHA 4500-H+ B Electrometric Method	7.58	--
2.	Colour	APHA 2120 B, Visual Comparison Method	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	APHA 2130 B Nephelometric Method	12	NTU
4.	Odour	APHA 2150 B Threshold Odour Method	Agreeable	--
5.	Taste	APHA 2160 B Threshold Test Method	NR	--
6.	Chloride (as Cl)	APHA 4500-Cl- B Argentometric Method	44.84	mg/L
7.	Conductivity	APHA 2510 B, Conductivity Meter Method	832	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34) Chromotropic Method	6.61	mg/L
9.	Iron (as Fe)	APHA 3500 Fe B 1,10 Phenanthroline Method	0.28	mg/L
10.	Total Dissolved Solids	APHA 2540 C Gravimetric Method	540.00	mg/L
11.	Lead (as Pb)	APHA 3111B Air Acetylene Method	BLQ(LOQ 0.002)	mg/L
12.	Boron	APHA 4500 C Carmine Method	0.19	mg/L
13.	Sulphate (as SO ₄)	APHA 4500 E Turbidimetric Method	25.61	mg/L
14.	Fluoride (as F)	APHA 4500-F- D SPADNS Method	0.44	mg/L
15.	BOD (5 Days at 20°C)	APHA 5210 C Ultimate BOD Test	4.16	mg/L
16.	COD	APHA 5220 B Open Reflux Method	21.06	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	7.17	mg/L
18.	Total Coliform	IS 15185:2016	Absent	Per 100ml
19.	Arsenic (as As)	APHA 3114 B Manual Hydride Generation	BLQ(LOQ 0.002)	mg/L
20.	Total Hardness (as CaCO ₃)	APHA 2340 C EDTA Titrimetric Method	163.20	mg/L
21.	Calcium (as Ca)	APHA 3500 Ca B EDTA Titrimetric Method	60.22	mg/L
22.	Alkalinity (as CaCO ₃)	APHA 2320 B Titrimetric Method	192.20	mg/L
23.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	3.15	mg/L
24.	Copper (as Cu)	APHA 3111 B, Air Acetylene Flame Method	5.14	mg/L
25.	Sodium (as Na)	APHA, 3500 Na B Flame Photometric Method	43.9	mg/L
26.	Potassium (as K)	APHA, 3500 K Flame Photometric Method	2.0	mg/L
27.	Total Chromium (as Cr)	APHA 3111B Direct Air Acetylene Flame Method	BLQ(LOQ 0.002)	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/01	Report No.:	VEL/S/2209260001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°05'45.69" N	Party Reference No.:	NIL
Longitude:	75°01'00.81" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Near Project Site	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	19/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.68	--
2.	Conductivity	IS:14767,2000	0.342	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	27.83	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.17	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	46.79	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	24.11	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	28.70	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	110.76	%
11.	Iron as (Fe)	USEPA 3050B	3.10	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.80	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	19.44	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	163.70	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	14.74	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	6.84	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.55	%
18.	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.59	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.68	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.29	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.30	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.83	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/02	Report No.:	VEL/S/2209260002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°07'91.97" N	Party Reference No.:	NIL
Longitude:	75°00'20.12" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Nasibpura	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	20/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.43	--
2.	Conductivity	IS:14767,2000	0.349	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	41.66	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.20	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	39.36	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	64.34	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	47.69	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	121.32	%
11.	Iron as (Fe)	USEPA 3050B	2.64	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.74	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	25.09	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	239.65	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	21.40	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	19.60	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.73	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.72	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.89	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.51	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	14.62	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/03	Report No.:	VEL/S/2209260003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°10'24.14" N	Party Reference No.:	NIL
Longitude:	75°00'52.26" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Kot Shamir	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	20/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.40	--
2.	Conductivity	IS:14767,2000	0.362	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	32.40	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.59	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.39	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	33.87	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	42.83	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	144.76	%
11.	Iron as (Fe)	USEPA 3050B	2.63	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.45	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	20.36	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	222.10	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	25.30	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.15	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.65	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.83	mg/kg
21.	Copper (as Cu)	USEPA 3050B	7.45	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	17.33	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/04	Report No.:	VEL/S/2209260004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°05'52.23" N	Party Reference No.:	NIL
Longitude:	75°04'12.03" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Kot Bhara	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	20/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.44	--
2.	Conductivity	IS:14767,2000	0.360	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	32.10	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.46	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	36.44	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	41.59	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	53.44	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	129.83	%
11.	Iron as (Fe)	USEPA 3050B	1.79	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.45	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	31.59	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	213.56	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	19.66	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	8.76	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.33	%
18.	Lead (as Pb)	USEPA 3050B	0.55	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.66	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.3	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.33	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.86	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	14.76	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/S/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°03'58.53" N
Longitude: 75°03'55.45" E
Sample Description: Soil Sample
Sample Location: Chathewala
Sample Collected By: Vardan EnviroLab Representative
Sampling & Analysis Protocol: IS 2720, USEPA 3050B & USDA

Report No.: VEL/S/2209260005
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 30/09/2022
Period of Analysis: 26/09/2022 to 30/09/2022
Receipt Date: 26/09/2022
Sampling Date: 20/09/2022
Sampling Type: Composite
Sample Quantity: 2.0 Kg
Packing Status: Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767,2000	0.301	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty Loam	--
4.	Color	SOP, SP - 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP - 81, Issue No. 01	17.66	%
6.	Bulk density	SOP, SP - 80, Issue No. 01	1.17	gm/cc
7.	Chloride (as Cl)	SOP, SP - 85, Issue No. 01	51.21	%
8.	Calcium (as Ca)	SOP, SP - 82, Issue No. 01	36.72	%
9.	Sodium (as Na)	SOP, SP - 84, Issue No. 01	39.03	%
10.	Potassium (as K)	SOP, SP - 84, Issue No. 01	96.70	%
11.	Iron as (Fe)	USEPA 3050B	2.42	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.57	%
13.	Magnesium (as Mg)	SOP, SP - 83, Issue No. 01	18.55	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	179.66	kg./hec.
15.	Available Phosphorus	SOP, SP - 86, Issue No. 01	22.04	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	6.87	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.33	%
18.	Lead (as Pb)	USEPA 3050B	0.77	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.66	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.75	mg/kg
21.	Copper (as Cu)	USEPA 3050B	5.17	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.16	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP - 79, Issue No. 01	16.77	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/06	Report No.:	VEL/S/2209260006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°05'52.23" N	Party Reference No.:	NIL
Longitude:	75°04'12.03" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Kot Fatta	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	20/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.59	--
2.	Conductivity	IS:14767,2000	0.29	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	23.38	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.11	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	43.36	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	53.76	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	40.57	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	123.16	%
11.	Iron as (Fe)	USEPA 3050B	2.40	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.64	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	17.84	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	173.18	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	11.02	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	7.44	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.44	%
18.	Lead (as Pb)	USEPA 3050B	0.64	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.70	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.59	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.66	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.34	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.44	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/07	Report No.:	VEL/S/2209260007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°02'56.54" N	Party Reference No.:	NIL
Longitude:	75°06'43.21" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Baghi Bandar	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	21/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.40	--
2.	Conductivity	IS:14767,2000	0.325	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	35.44	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.22	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	44.23	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	75.12	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	161.06	%
11.	Iron as (Fe)	USEPA 3050B	2.35	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.84	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	36.61	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	242.56	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	27.15	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	13.29	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.49	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.56	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.36	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	20.06	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/08	Report No.:	VEL/S/2209260008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°20'45.02" N	Party Reference No.:	NIL
Longitude:	75°53'06.28" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Manwala	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	21/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.33	--
2.	Conductivity	IS:14767,2000	0.319	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	37.64	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.37	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	46.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	55.71	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	36.40	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	148.76	%
11.	Iron as (Fe)	USEPA 3050B	2.24	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.69	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	23.48	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	243.78	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	14.26	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	9.22	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.54	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.36	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.22	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.42	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	13.77	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/09	Report No.:	VEL/S/2209260009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°04'18.09" N	Party Reference No.:	NIL
Longitude:	75°01'40.11" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Jiwan Singh Wala	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	21/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	6.98	--
2.	Conductivity	IS:14767,2000	0.309	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	29.56	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.19	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	42.96	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	36.74	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	45.26	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	133.66	%
11.	Iron as (Fe)	USEPA 3050B	2.61	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.78	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	19.44	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	223.54	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	16.76	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	14.04	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.68	%
18.	Lead (as Pb)	USEPA 3050B	0.71	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.62	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.35	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.33	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.37	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	12.58	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/10	Report No.:	VEL/S/2209260010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°08'22.64" N	Party Reference No.:	NIL
Longitude:	75°57'43.82" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Gehri Bhagi	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	22/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.43	--
2.	Conductivity	IS:14767,2000	0.286	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty Loam	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish Red	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	33.76	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.86	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	47.19	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	40.55	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	54.30	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	133.68	%
11.	Iron as (Fe)	USEPA 3050B	2.46	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.72	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	27.50	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	236.76	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	25.87	kg./hec.
16.	Zinc (as Zn)	USEPA 3050B	12.40	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.54	%
18.	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.53	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.25	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.24	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	23.15	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/11	Report No.:	VEL/S/2209260011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°02'32.01" N	Party Reference No.:	NIL
Longitude:	75°01'63.12" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Mahi Nangal	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	22/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.42	--
2.	Conductivity	IS:14767,2000	0.339	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Brown	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	30.63	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.43	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	54.42	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	38.16	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	60.44	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	136.26	%
11.	Iron as (Fe)	USEPA 3050 B	2.84	mg/kg
12.	Organic Matter	IS 2720 (P-22), Titrimetric Method	0.66	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	30.13	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	217.02	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	23.46	kg./hec.
16.	Zinc (as Zn)	USEPA 3050 B	8.87	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.64	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.37	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.47	mg/kg
22.	Molybdenum (as MO)	USEPA 3050B	0.85	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	16.63	%

Note- SOP- Standard Operating Procedure.

(Checked By)

Approved By
General Manager



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in



Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S/12	Report No.:	VEL/S/2209260012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	29°59'49.83" N	Party Reference No.:	NIL
Longitude:	75°01'15.53" E	Reporting Date:	30/09/2022
Sample Description:	Soil Sample	Period of Analysis:	26/09/2022 to 30/09/2022
Sample Location:	Laleana	Receipt Date:	26/09/2022
Sample Collected By:	Vardan EnviroLab Representative	Sampling Date:	22/09/2022
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26) by pH Meter	7.66	--
2.	Conductivity	IS:14767,2000	0.356	mS/cm
3.	Soil Texture	IS 2720 (P-4)	Silty	--
4.	Color	SOP, SP – 78, Issue No. 01	Yellowish	--
5.	Water holding capacity	SOP, SP – 81, Issue No. 01	26.43	%
6.	Bulk density	SOP, SP – 80, Issue No. 01	1.33	gm/cc
7.	Chloride (as Cl)	SOP, SP – 85, Issue No. 01	69.89	%
8.	Calcium (as Ca)	SOP, SP – 82, Issue No. 01	51.49	%
9.	Sodium (as Na)	SOP, SP – 84, Issue No. 01	46.77	%
10.	Potassium (as K)	SOP, SP – 84, Issue No. 01	153.76	%
11.	Iron as (Fe)	USEPA 3050 B	2.20	mg/kg
12.	Organic Matter	IS 2720 (P-22),Titrimetric Method	0.76	%
13.	Magnesium (as Mg)	SOP, SP – 83, Issue No. 01	29.55	%
14.	Available Nitrogen (as N)	IS 14648 , Distillation Method	238.76	kg./hec.
15.	Available Phosphorus	SOP, SP – 86, Issue No. 01	27.85	kg./hec.
16.	Zinc (as Zn)	USEPA 3050 B	9.28	%
17.	Organic Carbon	SOP, SP- 124, Issue No. 01	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.89	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.84	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.79	mg/kg
21.	Copper (as Cu)	USEPA 3050B	1.98	mg/kg
22.	Molybdenum (as Mo)	USEPA 3050B	0.56	mg/kg
23.	Nickel (as Ni)	USEPA 3050B	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	SOP, SP – 79, Issue No. 01	17.83	%

Note- SOP- Standard Operating Procedure.



www.vardan.co.in

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: lab@vardan.co.in, bd@vardan.co.in