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## 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 14<sup>th</sup> 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.

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**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.

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**2**

**ADHERENCE TO SPECIFIC AND GENERAL CONDITIONS**

**PART A- SPECIFIC CONDITION**

<b>S. No.</b>	<b>Conditions of Environmental Clearance</b>	<b>Status of Compliance</b>
<b>[A]</b>	The final product (Ethanol) shall be used exclusively for fuel blending only.	<i>Noted.</i>
<b>[B]</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>
<b>[C]</b>	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>
<b>[D]</b>	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>
<b>[E]</b>	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>
<b>[F]</b>	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>
<b>[G]</b>	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>
<b>[H]</b>	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>

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<b>[I]</b>	<p>The company shall undertake waste minimization measures as below:-</p> <ol style="list-style-type: none"> <li>i. Metering and control of quantities of active ingredients to minimize waste.</li> <li>ii. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.</li> <li>iii. Use of automated filling to minimize spillage.</li> <li>iv. Use of Close Feed system into batch reactors.</li> <li>v. Venting equipment through vapour recovery system</li> <li>vi. Use of high pressure hoses for equipment clearing to reduce wastewater generation.</li> </ol>	<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"> <li><i>i. Metering and control of quantities of active ingredients will be done regularly.</i></li> <li><i>ii. By products will be reused as raw material as much as possible according to requirement.</i></li> <li><i>iii. Automated filling will be carried out to minimize spillage</i></li> <li><i>iv. Close feed system will be used into batch reactors.</i></li> <li><i>v. Water scrubber, vent bottle &amp; flame arrestors will be provided as per requirement.</i></li> <li><i>vi. High pressure hoses for equipment clearing will be used to reduce waste water generation.</i></li> </ol>
<b>[J]</b>	<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&amp;CC in the EIA report and same will be developed as per the EC requirement.</i></p>
<b>[K]</b>	<p>All the commitments made regarding issues raised during the public hearing/ consultation meeting shall be satisfactorily implemented.</p>	<p><i>Noted.</i></p>
<b>[L]</b>	<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>
<b>[M]</b>	<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>
<b>[N]</b>	<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>
<b>[O]</b>	<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>
<b>[P]</b>	<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>
<b>[Q]</b>	<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>
<b>[R]</b>	<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>

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	meters in the channel/drain carrying effluent within the premises.	
[S]	CO <sub>2</sub> 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:-**

<b>S. No.</b>	<b>Conditions of Environmental Clearance</b>	<b>Status of Compliance</b>
<b>i.</b>	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>
<b>ii.</b>	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>
<b>iii.</b>	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 stations 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>
<b>iv.</b>	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R No. 826(E) dated 16 <sup>th</sup> November, 2009 Shall be Complied with.	<i>Noted.</i>
<b>v.</b>	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>
<b>vi.</b>	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>
<b>vii.</b>	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 &amp; safety will be provided to the employees for chemical handling.</i>

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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, ZilaParisad/ 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 <sup>st</sup> 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>

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	<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 <a href="http://moef.nic.in">http://moef.nic.in</a>. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the 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 &amp; Control of Pollution) Act, 1974, the Air (Prevention &amp; Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Hazardous Waste (Management, Handling and Trans boundary 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 2020	March 2021
1.	AAQ1	Near Project site	Near Project site
2.	AAQ2	Jiwan Singh Wala	Jiwan Singh Wala
3.	AAQ3	Maawala	Maawala
4.	AAQ4	Mahi Nangal	Mahi Nangal
5.	AAQ5	Leleana	Leleana
6.	AAQ6	Baghi Bandar	Baghi Bandar
7.	AAQ7	Nasibpura	Nasibpura
8.	AAQ8	Kothbhara	Kothbhara
9.	AAQ9	Kot Kashmir	Kot Kashmir
10.	AAQ10	GehriBoghi	Gehri Boghi
11.	AAQ11	Chathewala	Chathewala
12.	AAQ12	KotFatta	Kot Fatta

#### 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 (SO<sub>2</sub>)
- Oxides of Nitrogen (NO<sub>2</sub>)
- Carbon Monoxide (CO)
- Ammonia (NH<sub>3</sub>)
- Lead (Pb)
- Benzene (C<sub>6</sub>H<sub>6</sub>)
- Benzo(a)pyrene
- Ozone (O<sub>3</sub>)

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- 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 16<sup>th</sup> 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 SO<sub>2</sub>, and NO<sub>2</sub>. 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

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**3.1.3 Ambient Air Quality Monitoring Results (December-2020)**

**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 <sub>2.5</sub> ), µg/m <sup>3</sup>	52.34	55.16	51.97	54.20	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	91.62	94.36	89.20	93.05	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	26.10	27.55	23.10	26.20	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	9.72	8.71	7.88	12.58	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.84	0.87	1.13	0.99	4
6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	12.37	12.86	9.24	14.18	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	24.55	27.10	25.60	23.02	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	**BDL(*DL 0.2 ppm(v/v))	**BDL(*DL 0.2 ppm(v/v))	**BDL(*DL 0.2 ppm(v/v))	**BDL(*DL 0.2 ppm(v/v))	--

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

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

S. No.	Parameter	Test Result				NAAQS*
		AAQ5	AAQ2	AAQ7	AAQ8	
1	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	50.89	46.42	48.83	50.18	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	88.24	73.02	79.49	83.78	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	26.63	19.13	21.57	23.76	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	11.92	11.05	10.14	7.85	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.90	0.95	0.90	0.85	4

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6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	13.47	11.05	12.11	9.18	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	24.80	24.12	21.60	19.20	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	--

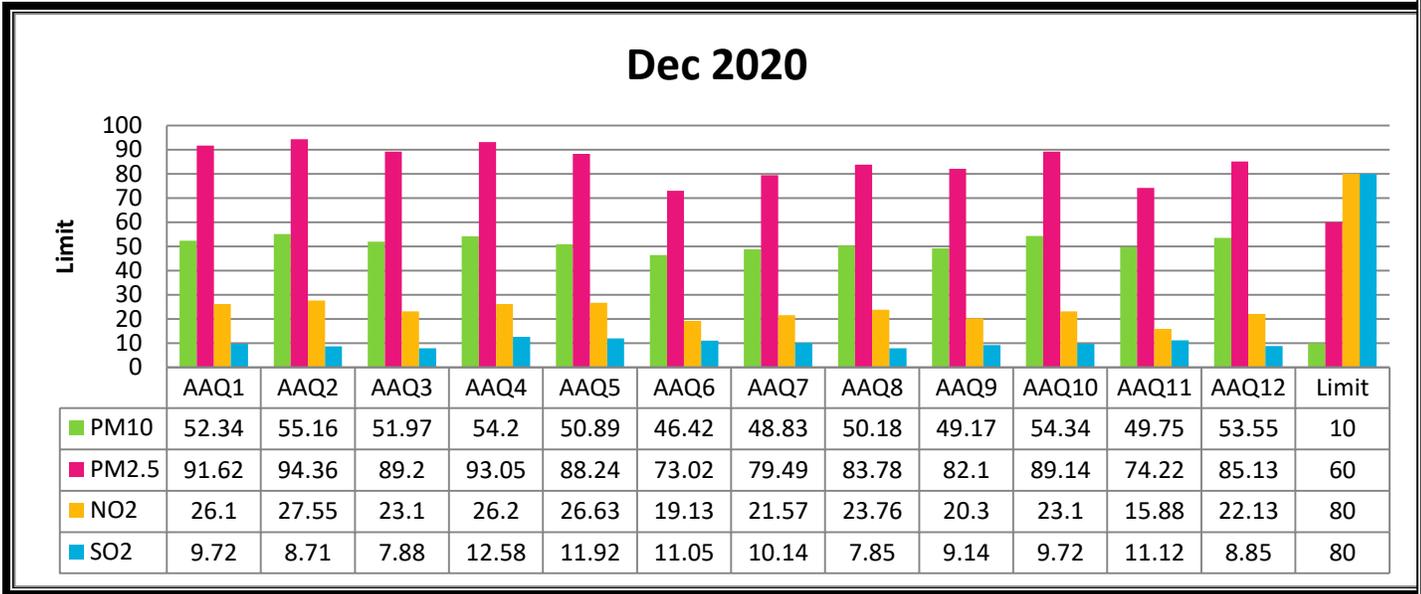
\*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

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

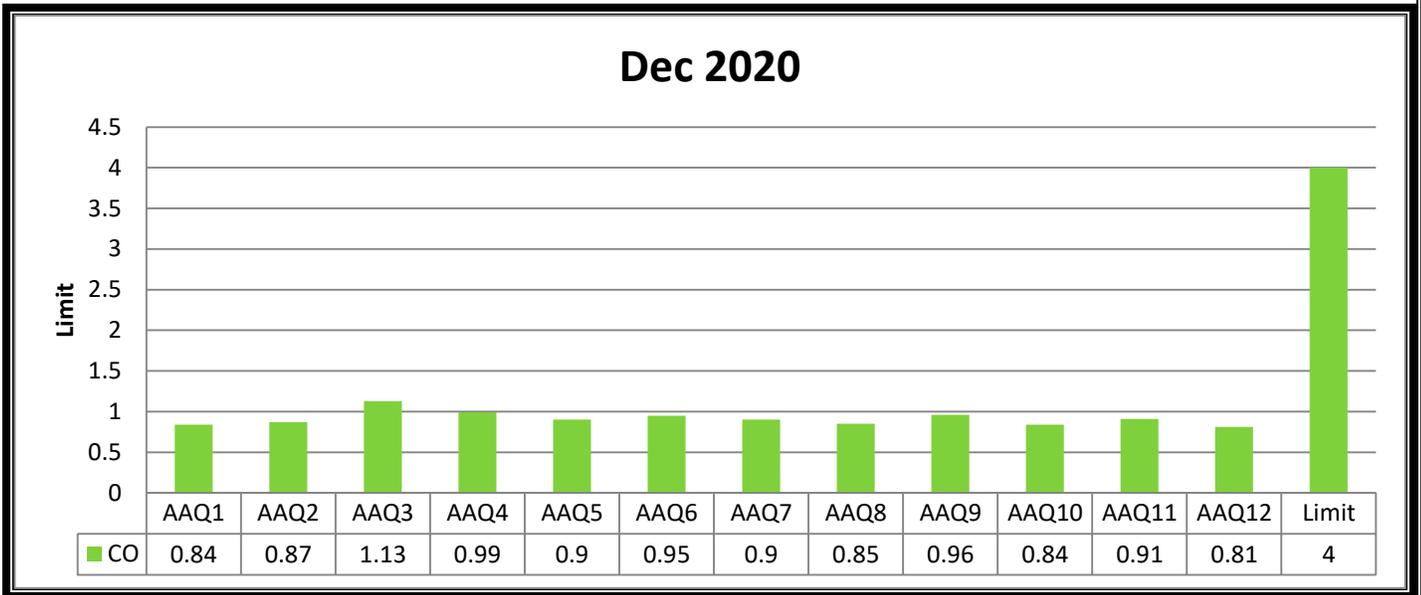
S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	49.17	54.34	49.75	53.55	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	82.10	89.14	74.22	85.13	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	20.30	23.10	15.88	22.13	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	9.14	9.72	11.12	8.85	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.96	0.84	0.91	0.81	4
6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	11.59	12.37	8.79	9.90	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	21.55	22.41	17.78	18.80	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	--

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

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**Figure 3.1 Location-wise Variation of Ambient Air Quality (December 2020)**



**Figure 3.2 Location-wise Variation of CO in Ambient Air Quality (December 2020)**

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**3.1.4 Ambient Air Quality Monitoring Results (March-2021)**

**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 <sub>2.5</sub> ), µg/m <sup>3</sup>	55.73	49.71	51.74	52.61	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	94.18	90.28	90.66	91.78	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	23.65	17.15	16.78	14.23	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	13.45	9.83	11.87	10.41	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.97	0.86	0.89	0.92	4
6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	15.31	9.12	11.73	12.37	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	22.43	15.18	21.27	19.63	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	*BDL(*DL 0.2 ppm(v/v)	*BDL(*DL 0.2 ppm(v/v)	*BDL(*DL 0.2 ppm(v/v)	*BDL(*DL 0.2ppm(v/v)	--

\*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	AAQ2	AAQ7	AAQ8	
1	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	48.25	47.15	50.21	48.16	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	89.12	86.21	89.67	87.95	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	21.75	17.30	20.55	21.73	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	10.33	9.87	12.37	13.15	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	1.01	0.91	0.88	0.98	4

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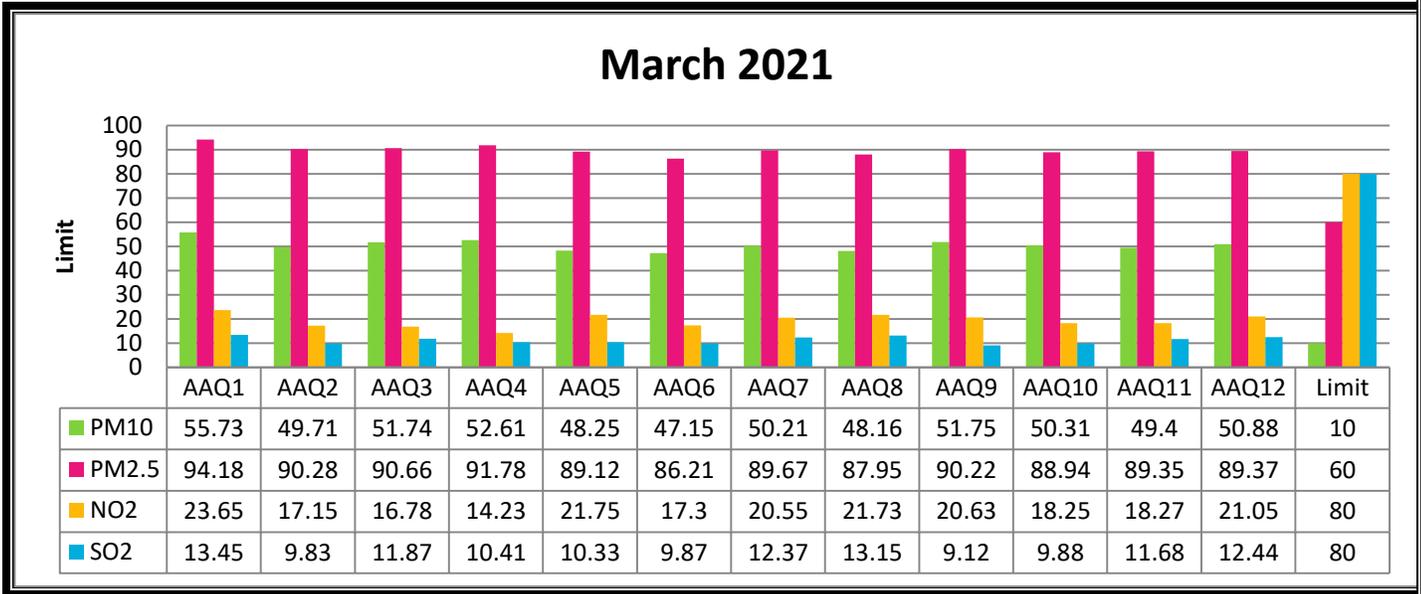
6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	13.26	14.01	13.07	11.04	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	23.64	22.16	24.66	17.38	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2ppm(v/v))	--

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

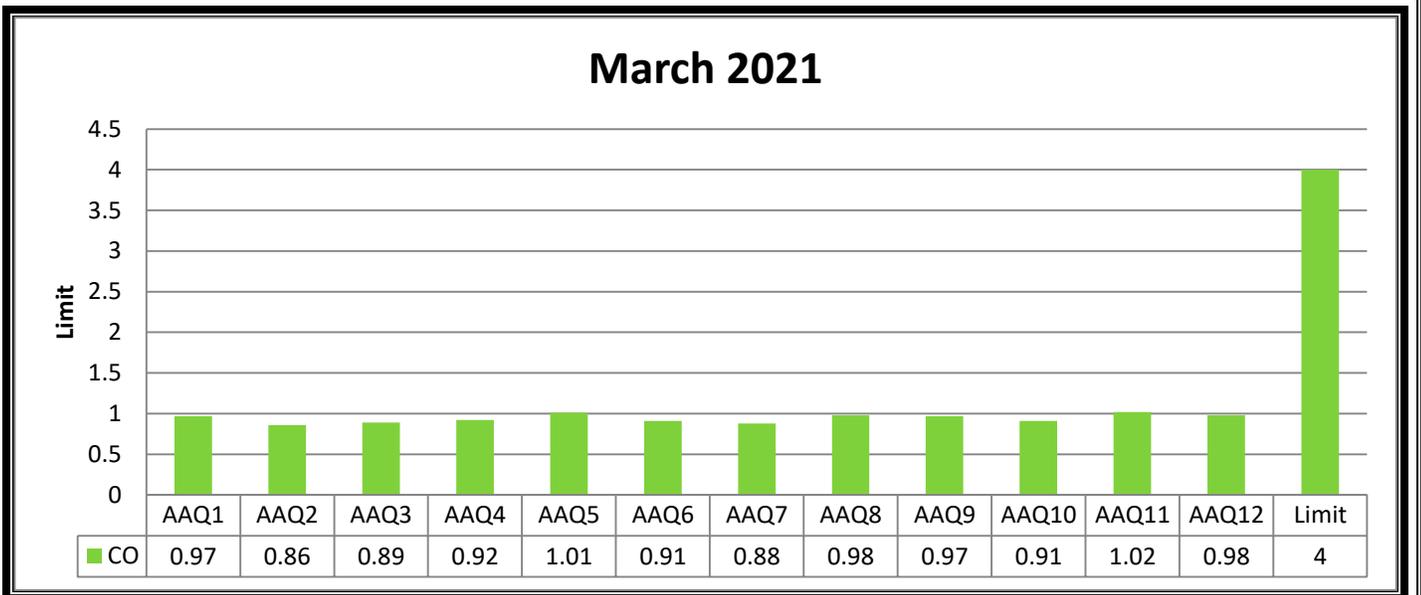
**Table 3.8 Ambient Air Quality Monitoring Results (9-12 Location)**

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	51.75	50.31	49.40	50.88	60
2	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	90.22	88.94	89.35	89.37	100
3	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	20.63	18.25	18.27	21.05	80
4	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	9.12	9.88	11.68	12.44	80
5	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.97	0.91	1.02	0.98	4
6	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	9.05	11.34	12.63	13.54	400
7	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m3)	1			
8	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m3)	05			
9	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m3)	01			
10	Ozone (O <sub>3</sub> ),µg/m <sup>3</sup>	21.75	21.52	17.56	22.18	180
11	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	6			
12	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m3)	20			
13	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m3)	--			
14	Hydrocarbon (as Methane)	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2 ppm(v/v))	*BDL(*DL 0.2ppm(v/v))	--

\*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 (March 2021)**



**Figure 3.4 Location-wise Variation of CO in Ambient Air Quality (March 2021)**

#### 3.1.4 Discussion on Ambient Air Quality in the Study Area

PM<sub>10</sub> and PM<sub>2.5</sub> levels at the project site are within the permissible limit of 100µg/m<sup>3</sup> and 60 µg/m<sup>3</sup> respectively (for residential, rural and other areas as stipulated in the National Ambient Air Quality Standards). SO<sub>2</sub>, NO<sub>x</sub> and CO was observed within the corresponding stipulated limits (Limit for SO<sub>2</sub> and NO<sub>x</sub>: 80 µg/m<sup>3</sup> and limit for CO: 4.0 mg/m<sup>3</sup>) 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**.

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**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 2020	March 2021	
1.	N1	Near Project site	Near Project site	Industrial
2.	N2	Jiwan Singh Wala	Jiwan Singh Wala	Residential
3.	N3	Maawala	Maawala	Residential
4.	N4	Mahi Nangal	Mahi Nangal	Residential
5.	N5	Leleana	Leleana	Residential
6.	N6	Baghi Bandar	Baghi Bandar	Residential
7.	N7	Nasibpura	Nasibpura	Residential
8.	N8	Kothbhara	Kothbhara	Residential
9.	N9	Kot Kashmir	Kot Kashmir	Residential
10.	N10	GehriBoghi	GehriBoghi	Residential
11.	N11	Chathewala	Chathewala	Residential
12.	N12	KotFatta	KotFatta	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.

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**3.2.3 Ambient Noise Monitoring Results (December-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	74.6	62.5	51.7	43.7	60.4	48.5	56.2	46.4
Lmin	53.8	41.6	34.8	27.5	38.3	27.2	35.8	28.6
Leq	63.10	54.30	42.50	34.30	49.20	36.10	45.50	35.30
CPCB Limit (Leq in dB(A) Industrial Limit & Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.0	45.0

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	59.5	47.4	56.1	43.9	59.8	47.9	58.3	49.4
Lmin	37.6	28.3	32.8	25.5	40.2	34.1	37.6	35.2
Leq	48.60	36.20	44.20	35.10	49.20	40.50	49.20	41.52
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.

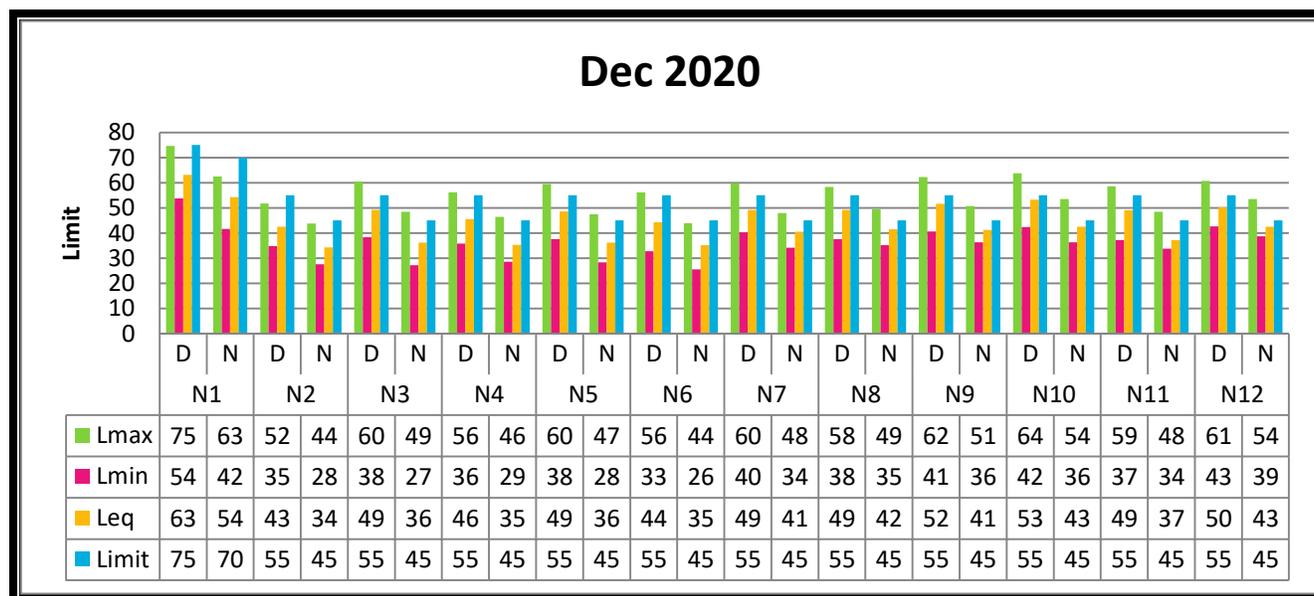
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**Table 3.12 Ambient Noise Monitoring Results (9-12 Location)**

Parameter	N9		N10		N11		N12	
	Day Time	Night Time						
<b>Lmax</b>	62.2	50.7	63.7	53.5	58.6	48.4	60.7	53.5
<b>Lmin</b>	40.6	36.3	42.4	36.3	37.2	33.7	42.6	38.7
<b>Leq</b>	51.60	41.20	53.20	42.50	49.10	37.20	50.20	42.50
<b>CPCB Limit (Leq in dB(A) Residential Limit)</b>	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 3.5 Location-wise Variation of Ambient Noise Levels (December 2020)**

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**3.2.4 Ambient Noise Monitoring Results (March-2021)**

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	76.8	60.7	62.2	53.7	68.3	53.5	58.2	46.4
Lmin	53.1	46.1	43.6	36.4	42.5	35.8	40.1	36.6
Leq	62.47	52.87	53.31	43.24	51.33	42.60	46.50	41.20
CPCB Limit (Leq in dB(A) Industrial Limit & Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.0	45.5

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	63.3	52.2	59.8	54.6	62.8	56.9	60.3	53.7
Lmin	44.6	37.5	43.6	36.7	45.6	35.4	42.6	35.6
Leq	52.32	41.25	50.45	42.11	52.60	43.80	51.10	42.18
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

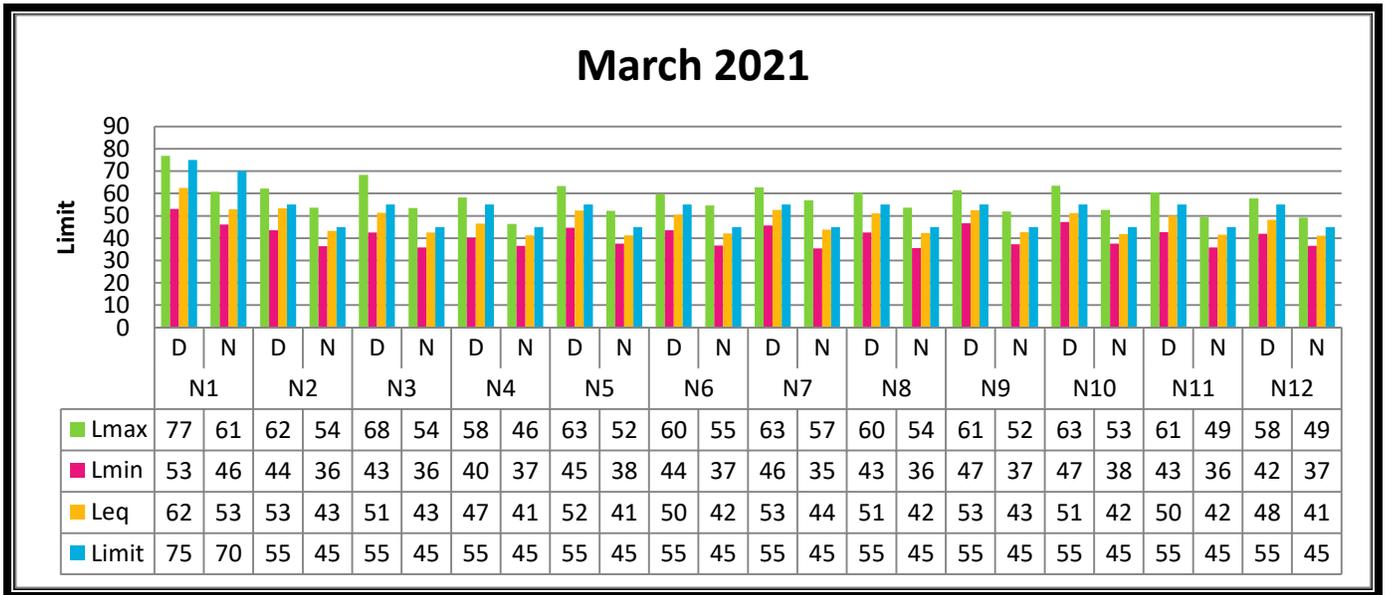
Note: \*A “decibel” is a unit in which noise is measured.

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

Parameter	N9		N10		N11		N12	
	Day Time	Night Time						
Lmax	61.4	51.9	63.4	52.6	60.5	49.3	57.7	49.2
Lmin	46.7	37.2	47.2	37.6	42.7	35.9	41.9	36.5
Leq	52.57	42.68	51.20	41.82	50.10	41.60	48.20	41.12
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 (March 2021)**

**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 dB (A).

### 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	
		June 2020	September 2020
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 2020 & March 2021**. 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 HNO<sub>3</sub>. 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**.

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**3.3.3 Ground Water & Surface Water Quality Monitoring Results (December 2020)**

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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.98	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	321.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	86.74	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	262.37	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	81.48	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	25.41	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	987.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	42.13	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.86	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	9.82	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.18	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.26	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.05	1.5

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25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL (**DL 0.001 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1645	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	29.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.8	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.74	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	210.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	63.41	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	178.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	82.34	mg/l	250	1000

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10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.58	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	615.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	21.64	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.78	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	9.53	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.21	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.42	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1025	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	21.3	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.90	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	311.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	84.96	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	293.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	121.87	mg/l	250	1000
10.	<sup>#</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	24.06	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	710.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	89.37	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	1.05	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.87	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.25	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.34	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1183	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	23.5	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	3.2	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.98	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	273.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	84.69	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	224.56	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	76.45	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	14.99	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	685.00	mg/l	500	2000

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13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	48.67	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.76	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.61	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.24	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.52	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1142	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	28.5	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.5	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.88	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	321.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.74	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	232.56	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	92.54	mg/l	250	1000
10.	<sup>#</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	23.59	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	801.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	79.51	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.86	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.22	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.25	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.58	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1335	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	25.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.55	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	310.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.95	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	258.14	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.16	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	20.79	mg/l	30	100

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12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	759.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	69.24	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 <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	8.93	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.68	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1265	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	26.7	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.6	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.35	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	476.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	129.47	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	298.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	102.66	mg/l	250	1000
10.	<sup>#</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	37.17	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1187.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	88.74	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.89	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	13.67	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.28	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.68	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1978	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	35.7	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	9.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.24 Surface water Quality Monitoring Result (KotFatta)**

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.83	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	21	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	82.34	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1280	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	15.27	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.29	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	513.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.18	mg/l
13.	Sulphate as SO <sup>4</sup>	APHA , 4500 E, Turbidimetric Method	15.34	mg/l
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.58	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	< 5.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	25.50	mg/l

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17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	13.41	mg/l
18.	Total Coliform	IS 1622	34	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l
20.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	196.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	58.31	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	174.45	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.27	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.7	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	92.10	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	34.12	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

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

**Table 3.25 Surface water Quality Monitoring Result (Chathewala)**

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.87	--
2	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3	Turbidity	APHA, 2130 B, Nephelometric Method	19	NTU
4	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5	Taste	APHA , 2160 B, Threshold Test Method	None	--
6	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.74	mg/l
7	Conductivity	APHA, 2510 B, Conductivity Meter Method	1257	μS/cm
8	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	7.63	mg/l
9	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.34	mg/l
10	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	605.00	mg/l
11	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12	Boron	APHA, 4500B C, Carmine Method	0.14	mg/l
13	Sulphate as SO <sup>4</sup>	APHA , 4500 E, Turbidimetric Method	25.18	mg/l
14	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.51	mg/l
15	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	5.00	mg/l
16	COD	APHA, 5220 B, Open Reflux Method	22.00	mg/l
17	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	10.63	mg/l
18	Total Coliform	IS 1622	27	MPN/100ml
19	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

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20	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	204.00	mg/l
21	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	57.12	mg/l
22	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	197.52	mg/l
23	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	14.94	mg/l
24	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.10	mg/l
25	Sodium	APHA, 3500 Na B Flame Photometric Method	92.34	mg/l
26	Potassium	APHA, 3500 Na B Flame Photometric Method	32.51	mg/l
27	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

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

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**3.3.4 Ground Water & Surface Water Quality Monitoring Results (March 2021)**

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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.84	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	312.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	79.82	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	242.51	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	56.88	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	27.42	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	951.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	34.10	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.82	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	7.56	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.17	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.24	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3

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26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL (**DL 0.001 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1585	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	24.82	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.3	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.66	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	198.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	59.34	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	210.63	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	49.20	mg/l	250	1000
10.	<sup>#</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No

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11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.14	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	574.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	19.72	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 <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	9.16	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.22	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.42	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	957	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	20.8	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	4.9	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.81	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	276.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	82.16	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	280.72	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	70.60	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	17.25	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	640.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	76.05	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.98	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	9.12	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.23	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.31	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1067	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	23.8	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	3.5	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.76	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	228.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	71.92	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	232.49	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	51.80	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	11.80	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	610.00	mg/l	500	2000

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13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	41.25	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 <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.34	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.22	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.48	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1017	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	27.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.68	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	283.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	74.63	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	276.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.19	mg/l	250	1000
10.	<sup>#</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	23.52	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	711.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	60.44	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.76	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.53	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.26	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.55	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1185	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	24.1	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.7	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.53	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	214.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	69.16	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	224.05	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	61.51	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.07	mg/l	30	100

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12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	620.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	50.19	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 <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	8.13	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.20	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.63	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1033	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	25.1	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.2	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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**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)	APHA ,4500-H <sup>+</sup> B Electrometric	7.89	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	410.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	113.82	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	354.91	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	86.34	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	30.62	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1043.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	76.44	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.82	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	10.16	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.65	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation

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27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1738	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	32.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	8.6	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/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 <sup>+</sup> B Electrometric Method	7.71	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 1Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	26	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	71.63	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	803	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	13.56	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	482.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.16	mg/l
13.	Sulphate as SO <sup>4</sup>	APHA , 4500 E, Turbidimetric Method	14.46	mg/l
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.57	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	5.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	24.00	mg/l

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17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	12.06	mg/l
18.	Total Coliform	IS 1622	29	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l
20.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	173.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	51.22	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	161.02	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.98	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.1	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	76.40	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	29.88	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	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 <sup>+</sup> B Electrometric Method	7.83	--
2	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 1Hazen)	Hazen
3	Turbidity	APHA, 2130 B, Nephelometric Method	20	NTU
4	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5	Taste	APHA , 2160 B, Threshold Test Method	None	--
6	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	69.41	mg/l
7	Conductivity	APHA, 2510 B, Conductivity Meter Method	913	µS/cm
8	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	7.10	mg/l
9	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.31	mg/l
10	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	548.00	mg/l
11	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12	Boron	APHA, 4500B C, Carmine Method	0.11	mg/l
13	Sulphate as SO <sup>4</sup>	APHA , 4500 E, Turbidimetric Method	21.54	mg/l
14	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.45	mg/l
15	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
16	COD	APHA, 5220 B, Open Reflux Method	29.00	mg/l
17	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	9.12	mg/l
18	Total Coliform	IS 1622	25	MPN/100ml
19	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

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20	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	192.00	mg/l
21	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	65.74	mg/l
22	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	217.12	mg/l
23	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	6.80	mg/l
24	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.02	mg/l
25	Sodium	APHA, 3500 Na B Flame Photometric Method	87.36	mg/l
26	Potassium	APHA, 3500 Na B Flame Photometric Method	29.51	mg/l
27	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

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

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**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 2020	March 2021
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 2020 & March 2021**.

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.

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**3.4.3 Soil Monitoring Results (December 2020)**

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 0C)	IS : 2720 (P-26) by pH Meter	7.75	--
2.	Conductivity	IS:14767 by Conductivity meter	0.316	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	22.34	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.51	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	53.01	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	39.22	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	42.64	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	134.26	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.68	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.58	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	19.55	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	206.16	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	16.22	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	10.86	mg/kg
17.	Organic Carbon	USEPA 3050B	0.40	%
18.	Lead (as Pb)	USEPA 3050B	0.81	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.88	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.13	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	14.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 0C)	IS : 2720 (P-26) by pH Meter	7.57	--
2.	Conductivity	IS:14767 by Conductivity meter	0.332	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	31.46	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.43	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	48.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	35.66	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	50.16	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	149.35	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.50	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.47	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	27.41	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	232.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.36	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.08	mg/kg
17.	Organic Carbon	USEPA 3050B	0.31	%
18.	Lead (as Pb)	USEPA 3050B	0.70	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.45	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.72	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.6	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.61	--
2.	Conductivity	IS:14767 by Conductivity meter	0.324	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	28.16	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.74	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	39.12	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	60.35	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	55.31	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	128.62	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.31	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.69	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	19.27	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	221.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	29.51	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.46	mg/kg
17.	Organic Carbon	USEPA 3050B	0.22	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.43	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.01	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.40	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	19.3	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 OC)	IS : 2720 (P-26) by pH Meter	7.52	--
2.	Conductivity	IS:14767 by Conductivity meter	0.331	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	25.65	%
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	50.49	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.33	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	59.10	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	139.74	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.69	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	30.16	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	225.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	15.46	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	7.29	mg/kg
17.	Organic Carbon	USEPA 3050B	0.23	%
18.	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.69	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.41	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.49	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.80	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	17.5	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.64	--
2.	Conductivity	IS:14767 by Conductivity meter	0.339	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	32.16	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.77	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	62.51	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	48.33	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	56.71	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	151.06	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.82	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	27.06	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	238.32	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.11	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.90	mg/kg
17.	Organic Carbon	USEPA 3050B	0.25	%
18.	Lead (as Pb)	USEPA 3050B	0.94	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.87	mg/kg
21.	Copper (as Cu )	USEPA 3050B	7.16	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.52	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	15.8	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 0C)	IS : 2720 (P-26) by pH Meter	7.57	--
2.	Conductivity	IS:14767 by Conductivity meter	0.340	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	40.11	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.67	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	54.86	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	43.15	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	53.29	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	161.85	kg/hec.
11.	Iron as Fe	USDA Method, 1968	0.61	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.73	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	34.16	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	242.69	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.34	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.63	mg/kg
17.	Organic Carbon	USEPA 3050B	0.29	%
18.	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.48	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.69	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	19.9	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.76	--
2.	Conductivity	IS:14767 by Conductivity meter	0.356	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	43.51	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.80	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	53.96	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	69.85	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	61.02	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	127.65	kg/hec.
11.	Iron as Fe	USDA Method, 1968	0.52	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	25.13	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	238.00	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	33.59	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	17.29	mg/kg
17.	Organic Carbon	USEPA 3050B	0.43	%
18.	Lead (as Pb)	USEPA 3050B	0.61	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.78	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.16	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.59	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	21.1	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.50	--
2.	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	25.08	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.24	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	42.16	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	48.44	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.08	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	145.49	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.64	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	39.47	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	228.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	20.39	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	83.15	mg/kg
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.64	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.52	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.47	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.94	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	21.8	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 0C)	IS : 2720 (P-26) by pH Meter	7.87	--
2.	Conductivity	IS:14767 by Conductivity meter	0.341	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	28.57	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.65	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	58.36	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	44.18	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.22	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	154.78	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.79	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.70	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	23.61	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	229.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	26.54	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.47	mg/kg
17.	Organic Carbon	USEPA 3050B	0.55	%
18.	Lead (as Pb)	USEPA 3050B	0.91	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.95	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.65	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	22.5	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.59	--
2.	Conductivity	IS:14767 by Conductivity meter	0.325	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	35.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.51	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.95	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	47.11	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	54.07	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	161.70	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.71	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.82	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	32.67	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	257.68	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	23.21	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.99	mg/kg
17.	Organic Carbon	USEPA 3050B	0.40	%
18.	Lead (as Pb)	USEPA 3050B	0.75	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.60	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.72	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.31	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.3	%

\*SOP-Laboratory Standard Operating Procedure.

#Chromium- This parameter is not covered our NABL scope.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.68	--
2.	Conductivity	IS:14767 by Conductivity meter	0.318	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.86	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.75	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	63.28	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	47.31	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	48.28	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	139.18	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.75	mg/100g
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	21.49	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	207.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.67	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.71	mg/kg
17.	Organic Carbon	USEPA 3050B	0.47	%
18.	Lead (as Pb)	USEPA 3050B	1.06	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.89	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.37	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.39	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	22.5	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.78	--
2.	Conductivity	IS:14767 by Conductivity meter	0.347	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	32.66	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.87	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	59.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	68.34	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.32	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	118.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.41	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.85	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	23.69	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	211.02	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	56.45	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	15.32	mg/kg
17.	Organic Carbon	USEPA 3050B	0.51	%
18.	Lead (as Pb)	USEPA 3050B	0.73	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.81	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.72	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.49	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	17.5	%

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**3.4.4 Soil Monitoring Results (March 2021)**

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 0C)	IS : 2720 (P-26) by pH Meter	7.67	--
2.	Conductivity	IS:14767 by Conductivity meter	0.321	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	32.60	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.32	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	54.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	40.32	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	43.83	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	135.94	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.10	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.99	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	20.35	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	210.45	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	17.21	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.45	mg/kg
17.	Organic Carbon	USEPA 3050B	0.58	%
18.	Lead (as Pb)	USEPA 3050B	0.83	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.89	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.37	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	15.6	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 0C)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767 by Conductivity meter	0.335	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.20	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.34	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	50.18	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	36.75	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	52.06	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	151.02	kg/hec.
11.	Iron as Fe	USDA Method, 1968	2.60	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.91	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	28.17	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	238.00	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	21.53	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.27	mg/kg
17.	Organic Carbon	USEPA 3050B	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.78	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.47	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.78	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.43	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	14.8	%

\*SOP-Laboratory Standard Operating Procedure.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.68	--
2.	Conductivity	IS:14767 by Conductivity meter	0.328	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.27	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.26	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	40.25	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	61.19	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	56.30	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	129.72	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.40	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	23.15	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	225.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	31.49	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.56	mg/kg
17.	Organic Carbon	USEPA 3050B	0.42	%
18.	Lead (as Pb)	USEPA 3050B	0.63	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.49	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.12	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.44	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 OC)	IS : 2720 (P-26) by pH Meter	7.57	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	33.80	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.29	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	52.45	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	46.72	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	62.81	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	142.18	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.96	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.76	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	32.05	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	231.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.58	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	7.35	mg/kg
17.	Organic Carbon	USEPA 3050B	0.44	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.73	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.48	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.55	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.86	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.4	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.73	--
2.	Conductivity	IS:14767 by Conductivity meter	0.341	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.28	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.31	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	63.24	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	49.31	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	58.16	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	152.46	kg/hec.
11.	Iron as Fe	USDA Method, 1968	2.76	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.75	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	28.13	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	242.72	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	26.86	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.73	mg/kg
17.	Organic Carbon	USEPA 3050B	0.43	%
18.	Lead (as Pb)	USEPA 3050B	0.96	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.85	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.83	mg/kg
21.	Copper (as Cu )	USEPA 3050B	7.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.54	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**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 0C)	IS : 2720 (P-26) by pH Meter	7.54	--
2.	Conductivity	IS:14767 by Conductivity meter	0.335	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	42.18	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.34	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.74	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.12	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	54.79	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	163.41	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.84	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.78	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	35.80	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	245.26	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	19.78	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.72	mg/kg
17.	Organic Carbon	USEPA 3050B	0.45	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.43	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.61	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.39	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.3	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.80	--
2.	Conductivity	IS:14767 by Conductivity meter	0.344	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	41.12	%
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	51.67	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	67.15	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	59.72	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	125.34	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.96	mg/100g
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	24.83	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	251.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	31.73	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	16.72	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.58	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.74	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.05	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.56	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	20.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.45	--
2.	Conductivity	IS:14767 by Conductivity meter	0.331	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.06	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.26	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	41.48	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	46.12	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	50.65	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	141.49	kg/hec.
11.	Iron as Fe	USDA Method, 1968	2.06	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	37.25	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	221.00	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.45	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.25	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.61	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.47	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.38	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.92	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.82	--
2.	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	32.60	%
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	56.46	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	42.15	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	48.52	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	153.19	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.61	mg/100g
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	22.17	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	223.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.43	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.41	mg/kg
17.	Organic Carbon	USEPA 3050B	0.34	%
18.	Lead (as Pb)	USEPA 3050B	0.87	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.91	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.56	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.38	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.2	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.56	--
2.	Conductivity	IS:14767 by Conductivity meter	0.319	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.72	%
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	54.16	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.72	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.06	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	157.23	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.95	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.82	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	31.46	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	251.75	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	21.78	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.83	mg/kg
17.	Organic Carbon	USEPA 3050B	0.47	%
18.	Lead (as Pb)	USEPA 3050B	0.71	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.57	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.25	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.29	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	15.6	%

\*SOP-Laboratory Standard Operating Procedure.

#Chromium- This parameter is not covered our NABL scope.

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

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.61	--
2.	Conductivity	IS:14767 by Conductivity meter	0.313	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	33.60	%
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	61.43	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.78	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	45.16	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	132.87	kg/hec.
11.	Iron as Fe	USDA Method, 1968	2.45	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.54	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	20.78	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	201.00	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.63	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.42	mg/kg
17.	Organic Carbon	USEPA 3050B	0.31	%
18.	Lead (as Pb)	USEPA 3050B	0.97	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.82	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.28	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	20.5	%

\*SOP-Laboratory Standard Operating Procedure.

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**(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 0C)	IS : 2720 (P-26) by pH Meter	7.70	--
2.	Conductivity	IS:14767 by Conductivity meter	0.343	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	36.40	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.31	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.12	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	65.41	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	49.25	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	108.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.09	mg/100g
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	21.32	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	202.49	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.20	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	13.46	mg/kg
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.75	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.67	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.45	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP, SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

\*SOP-Laboratory Standard Operating Procedure.

#### **3.4.4 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.



## PUNJAB POLLUTION CONTROL BOARD

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

Website:- [www.ppcb.gov.in](http://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"><li>• Bio-mass @ 500 TPD.</li><li>• Yeast @ .05 TPD</li><li>• Acid @ 10 TPD</li><li>• Enzymes @ 3.5 TPD</li><li>• Nutrients @ 4 TPD</li><li>• Chemicals @ 23 TPD</li></ul>

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



04/01/2021

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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.



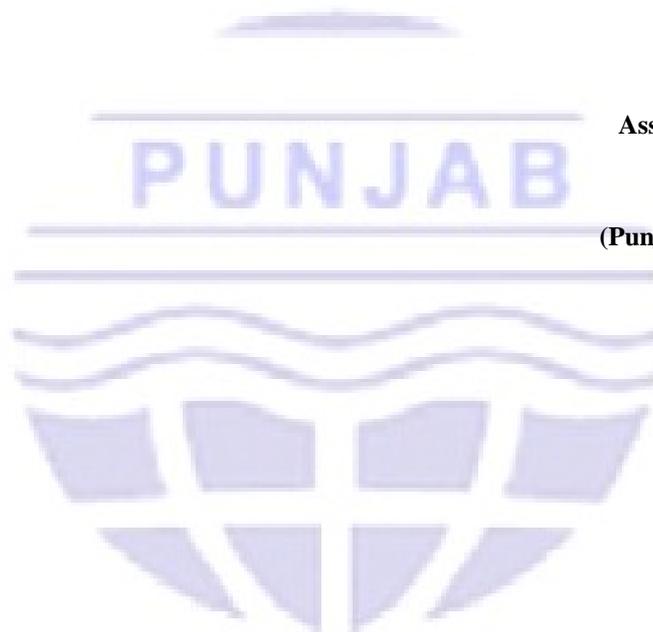
04/01/2021

**(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 whichever 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 <sub>2</sub> 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.

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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)**

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*Page6*



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*Page 7*

**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.



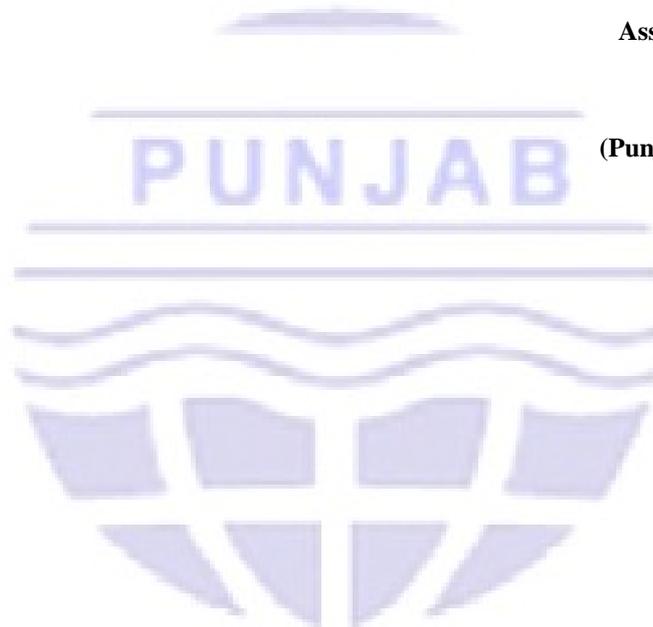
04/01/2021

**(Ruby Sidhu)**  
**Asstt Environmental Engineer**

*For & on behalf*

*of*

**(Punjab Pollution Control Board)**





सत्यमेव जयते

**By Speed Post/Online**

**F.No.J-11011/221/2017- IA II(I)**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Impact Assessment Division)**

\*\*\*

Indira Paryavaran Bhawan  
Jorbagh Road, New Delhi - 110003

**Dated: 23<sup>rd</sup> September, 2020**

To

**M/s Hindustan Petroleum Corporation Limited**  
6<sup>th</sup> Floor, Core – II, North Tower, Scope Minar  
Lakshmi Nagar, Delhi-110092

Email: sanjoykr@hpcl.in

**Sub: Setting up 2G Ethanol Bio-refinery Plant of capacity 100 KLPD at Village Nasibpura, Tehsil Talwandi Sabo, Bathinda, Punjab by M/s Hindustan Petroleum Corporation Limited- Amendment in the Environmental Clearance-reg.**

Sir,

This has reference to your proposal No. IA/PB/IND2/154665/2020 dated 28<sup>th</sup> May 2020, for amendment in the environmental clearance (EC) granted for the above project.

2. The Ministry has granted environmental clearance vide letter dated 14<sup>th</sup> August, 2018 to the project for Setting up 2G Ethanol Bio-refinery Plant of capacity 100 KLPD at Village Nasibpura, Tehsil Talwandi Sabo, Bathinda, Punjab in favour of M/s Hindustan Petroleum Corporation Limited.

3. The project proponent has now requested for amendment in the EC with the details are as under;

S. No.	Para of EC issued by Ministry	Details as per the EC	To be revised/ read as																				
1.	Para No.2	2G Ethanol Bio-refinery plant of capacity 100 KLPD in total area of 15.1 Ha.	The area of Bio-refinery is changed from 15.1 Ha to 20.9 Ha																				
2.	Para No.3	Details of by-products: <table border="1"><tr><td>CO<sub>2</sub> (raw)</td><td>80 TPD</td></tr><tr><td>Methanol</td><td>0.03 KLPD</td></tr><tr><td>Technical Alcohol</td><td>N/A</td></tr><tr><td>FO</td><td>0.3 KLPD</td></tr><tr><td>Ash</td><td>60 TPD</td></tr></table>	CO <sub>2</sub> (raw)	80 TPD	Methanol	0.03 KLPD	Technical Alcohol	N/A	FO	0.3 KLPD	Ash	60 TPD	Details of By-Product <table border="1"><tr><td>CO<sub>2</sub> (raw)</td><td>75-76 TPD</td></tr><tr><td>Methanol</td><td>N/A</td></tr><tr><td>Technical Alcohol</td><td>2 KLPD</td></tr><tr><td>FO</td><td>0.3 KLPD</td></tr><tr><td>Ash</td><td>115-125 TPD</td></tr></table>	CO <sub>2</sub> (raw)	75-76 TPD	Methanol	N/A	Technical Alcohol	2 KLPD	FO	0.3 KLPD	Ash	115-125 TPD
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FO	0.3 KLPD																						
Ash	115-125 TPD																						

3.	Para No.4	Greenbelt will be developed in 4.98 ha. Total Estimated cost is 850 Crores. Environmental pollution control measures will be Rs. 13.5 Crores. The recurring cost (O&M) will be about Rs. 123 Crores per annum.	Greenbelt will be developed in 6.88 ha. Total Estimated cost is Rs. 1096.25 Crores. Environmental pollution control measures will be Rs. 38 Crores. The recurring cost (O&M) will be about Rs. 240.09 Crores per annum.																																
4.	Para No.6	<ul style="list-style-type: none"> <li>• Fresh water requirement 1800 Cum/day.</li> <li>• Power requirement 10.5 MW</li> <li>• 2 X 500 KVA DG sets</li> <li>• Two rice straw/Cotton stalk fired boiler of 35 TPH</li> </ul>	<ul style="list-style-type: none"> <li>• Fresh water requirement 2280 Cum/day.</li> <li>• Power requirement 11.5 MW</li> <li>• 2 X 2000 KVA DG sets</li> <li>• Two rice straw/Cotton stalk fired boiler of 42 TPH</li> </ul>																																
5.	Para No.7	<table border="1"> <tr> <td colspan="2">Hazardous waste</td> </tr> <tr> <td>Used Lubricants</td> <td>0.5 MTM</td> </tr> <tr> <td>Used Containers (Metal &amp; Plastic)</td> <td>1200 (Nos.)</td> </tr> <tr> <td>HDPE/LDTE/Gunny bags</td> <td>800 (Nos.)</td> </tr> <tr> <td colspan="2">Non Hazardous waste</td> </tr> <tr> <td>Mud</td> <td>8 TPD</td> </tr> <tr> <td>Ash</td> <td>79.2 TPD</td> </tr> <tr> <td>Dewatered sludge</td> <td>N/A</td> </tr> </table> <p>Solid and Harzardous waste generated as:Used Lubricants 0.5 MTM , Used Container(Metal and Plastic) 1200, HDPE/LDTE/Gunny Bags 800 Non-Hazardous Waste Generated as: Mud 8 TPD, Ash 79.2 TPD</p>	Hazardous waste		Used Lubricants	0.5 MTM	Used Containers (Metal & Plastic)	1200 (Nos.)	HDPE/LDTE/Gunny bags	800 (Nos.)	Non Hazardous waste		Mud	8 TPD	Ash	79.2 TPD	Dewatered sludge	N/A	<table border="1"> <tr> <td colspan="2">Hazardous waste</td> </tr> <tr> <td>Used Lubricants</td> <td>0.5-0.7 MTM</td> </tr> <tr> <td>Used Containers (Metal &amp; Plastic)</td> <td>1300 (Nos.)</td> </tr> <tr> <td>HDPE/LDTE/Gunny bags</td> <td>1700 (Nos.)</td> </tr> <tr> <td colspan="2">Non Hazardous waste</td> </tr> <tr> <td>Mud</td> <td>8-10 TPD</td> </tr> <tr> <td>Ash</td> <td>115-125 TPD</td> </tr> <tr> <td>Dewatered sludge</td> <td>8-9 TPD</td> </tr> </table> <p>Solid and Harzardous waste generated as:Used Lubricants 0.5-0.7 MTM , Used Container(Metal and Plastic) 1300, HDPE/LDTE/Gunny Bags 1700 Non-Hazardous Waste Generated as: Mud 8-10 TPD, Ash 115-125 TPD and De-watered sludge 8-9 TPD</p>	Hazardous waste		Used Lubricants	0.5-0.7 MTM	Used Containers (Metal & Plastic)	1300 (Nos.)	HDPE/LDTE/Gunny bags	1700 (Nos.)	Non Hazardous waste		Mud	8-10 TPD	Ash	115-125 TPD	Dewatered sludge	8-9 TPD
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6.	Para No.11 (f)	Total fresh water requirement shall not exceed 1800 Cum/day.	Total fresh water requirement shall not exceed 2280 Cum/day.																																

4. The proposal was considered by the Expert Appraisal Committee (Industry-2) in its meeting held on 14-16 July, 2020 in the Ministry. The project proponent has informed the Committee that the previous technology has failed to meet the performance guarantees for water, power, consumables and ethanol yield. The technology had many gaps in BEDP and proprietary equipment hence, HPCL has to adopt new technology which is well proven at demonstration scale plant. All the changes are attributable to change in technology. The additional land of 5.8 ha is under possession of HPCL since March, 2019 and was originally to be utilized for biomass storage. Green belt shall be increased to cover 33% of the project area. Capital cost and O&M cost has increased due to change in equipment and technology.

The EAC noted that the amendment in EC is necessitated due to changes in technology adopted by the project proponent for the bio-refinery project to produce ethanol from Biomass. The Committee took serious note on the techno-economic

viability of the project, and also huge requirement of fresh water and additional land. However, considering adverse impact of burning of paddy/rice straw (stubble burning) in the country and particularly in the NCR, significantly contributing to air pollution especially during winters, the Committee agreed to consider the proposal. The EAC after detailed deliberations, considering the importance of the project, improvement in technology and R&D in the area, has of the view that such projects require encouragement and has accordingly recommended for amendment in EC as proposed by the project proponent.

5. Based on recommendations of the EAC, Ministry hereby accords approval for amendment in the environmental clearance dated 14<sup>th</sup> August, 2018, with all other terms and conditions stipulated therein remain unchanged.

6. This issues with approval of the competent authority.

*23/09/2020*  
**(Dr. R. B. Lal)**

**Scientist 'E'/Additional Director**

**Copy to:-**

1. The Deputy DGF (C), MoEF&CC Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg, Chandigarh – 30
2. The Secretary, Department of Science, Technology and Environment, Government of Punjab, Civil Secretariat, Chandigarh
3. The Member Secretary, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex East Arjun Nagar, Delhi – 32
4. The Member Secretary, Punjab Pollution Control Board, Vatavaran Bhawan, Patiala (Punjab)
5. Guard File/Monitoring File/Website/Record File

*o/copy*

*23/09/2020*  
**(Dr. R. B. Lal)**

**Scientist 'E'/Additional Director**

Tele-fax: 011-24695362

Email-rb.lal@nic.in

**F. No. J-11011/221/2017- IA II(I)**  
Government of India  
Ministry of Environment, Forest and Climate Change  
(IA-II Division)

Indira Paryavaran Bhawan  
Jorbagh Road, New Delhi - 3  
Dated: 14<sup>th</sup> August, 2018

To,

**M/s Hindustan Petroleum Corporation Limited**  
17, Jamshedji Tata Road,  
**Mumbai** - 400 020 (Maharashtra)

**Sub: Setting up 2G Ethanol Bio-refinery Plant of capacity 100 KLPD by M/s Hindustan Petroleum Corporation Limited at Village Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab) - Environmental Clearance - reg.**

**Ref: Online proposal No.IA/PB/IND2/64593/2017 dated 18<sup>th</sup> July, 2018.**

Sir,

This has reference to your online proposal No.IA/PB/IND2/64593/2017 dated 18<sup>th</sup> July, 2018 for environmental clearance to the above project, along with project documents namely, EIA/EMP report containing the public hearing details for the above mentioned project.

2. The Ministry of Environment, Forest and Climate Change has examined the proposal for environmental clearance to the project for setting up 2G Ethanol Bio-refinery plant of capacity 100 KLPD by M/s Hindustan Petroleum Corporation Limited in a total area of 15.1 ha at Village Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab).

3. The details of the products and by-products are as under:-

S. No.	Product	Capacity
1	Ethanol	100 KLPD

By-Product		
1	CO <sub>2</sub>	80 TPD
2	Ash (with Silica)	60 TPD
3	Fuel Oil	0.3 KLPD
4	Methanol	0.03 KLPD

4. Total land area requirement will be 15.1 ha. Green belt will be developed in 4.98 ha, covering 33 % of total project area. Total estimated project cost is Rs.850 crore. The capital cost earmarked for environmental pollution control measures will be Rs.13.5 crore, and the recurring cost (operation & maintenance) will be about Rs.123 crore per annum.



5. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc within the 10 km of the project site. Lasara drain is situated at a distance of 0.67 km in SE direction.

6. Total water requirement is estimated to be 4972 cum/day, out of which fresh water requirement of 1800 cum/day will be met from canal supply.

Total effluent generated from different industrial operations is estimated to be 3340 cum/day, which shall be treated through the RO and MEE. Treated water of 3172 cum/day shall be recycled to meet the process requirements. There will be no discharge of treated/ untreated waste water from the unit and thus ensuring zero liquid discharge.

Power requirement of 10.5 MW is proposed to be met from State Power Distribution Corporation Limited (SPDCL). Two DG sets of 500 KVA capacity each will be used during power failure. Adequate stack height shall be provided to the proposed DG sets as per CPCB norms.

Two rice straw/cotton stalk fired boilers of 35 TPH each will be installed. Electrostatic Precipitator (ESP) with a stack height of 70 m will be provided to control the particulate emissions within the statutory norms.

7. Details of solid waste/hazardous waste generation and its management are as under:-

(a) Hazardous Waste

Waste	Quantity	Disposal
Used Lubricants	0.5 MTM	CHWTSDF
Used Containers (Metal & Plastic)	1200 (Nos.)	Decontamination & Re-use or sell to Scrap vendors
HDPE/ LDTE/ Gunny Bags	800 (Nos.)	Decontamination & Re-use or sell to Scrap vendors

(b) Non-Hazardous Solid Waste

Waste	Qty.	Remarks
Mud	8 TPD	used in construction business.
Ash (comprising silica)	60 TPD (For Rice straw)	to be sold
Ash	19.2 TPD (For Cotton Stalk)	to be sold

8. The project/activity is covered under category A of item 5(g) 'Distilleries' of Schedule of Environment Impact Assessment (EIA) Notification, 2006, and requires appraisal at central level by the sectoral EAC in the Ministry.

9. The ToR for the project was granted on 19<sup>th</sup> July, 2017, and public hearing was conducted by the State Pollution Control Board on 2<sup>nd</sup> May, 2018.

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10. The proposal was considered by the Expert Appraisal Committee (Industry-2) in its 39<sup>th</sup> meeting held during 25-27 July, 2018. The project proponent and their accredited consultant M/s Ultratech, presented the EIA / EMP report as per the ToR. The Committee found the EIA / EMP Report to be satisfactory and complying with the ToR. The Committee has recommended the proposal for grant of environmental clearance.

11. Based on the proposal submitted by the project proponent and recommendations of the EAC (Industry-2), the Ministry of Environment, Forest and Climate change hereby accords environmental clearance to the project for setting up **2G Ethanol Bio-Refinery Plant of capacity 100 KLPD** by M/s Hindustan Petroleum Corporation Limited in a total area of 15.1 ha at Village Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab), under the provisions of the EIA Notification, 2006, subject to the compliance of terms and conditions as below:-

- (a) The final product (Ethanol) shall be used exclusively for fuel blending only.
- (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.
- (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.
- (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.
- (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.
- (f) Total fresh water requirement shall not exceed 1800 cum/day, proposed to be met from canal supply.
- (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.
- (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) The company shall undertake waste minimization measures as below:-
  - (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.



- (j) 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.
- (k) All the commitments made regarding issues raised during the public hearing/ consultation meeting shall be satisfactorily implemented.
- (l) 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.
- (m) 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.
- (n) 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.
- (o) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
- (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.
- (q) Storage of raw materials shall be either stored in silos or in covered areas to prevent dust pollution and other fugitive emissions.
- (r) 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 meters in the channel/drain carrying effluent within the premises.
- (s) CO<sub>2</sub> generated from the process shall be bottled/made solid ice/value added products and sold to authorized vendors.

**11.1** The grant of Environmental Clearance is further subject to compliance of other generic conditions as under:-

- (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.
- (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.



- (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 stations each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.
- (iv) The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16<sup>th</sup> November, 2009 shall be complied with.
- (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).
- (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.
- (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.
- (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.
- (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.
- (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.
- (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 Change as 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.
- (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.
- (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

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Zonal office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.

(xiv) The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional offices of MoEF&CC by e-mail.

(xv) The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry 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.

12. 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.

13. 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.

  
14/8/2018  
(S. K. Srivastava)  
Scientist E

**Copy to: -**

1. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (NZ), Bays No.24-25, Sector 31-A, Dakshin Marg, Chandigarh - 160030
2. The Secretary, Department of Science, Technology & Environment, Government of Punjab, **Chandigarh**
3. The Member Secretary, Central Pollution Control Board, Parivesh Bhavan, East Arjun Nagar, **Delhi** - 32
4. The Member Secretary, Punjab Pollution Control Board, Vatavaran Bhawan, Nabha Road, Patiala, 147001 (Punjab)
5. Monitoring Cell, Ministry of Environment, Forest and Climate Change, **New Delhi**
6. Guard File/Monitoring File/Record File

  
14/8/2018  
(S. K. Srivastava)  
Scientist E



# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/HPCL/AA/01 Report No.: VEL/AA/2012/21/001  
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
 Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
 Reporting Date: 26/12/2020  
 Latitude: 30° 3' 13.34"N Period of Analysis: 21/12/2020 - 26/12/2020  
 Longitude: 75° 0' 41.57"E Receipt Date: 21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative

Sampling Location : Near Project Site

Instrument Used : RDS & FPS sampler with all Accessories

Instrument Code : VEL/RDS/01 & VEL/FPS/01

Instrument Calibration Status : Calibrated

Meteorological condition during monitoring : Clear Sky

Date of Monitoring : 16/12/2020 to 17/12/2020

Time of Monitoring : 10:15 AM – 10:15 AM

Ambient Temperature (°C) : Min. 11°C Max. 21°C

Surrounding Activity : Human & Vehicular Activities

Scope of Monitoring : Regulatory Requirement

Control measure if Any : No

Sampling & Analysis Protocol : IS-5182

Parameter Required : As per client requirement.

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>at</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	53.14	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	92.36	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.15	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.54	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.95	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	14.21	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	21.68	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	ppm(v/v)	--

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

# Vardan Enviro Lab Standard Operating Procedure. \*\*BDL- Below Detection Limit, \*DL- Detection Limit

KOMAL SINGH  
ANALYST  
*[Signature]*

ARJUN RAWAT  
(Checked by)  
*[Signature]*

(Approved By)  
PRAJAP SINGH  
AUTHORIZED SIGNATURE  
*[Signature]*

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/AA/02	Report No.:	VEL/AA/2012/21/002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 3' 37.63"N	Party Reference No.:	NIL
Longitude:	75° 2' 75.30"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative

Sampling Location : Jiwan Singh Wala

Instrument Used : RDS & FPS sampler with all Accessories

Instrument Code : VEL/RDS/03& VEL/FPS/03

Instrument Calibration Status : Calibrated

Meteorological condition during monitoring : Clear Sky

Date of Monitoring : 16/12/2020 to 17/12/2020

Time of Monitoring : 10:30 AM – 10:30 AM

Ambient Temperature (°C) : Min. 11°C Max. 21°C

Surrounding Activity : Human & Vehicular Activities

Scope of Monitoring : Regulatory Requirement

Control measure if Any : No

Sampling & Analysis Protocol : IS-5182

Parameter Required : As per client requirement.

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>at</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	48.32	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.15	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	14.64	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.28	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.83	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	9.02	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	16.37	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	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

**KOMAL SINGH**

ANALYST

**ARJUN RAWAT**

CLIENT

(Approved By)

GAURAV

PRATAP SINGH

AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AA/03	Report No.:	VEL/AA/2012/21/003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 2' 33.23"N	Party Reference No.:	NIL
Longitude:	75° 58' 6.88"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Maanwala
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/04& VEL/FPS/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 16/12/2020 to 17/12/2020
Time of Monitoring	: 09:15 AM – 09:15 AM
Ambient Temperature (°C)	: Min. 11°C Max. 21°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	*SOP No. VEL/SOP/01, Section No. SP 63	49.05	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	90.74	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	15.93	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	10.78	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.83	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	10.15	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	19.50	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	ppm(v/v)	--

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

KOMAL SINGH  
ANALYST  
[Signature]

ARJUN RAWAT  
(Checked By)  
[Signature]

(Approved By)  
PRATAP SINGH  
[Signature]  
VARDAN ENVIROLAB  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | 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.  
Village Nasibpura, Bhatinda Punjab  
Latitude: 30° 1' 13.05"N  
Longitude: 75° 1' 3.89"E  
Report No.: VEL/AA/2012/21/004  
Format No.: 7.8 F-01  
Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Period of Analysis: 21/12/2020 - 26/12/2020  
Receipt Date: 21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
Sampling Location : Mahi Nangal  
Instrument Used : RDS & FPS sampler with all Accessories  
Instrument Code : VEL/RDS/02& VEL/FPS/02  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/12/2020 to 17/12/2020  
Time of Monitoring : 09:30 AM – 09:30 AM  
Ambient Temperature (°C) : Min. 11°C Max. 21°C  
Surrounding Activity : Human & Vehicular Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No  
Sampling & Analysis Protocol : IS-5182  
Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>@</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	50.24	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.33	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	14.75	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.86	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.88	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	11.27	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	18.38	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

KOMAL SINGH

ANALYST

ARJUN RAWAT

COLLECTOR



Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/NMDCL/AA/05  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
Latitude: 29° 59' 40.64"N  
Longitude: 75° 1' 17.61"E  
Report No.: VEL/AA/2012/21/005  
Format No.: 7.8 F-01  
Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Period of Analysis: 21/12/2020 - 26/12/2020  
Receipt Date: 21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
Sampling Location : Leleana  
Instrument Used : RDS & FPS sampler with all Accessories  
Instrument Code : VEL/RDS/06 & VEL/FPS/06  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/12/2020 to 17/12/2020  
Time of Monitoring : 10:45 AM – 10:45 AM  
Ambient Temperature (°C) : Min. 11°C Max. 21°C  
Surrounding Activity : Human & Vehicular Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No  
Sampling & Analysis Protocol : IS-5182  
Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>(a)</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	46.22	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.94	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	16.27	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	10.21	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.98	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	11.05	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	21.40	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

KOMAL SINGH  
ANALYST

ARJUN RAJWAT



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AA/06</b>	<b>Report No.:</b>	<b>VEL/AA/2012/21/006</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 1' 27.46"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 4' 8.62"E</b>	<b>Reporting Date:</b>	<b>26/12/2020</b>
		<b>Period of Analysis:</b>	<b>21/12/2020 - 26/12/2020</b>
		<b>Receipt Date:</b>	<b>21/12/2020</b>

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative

Sampling Location : **Baghi Bandar**

Instrument Used : RDS & FPS sampler with all Accessories

Instrument Code : VEL/RDS/05 & VEL/FPS/05

Instrument Calibration Status : Calibrated

Meteorological condition during monitoring : Clear Sky

Date of Monitoring : **16/12/2020 to 17/12/2020**

Time of Monitoring : 11:15 AM – 11:15 AM

Ambient Temperature (°C) : Min. 11°C Max. 21°C

Surrounding Activity : Human & Vehicular Activities

Scope of Monitoring : Regulatory Requirement

Control measure if Any : No

Sampling & Analysis Protocol : IS-5182

Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>at</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	45.37	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	86.80	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	16.11	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.75	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.89	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	13.54	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	20.67	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

**KOMAL SINGH**  
(Tested By)

**ARIJUN RAWAT**  
(Checked By)



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number: VEL/HPCL/AA/07 Report No.: VEL/AA/2012/21/007  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Latitude: 30° 4' 34.79"N Period of Analysis: 21/12/2020 - 26/12/2020  
Longitude: 74° 59' 57.45"E Receipt Date: 21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
Sampling Location : Nasibpura  
Instrument Used : RDS & FPS sampler with all Accessories  
Instrument Code : VEL/RDS/03 & VEL/FPS/03  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 17/12/2020 to 18/12/2020  
Time of Monitoring : 09:15 AM – 09:15 AM  
Ambient Temperature (°C) : Min. 11°C Max. 21°C  
Surrounding Activity : Human & Vehicular Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No  
Sampling & Analysis Protocol : IS-5182  
Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>(a)</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	47.55	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	86.21	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	17.96	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.02	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.84	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	12.89	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	22.81	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/m <sup>3</sup> )	ng/m <sup>3</sup>	6
12.	Nickel Ni, ng/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/m <sup>3</sup> )	ng/m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

KOMAL SINGH  
(Tested By)  
ANALYST

ARJUN RAWAT  
(Checked By)

(Approved By)  
PRATAP SINGH  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/AA/08	Report No.:	VEL/AA/2012/21/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 5' 40.22"N	Party Reference No.:	NIL
Longitude:	75° 4' 5.30"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

Sample Description: AMBIENT AIR QUALITY MONITORING

### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Kotbhara
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/02& VEL/FPS/02
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 10:00 AM – 10:00 AM
Ambient Temperature (°C)	: Min. 11°C Max. 21°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>(a)</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	45.69	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	86.40	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	18.31	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	12.15	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.93	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	10.46	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	16.32	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

KOMAL SINGH  
(Tester By)

ANARJST

ARJUN RAWAT  
(Checked By)

[Signature]



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number: VEL/HPCL/AA/09 Report No.: VEL/AA/2012/21/009  
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
 Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
 Reporting Date: 26/12/2020  
 Latitude: 30° 6' 34.53"N Period of Analysis: 21/12/2020 - 26/12/2020  
 Longitude: 75° 0' 23.67"E Receipt Date: 21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
 Sampling Location : Kot Kashmir  
 Instrument Used : RDS & FPS sampler with all Accessories  
 Instrument Code : VEL/RDS/01 & VEL/FPS/01  
 Instrument Calibration Status : Calibrated  
 Meteorological condition during monitoring : Clear Sky  
 Date of Monitoring : 17/12/2020 to 18/12/2020  
 Time of Monitoring : 10:30 AM – 10:30 AM  
 Ambient Temperature (°C) : Min. 11°C Max. 21°C  
 Surrounding Activity : Human & Vehicular Activities  
 Scope of Monitoring : Regulatory Requirement  
 Control measure if Any : No  
 Sampling & Analysis Protocol : IS-5182  
 Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	48.33	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.40	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	18.22	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.04	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.91	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	8.99	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	17.66	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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., \*\*BDL- Below Detection Limit, \*DL- Detection Limit

KOMAL SINGH

ANALYST

ARJUN RAWAT

(Checked By)

(Approved By)

PRATAP SINGH

AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AA/10	Report No.:	VEL/AA/2012/21/010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 6' 44.02"N	Party Reference No.:	NIL
Longitude:	74° 57' 21.06"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Gehri Boghi
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/04& VEL/FPS/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 10:45 AM – 10:45 AM
Ambient Temperature (°C)	: Min. 11°C Max. 21°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>(a)</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	47.14	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.59	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	17.20	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.81	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.88	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	10.97	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	20.65	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

**KOMAL SINGH**  
(Tested By)  
*[Signature]*

**ARJUN RAWAT**  
(Checked By)  
*[Signature]*

(Approved By)  
**GAURAV PRATAP SINGH**  
*[Signature]*  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/AA/11	Report No.:	VEL/AA/2012/21/011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 3' 45.41"N	Party Reference No.:	NIL
Longitude:	75° 4' 6.08"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Chathewala
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/05& VEL/FPS/05
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 11:15 AM – 11:15 AM
Ambient Temperature (°C)	: Min. 11°C Max. 21°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>4d</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	46.80	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.46	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	17.22	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.50	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.97	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	12.34	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	16.49	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	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

**KOMAL SINGH**

(Tested By)

ANAYST

**ARJUN RAWAT**

(Checked By)

ARJUN RAWAT

(Approved By)

PRATAP SINGH



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample Number:	VEL/HPDCL/AA/12	Report No.:	VEL/AA/2012/21/012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 6' 48.99"N	Party Reference No.:	NIL
Longitude:	75° 4' 54.51"E	Reporting Date:	26/12/2020
		Period of Analysis:	21/12/2020 - 26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Kot Fatta
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/06& VEL/FPS/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 11:40 AM – 11:40 AM
Ambient Temperature (°C)	: Min. 11°C Max. 21°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	48.65	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.19	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	22.04	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	12.30	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.94	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	12.33	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	21.19	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

KOMAL SINGH  
(tested By)  
ANALYST

ABJIN RAWAT  
(checked By)

(Approved By)  
GOURAV  
PRATAP SINGH  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AN/01</b>	<b>Report No.:</b>	<b>VEL/AN/2012/21/001</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
		<b>Party Reference No.:</b>	<b>NIL</b>
		<b>Reporting Date:</b>	<b>26/12/2020</b>
		<b>Receipt Date:</b>	<b>21/12/2020</b>

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Near Project Site
Latitude	: 30° 3' 13.34"N
Longitude	: 75° 0' 41.57"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/01
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 16/12/2020 to 17/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	74.6	62.5	dB(A)
2.	Lmin	IS 9989 R-2003	53.8	41.6	dB(A)
3.	Leq	IS 9989 R-2003	63.10	54.30	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.

**KOMAL SINGH**  
ANALYST

(Tested By)

**AR.IJUN RAWAT**

(Checked By)

(Approved By)



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



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## Test Report

Sample Number: **VEL/HPCL/AN/02** Report No.: **VEL/AN/2012/21/002**  
Name & Address of the Project: **M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab** Format No.: **7.8 F-01**  
Party Reference No.: **NIL** Reporting Date: **26/12/2020**  
Receipt Date: **21/12/2020**

Sample Description: **AMBIENT NOISE LEVEL MONITORING**

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : **Jiwan Singh Wala**  
Latitude : **30° 3' 37.63"N**  
Longitude : **75° 2' 75.30"E**  
Instrument Used : Sound Level Meter  
Instrument Code : **VEL/S/SLM/03**  
Instrument Calibration Status : **Calibrated**  
Meteorological condition during monitoring : **Clear Sky**  
Date of Monitoring : **16/12/2020 to 17/12/2020**  
Time of Monitoring : **06:00 AM to 06:00AM**  
Surrounding Activity : **Human, Vehicular and Cement plant Activities**  
Scope of Monitoring : **Regulatory Requirement**  
Control measure if Any : **No any**  
Sampling & Analysis Protocol : **IS-9989 R-2003**  
Sampling Duration : **24 Hours**  
Parameter Required : **As per Work Order**

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.	Lmax	IS 9989 R-2003	51.7	43.7	dB(A)
2.	Lmin	IS 9989 R-2003	34.8	27.5	dB(A)
3.	Leq	IS 9989 R-2003	42.50	34.30	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.

**KOMAL SINGH**  
ANALYST

(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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## Test Report

Sample Number: VEL/HPCL/AN/03 Report No.: VEL/AN/2012/21/003  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Receipt Date: 21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : Maanwala  
Latitude : 30° 2' 33.23"N  
Longitude : 75° 58' 6.88"E  
Instrument Used : Sound Level Meter  
Instrument Code : VEL/S/SLM/04  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/12/2020 to 17/12/2020  
Time of Monitoring : 06:00 AM to 06:00AM  
Surrounding Activity : Human, Vehicular and Cement plant Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No any  
Sampling & Analysis Protocol : IS-9989 R-2003  
Sampling Duration : 24 Hours  
Parameter Required : As per Work Order

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.	Lmax	IS 9989 R-2003	60.4	48.5	dB(A)
2.	Lmin	IS 9989 R-2003	38.3	27.2	dB(A)
3.	Leq	IS 9989 R-2003	49.20	36.10	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.

**KOMAL SINGH**

ANALYST  
(Tested By)

**AR.II IN RAWAT**

(Checked By)

(Approved By)



Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

Sample Number: VEL/HPCL/AN/04 Report No.: VEL/AN/2012/21/004  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Receipt Date: 21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : Mahi Nangal  
Latitude : 30° 1' 13.05"N  
Longitude : 75° 1' 3.89"E  
Instrument Used : Sound Level Meter  
Instrument Code : VEL/S/SLM/02  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/12/2020 to 17/12/2020  
Time of Monitoring : 06:00 AM to 06:00AM  
Surrounding Activity : Human, Vehicular and Cement plant Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No any  
Sampling & Analysis Protocol : IS-9989 R-2003  
Sampling Duration : 24 Hours  
Parameter Required : As per Work Order

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.	Lmax	IS 9989 R-2003	56.2	46.4	dB(A)
2.	Lmin	IS 9989 R-2003	35.8	28.6	dB(A)
3.	Leq	IS 9989 R-2003	45.50	35.30	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.

**KOMAL SINGH**

ANALYST

(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

PRATAN SINGH



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number: VEL/HPCL/AN/05 Report No.: VEL/AN/2012/21/005  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Receipt Date: 21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : Leleana  
Latitude : 29° 59' 40.64"N  
Longitude : 75° 1' 17.61"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 : 16/12/2020 to 17/12/2020  
Time of Monitoring : 06:00 AM to 06:00AM  
Surrounding Activity : Human, Vehicular and Rail Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No any  
Sampling & Analysis Protocol : IS-9989 R-2003  
Sampling Duration : 24 Hours  
Parameter Required : As per Work Order

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.	Lmax	IS 9989 R-2003	59.5	47.4	dB(A)
2.	Lmin	IS 9989 R-2003	37.6	28.3	dB(A)
3.	Leq	IS 9989 R-2003	48.60	36.20	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.

**KOMAL SINGH**

ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

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



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## Test Report

Sample Number: VEL/HPCL/AN/06 Report No.: VEL/AN/2012/21/006  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Receipt Date: 21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : Baghi Bandar  
Latitude : 30° 1' 27.46"N  
Longitude : 75° 4' 8.62"E  
Instrument Used : Sound Level Meter  
Instrument Code : VEL/S/SLM/05  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/12/2020 to 17/12/2020  
Time of Monitoring : 06:00 AM to 06:00AM  
Surrounding Activity : Human, Vehicular and Rail Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No any  
Sampling & Analysis Protocol : IS-9989 R-2003  
Sampling Duration : 24 Hours  
Parameter Required : As per Work Order

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.	Lmax	IS 9989 R-2003	56.1	43.9	dB(A)
2.	Lmin	IS 9989 R-2003	32.8	25.5	dB(A)
3.	Leq	IS 9989 R-2003	44.20	35.10	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.

**KOMAL SINGH**

(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

PRATAP SINGH

AUTHORIZED SIGNATURE

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



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## Test Report

Sample Number: VEL/HPCL/AN/07 Report No.: VEL/AN/2012/21/007  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Reporting Date: 26/12/2020  
Receipt Date: 21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : Nasibpura  
Latitude : 30° 4' 34.79"N  
Longitude : 74° 59' 57.45"E  
Instrument Used : Sound Level Meter  
Instrument Code : VEL/S/SLM/05  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 17/12/2020 to 18/12/2020  
Time of Monitoring : 06:00 AM to 06:00AM  
Surrounding Activity : Human, Vehicular and Cement plant Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No any  
Sampling & Analysis Protocol : IS-9989 R-2003  
Sampling Duration : 24 Hours  
Parameter Required : As per Work Order

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.	Lmax	IS 9989 R-2003	59.8	47.9	dB(A)
2.	Lmin	IS 9989 R-2003	40.2	34.1	dB(A)
3.	Leq	IS 9989 R-2003	49.20	40.50	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.

**KOMAL SINGH**

ANALYST  
(Tested By)

**ARJIIN RAWAT**

(Checked By)

(Approved By)



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## Test Report

Sample Number:	VEL/HPCL/AN/08	Report No.:	VEL/AN/2012/21/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	26/12/2020
		Receipt Date:	21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Kotbhara
Latitude	: 30° 5' 40.22"N
Longitude	: 75° 4' 5.30"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	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	58.3	49.4	dB(A)
2.	Lmin	IS 9989 R-2003	37.6	35.2	dB(A)
3.	Leq	IS 9989 R-2003	49.20	41.52	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.

**KOMAL SINGH**

ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

PRATAP SINGH



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## Test Report

Sample Number:	VEL/HPCL/AN/09	Report No.:	VEL/AN/2012/21/009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Kashmir
Latitude	: 30° 6' 34.53"N
Longitude	: 75° 0' 23.67"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/02
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	62.2	50.7	dB(A)
2.	Lmin	IS 9989 R-2003	40.6	36.3	dB(A)
3.	Leq	IS 9989 R-2003	51.60	41.20	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.

**KOMAL SINGH**

ANALYST  
(Created By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

PRATAP SINGH

AUTHORIZED SIGNATURE

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## Test Report

Sample Number:	VEL/HPCL/AN/10	Report No.:	VEL/AN/2012/21/010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Gehri Boghi
Latitude	: 30° 6' 44.02"N
Longitude	: 74° 57' 21.06"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/01
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	63.7	53.5	dB(A)
2.	Lmin	IS 9989 R-2003	42.4	36.3	dB(A)
3.	Leq	IS 9989 R-2003	53.20	42.50	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.

**KOMAL SINGH**

**ANALYST**

(Tested By)

**ARIJUN RAWAT**

(Checked By)

(Approved By)

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## Test Report

Sample Number:	VEL/HPCL/AN/11	Report No.:	VEL/AN/2012/21/011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	26/12/2020
		Receipt Date:	21/12/2020

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Chathewala
Latitude	: 30° 3' 45.41"N
Longitude	: 75° 4' 6.08"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	58.6	48.4	dB(A)
2.	Lmin	IS 9989 R-2003	37.2	33.7	dB(A)
3.	Leq	IS 9989 R-2003	49.10	37.20	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.

**KOMAL SINGH**  
ANALYST

(Tested By)

**ARJUN RAWAT**  
(Checked By)



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## Test Report

Sample Number:	VEL/HPCL/AN/12	Report No.:	VEL/AN/2012/21/012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	26/12/2020
		Receipt Date:	21/12/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Fatta
Latitude	: 30° 6' 48.99"N
Longitude	: 75° 4' 54.51"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/03
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 17/12/2020 to 18/12/2020
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2003
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

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.	Lmax	IS 9989 R-2003	60.7	53.5	dB(A)
2.	Lmin	IS 9989 R-2003	42.6	38.7	dB(A)
3.	Leq	IS 9989 R-2003	50.20	42.50	dB(A)
4.	CPCB Limits in dB(A <sup>*</sup> ) Leq (Residential Area)		55.00	45.00	dB(A)

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

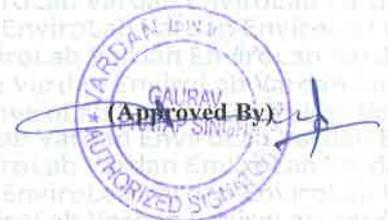
**KOMAL SINGH**

ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)



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## Test Report

Sample Number:	VEL/HPCL/W/01	Report No.:	VEL/W/2012/21/001
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 3' 13.34" N	Party Reference No.:	NIL
Longitude:	75° 0' 41.57" E	Reporting Date:	26/12/2020
Sample Description:	Ground Water Sample	Period of Analysis:	21/12/2020 – 26/12/2020
Sample Location:	Near Project Site	Receipt Date:	21/12/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	16/12/2020
Parameter Required:	As per work order	Sampling Quantity:	2.0 Ltr
Sampling & Analysis Protocol:	IS-10500-2012, APHA	Sampling Type:	Garb
		Preservation:	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.98	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	321.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	86.74	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	262.37	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	81.48	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	25.41	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	987.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	42.13	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.86	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	9.82	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.18	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL (**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST  
(Tested By)  
*Priyanka*

**ARJUN RAWAT**  
(Checked By)  
*Arjun*



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



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## Test Report

Sample No.: VEL/HPCL/W/01

Report No.: VEL/W/2012/21/001

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.26	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL (**DL 0.001 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1645	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	29.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.8	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/W/02  
**Name & Address of Party:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 3' 37.63" N  
**Longitude:** 75° 2' 75.30" E  
**Sample Description:** Ground Water Sample  
**Sample Location:** Jiwan Singh Wala  
**Sample Collected by:** Vardan Enviro Lab Representative  
**Parameter Required:** As per work order  
**Sampling & Analysis Protocol:** IS-10500-2012, APHA

**Report No.:** VEL/W/2012/21/002  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 26/12/2020  
**Period of Analysis:** 21/12/2020 – 26/12/2020  
**Receipt Date:** 21/12/2020  
**Sampling Date:** 16/12/2020  
**Sampling Quantity:** 2.0 Ltr  
**Sampling Type:** Garb  
**Preservation:** Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.74	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	210.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	63.41	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	178.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	82.34	mg/l	250	1000
10.	*Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.58	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	615.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	21.64	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.78	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.53	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.21	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

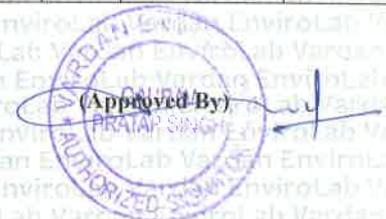
**PRIYANKA**  
ANALYST  
(Checked By)

*Priyanka*

**ARJUN RAWAT**

(Checked By)

*Arjun Rawat*



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: VEL/HPCL/W/02				Report No.: VEL/W/2012/21/002		
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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.42	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1025	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	21.3	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note:- \*BDL- Below Detection Limit, \*\*DL- Detection Limit. <sup>#</sup>These parameter are not covered in our NABL scope.

**PRIYANKA**  
ANALYST

(Tested By)

**ARJUN RAWAT**

(Checked By)



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/03	<b>Report No.:</b>	VEL/W/2012/21/003
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 2' 33.23" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 58' 6.88" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Maanwala	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	16/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS-10500-2012, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated
		<b>Amendment No. 1</b>	Dated 26/11/2020

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.90	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	311.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	84.96	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	293.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	121.87	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	24.06	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	710.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	89.37	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	1.05	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.87	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.25	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL (**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST  
(Tested By)  
*Priyanka*

**ARJUN RAWAT**  
(Checked By)  
*Arjun Rawat*



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: **VEL/HPCL/W/03**

Report No.: **VEL/W/2012/21/003**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.34	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1183	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	23.5	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	3.2	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)



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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/04	<b>Report No.:</b>	VEL/W/2012/21/004
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 1' 13.05" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 1' 3.89" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Mahi Nangal	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	16/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS-10500-2012, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.98	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	273.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	84.69	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	224.56	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	76.45	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	14.99	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	685.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	48.67	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.76	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.61	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.24	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST  
(Tested By)  
*Priyanka*

**ARJUN RAWAT**  
(Checked By)  
*Arjun Rawat*



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: **VEL/HPCL/W/04**

Report No.: **VEL/W/2012/21/004**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.52	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1142	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	28.5	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.5	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**  
(Checked By)



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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/05	<b>Report No.:</b>	VEL/W/2012/21/005
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 6' 34.53" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 0' 23.67" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Kot Kashmir	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	17/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS-10500-2012, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.88	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	321.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.74	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	232.56	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	92.54	mg/l	250	1000
10.	<sup>δ</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	23.59	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	801.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	79.51	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.86	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.22	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.25	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL (**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST  
*Priyanka*

**ARJUN RAWAT**

(Checked By)  
*Arjun Rawat*



**Note:** Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
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## Test Report

Sample No.: **VEL/HPCL/W/05**

Report No.: **VEL/W/2012/21/005**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01 mg/l)	mg/l	0.5	No Relaxation
22.	Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA, 3111 B, Direct Air, Acetylene Flame Method	0.58	mg/l	5	15
24.	Copper as Cu	APHA, 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA, 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA, 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA, 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA, 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA, 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA, 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1335	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34), Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	25.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**  
(Checked By)

**VARDAN ENVIROLAB**  
GANDRAV  
(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/06	<b>Report No.:</b>	VEL/W/2012/21/006
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 4' 34.79" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	74° 59' 57.45" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Nasibpura	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	17/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS-10500-2012, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.55	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	310.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.95	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	258.14	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.16	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	20.79	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	759.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	69.24	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.74	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.93	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL (**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST  
(Tested By)

*Priyanka*

**ARJUN RAWAT**

(Checked By)  
*Arjun Rawat*

(Approved By)

*Priyanka*

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: **VEL/HPCL/W/06**

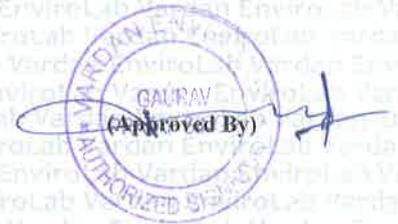
Report No.: **VEL/W/2012/21/006**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.68	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1265	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	26.7	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.6	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**  
(Checked By)



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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/07	<b>Report No.:</b>	VEL/W/2012/21/007
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 1' 27.46" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 4' 8.62" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Baghi Bandar	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	17/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS-10500-2012, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.35	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	476.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	129.47	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	298.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	102.66	mg/l	250	1000
10.	<sup>-</sup> Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	37.17	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1187.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	88.74	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.89	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	13.67	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.28	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**PRIYANKA**  
ANALYST

*(Checked By)*

**ARJUN RAWAT**

*(Checked By)*



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: **VEL/HPCL/W/07**

Report No.: **VEL/W/2012/21/007**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.68	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1978	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	35.7	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	9.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)

(Approved By)

PRATAP SINGH



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenvironet.com](mailto:lab@vardanenvironet.com), [bd@vardanenvironet.com](mailto:bd@vardanenvironet.com)



# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/08	<b>Report No.:</b>	VEL/W/2012/21/008
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 6' 48.99" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 4' 54.51" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Surface Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Kot Fatta	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	18/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS 2296 & CPCB, 1979, APHA	<b>Sampling Type:</b>	–
		<b>Preservation:</b>	Refrigerated

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.83	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	21	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	82.34	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1280	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	15.27	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.29	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	513.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.18	mg/l
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	15.34	mg/l
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.58	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	< 5.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	25.50	mg/l
17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	13.41	mg/l
18.	Total Coliform	IS 1622	34	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL (**DL 0.01 mg/l)	mg/l

**PRIYANKA**  
ANALYST

**ARJUN RAWAT**

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

Sample No.: VEL/HPCL/W/08			Report No.: VEL/W/2012/21/008	
S. No.	Parameter	Test-Method	Result	Unit
20.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	196.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	58.31	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	174.45	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.27	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.7	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	92.10	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	34.12	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

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

**PRIYANKA**  
ANALYST  
(Tested By)

**ARJUN RAWAT**

(Checked By)



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/09	<b>Report No.:</b>	VEL/W/2012/21/009
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 3' 45.41" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 4' 6.08" E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Surface Water Sample	<b>Period of Analysis:</b>	21/12/2020 – 26/12/2020
<b>Sample Location:</b>	Chathewala	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	18/12/2020
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr
<b>Sampling &amp; Analysis Protocol:</b>	IS 2296 & CPCB, 1979, APHA	<b>Sampling Type:</b>	--
		<b>Preservation:</b>	Refrigerated
		<b>Amendment No. 1</b>	Dated 26/11/2020

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.87	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	19	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.74	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1257	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) .Chromotropic Method	7.63	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.34	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	605.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.14	mg/l
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	25.18	mg/l
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.51	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	5.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	22.00	mg/l
17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	10.63	mg/l
18.	Total Coliform	IS 1622	27	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

**PRIYANKA**  
ANALYST

*Priyanka*

**ARJUN RAWAT**

(Checked By)

*Arjun Rawat*

(Approved By)



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: <b>VEL/HPCL/W/09</b>			Report No.: <b>VEL/W/2012/21/009</b>	
S. No.	Parameter	Test-Method	Result	Unit
20.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C. EDTA Titrimetric Method	204.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	57.12	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	197.52	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	14.94	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.10	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	92.34	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	32.51	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

Note: \*BDL- Below Detection Limit, \*\*DL- Detection Limit. ^Due to Additional Parameter.

**PRIYANKA**  
ANALYST

(Checked By)  
*Priyanka*

**ARJUN RAWAT**

(Checked By)  
*Arjun Rawat*

**GAURAV**

(Approved By)  
*Gaurav*



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

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



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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/S/01</b>	<b>Report No.:</b>	<b>VEL/S/2012/21/001</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 3' 13.34"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 0' 41.57"E</b>	<b>Reporting Date:</b>	<b>26/12/2020</b>
<b>Sample Description:</b>	<b>Soil Sample</b>	<b>Period of Analysis :</b>	<b>21/12/2020-26/12/2020</b>
<b>Sampling Location:</b>	<b>Near Project Site</b>	<b>Receipt Date:</b>	<b>21/12/2020</b>
<b>Sample Collected by:</b>	<b>Vardan Enviro Lab Team</b>	<b>Sampling Date:</b>	<b>16/12/2020</b>
<b>Sampling &amp; Analysis Protocol:</b>	<b>IS 2720 , USEPA &amp; USDA</b>	<b>Type of Sampling:</b>	<b>Composite</b>
		<b>Sampling Quantity:</b>	<b>2.0 Kg</b>
		<b>Packing Status:</b>	<b>Temp Sealed</b>

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.75	--
2	Conductivity	IS:14767 by Conductivity meter	0.316	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	22.34	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.51	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	53.01	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	39.22	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	42.64	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	134.26	kg/hect
11	Iron as Fe	USDA Method, 1968	0.68	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.58	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	19.55	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	206.16	kg./hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	16.22	kg./hect
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	10.86	mg/kg
17	Organic Carbon	USEPA 3050B	0.40	%
18	Lead (as Pb)	USEPA 3050B	0.81	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.71	mg/kg
20	Chromium (as Cr)	USEPA 3050B	0.88	mg/kg
21	Copper (as Cu )	USEPA 3050B	6.13	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	14.2	%

Note: SOP Standard Operating Procedure.

**MAMTA NAYAK**  
Sr. Analyst  
(Checked By)

**ARJUN RAWAT**  
(Checked By)

(Approved By)  
**PRATAP SINGH**  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/02	<b>Report No.:</b>	VEL/S/2012/21/002
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 3' 37.63"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 2' 75.30"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Jiwan Singh Wala	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.57	--
2	Conductivity	IS:14767 by Conductivity meter	0.332	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	31.46	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.43	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	48.21	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	35.66	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	50.16	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	149.35	kg/hect.
11	Iron as Fe	USDA Method, 1968	0.50	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.47	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	27.41	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	232.00	kg/hect.
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.36	kg/hect.
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.08	mg/kg
17	Organic Carbon	USEPA 3050B	0.31	%
18	Lead (as Pb)	USEPA 3050B	0.70	mg/kg
19	Cadmium (as Cd)	USEPA 3050B	0.79	mg/kg
20	Chromium (as Cr)	USEPA 3050B	0.45	mg/kg
21	Copper (as Cu)	USEPA 3050B	2.72	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.6	%

Note: SOP-Standard Operating Procedure, ^Due to Additional Parameter

**MAMTA NAYAK**  
SR. ANALYST

(Checked By)

**ARJUN RAWAT**

(Checked By)



(Approved By)

PRATAP SINGH

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/03	<b>Report No.:</b>	VEL/S/2012/21/003
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 2' 33.23"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 58' 6.88"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Maanwala	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.61	--
2	Conductivity	IS:14767 by Conductivity meter	0.324	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	28.16	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.74	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	39.12	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	60.35	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	55.31	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	128.62	kg/hect.
11	Iron as Fe	USDA Method, 1968	0.31	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.69	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	19.27	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	221.00	kg./hect.
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	29.51	kg./hect.
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.46	mg/kg
17	Organic Carbon	USEPA 3050B	0.22	%
18	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19	Cadmium (as Cd)	USEPA 3050B	0.71	mg/kg
20	Chromium (as Cr)	USEPA 3050B	1.43	mg/kg
21	Copper (as Cu)	USEPA 3050B	2.01	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.40	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	19.3	%

Note: SOP-Standard Operating Procedure.

**VIAMTA NAYAK**  
SIR ANALYST  
*[Signature]*

**ARJUN RAWAT**  
Checked By  
*[Signature]*

(Approved By)  
**PRATAP SINGH**  
AUTHORIZED SIGNATURE  
*[Signature]*

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



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## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/S/04</b>	<b>Report No.:</b>	<b>VEL/S/2012/21/004</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 1' 13.05"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 1' 3.89"E</b>	<b>Reporting Date:</b>	<b>26/12/2020</b>
<b>Sample Description:</b>	<b>Soil Sample</b>	<b>Period of Analysis :</b>	<b>21/12/2020-26/12/2020</b>
<b>Sampling Location:</b>	<b>Mahi Nangal</b>	<b>Receipt Date:</b>	<b>21/12/2020</b>
<b>Sample Collected by:</b>	<b>Vardan Enviro Lab Team</b>	<b>Sampling Date:</b>	<b>16/12/2020</b>
<b>Sampling &amp; Analysis Protocol:</b>	<b>IS 2720 , USEPA &amp; USDA</b>	<b>Type of Sampling:</b>	<b>Composite</b>
<b>Packing Status:</b>	<b>Temp Sealed</b>	<b>Sampling Quantity:</b>	<b>2.0 Kg</b>
		<b>Depth of Sampling:</b>	<b>30 cm</b>

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.52	--
2	Conductivity	IS:14767 by Conductivity meter	0.331	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	25.65	%
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	50.49	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.33	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	59.10	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	139.74	kg/hect
11	Iron as Fe	USDA Method, 1968	0.69	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	30.16	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	225.00	kg /hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	15.46	kg /hect
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	7.29	mg/kg
17	Organic Carbon	USEPA 3050B	0.23	%
18	Lead (as Pb)	USEPA 3050B	0.65	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.69	mg/kg
20	Chromium (as Cr)	USEPA 3050B	1.41	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.49	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.80	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	17.5	%

Note: SOP:Standard Operating Procedure.

**MAMTA NAYAK**  
Sr. ANALYST  
*[Signature]*

**ARJUN RAWAT**  
(Checked By)  
*[Signature]*

(Approved By)  
**PRATAP SINGH**  
*[Signature]*  
AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/05	<b>Report No.:</b>	VEL/S/2012/21/005
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	29° 59' 40.64"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 1' 17.61"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Leleana	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.64	--
2.	Conductivity	IS:14767 by Conductivity meter	0.339	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	32.16	%
6.	Bulk density	SOP , SP-80,Issue No -01& Issue Date-14/02/2013	1.77	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No -01& Issue Date-14/02/2013	62.51	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No -01& Issue Date-14/02/2013	48.33	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	56.71	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	151.06	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.82	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13.	Magnesium as Mg	SOP , SP-83,Issue No -01& Issue Date-14/02/2013	27.06	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	238.32	kg /hect.
15.	Available Phosphorus	SOP , SP-86,Issue No -01& Issue Date-14/02/2013	25.11	kg /hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No -01	8.90	mg/kg
17.	Organic Carbon	USEPA 3050B	0.25	%
18.	Lead (as Pb)	USEPA 3050B	0.94	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.87	mg/kg
21.	Copper (as Cu )	USEPA 3050B	7.16	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.52	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No -01& Issue Date-14/02/2013	15.8	%

Note: SOP: Standard Operating Procedure

**MAMTA NAYAK**  
S.R. ANALYST  
(Tested By)  
*Mamta Nayak*

**ARJUN RAWAT**  
(Checked By)  
*Arjun Rawat*

(Approved By)  
**PRATAP SINGH**  
*Pratap Singh*

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/06	<b>Report No.:</b>	VEL/S/2012/21/006
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 1' 27.46"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 4' 8.62"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Baghi Bandar	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.57	--
2	Conductivity	IS:14767 by Conductivity meter	0.340	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	40.11	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.67	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	54.86	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	43.15	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	53.29	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	161.85	kg/hect.
11	Iron as Fe	USDA Method, 1968	0.61	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.73	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	34.16	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	242.69	kg/hect.
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.34	kg/hect.
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.63	mg/kg
17	Organic Carbon	USEPA 3050B	0.29	%
18	Lead (as Pb)	USEPA 3050B	0.72	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20	Chromium (as Cr)	USEPA 3050B	0.48	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.69	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	19.9	%

MAMTA NAYAK Operating Procedure

S.R. ANALYST

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

PRATAP SINGH

AUTHORIZED SIGNATURE

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/07	<b>Report No.:</b>	VEL/S/2012/21/007
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 4' 34.79"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	74° 59' 57.45"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Nasibpura	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.76	--
2	Conductivity	IS:14767 by Conductivity meter	0.356	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	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	43.51	%
6	Bulk density	SOP , SP-80,Issue No -01& Issue Date-14/02/2013	1.80	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No -01& Issue Date-14/02/2013	53.96	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No -01& Issue Date-14/02/2013	69.85	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	61.02	mg/kg
10	Potassium as K	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	127.65	kg/hect
11	Iron as Fe	USDA Method, 1968	0.52	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13	Magnesium as Mg	SOP , SP-83,Issue No -01& Issue Date-14/02/2013	25.13	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	238.00	kg /hect.
15	Available Phosphorus	SOP , SP-86,Issue No -01& Issue Date-14/02/2013	33.59	kg /hect.
16	Zinc (as Zn)	SOP , SP-86,Issue No -01	17.29	mg/kg
17	Organic Carbon	USEPA 3050B	0.43	%
18	Lead (as Pb)	USEPA 3050B	0.61	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20	Chromium (as Cr)	USEPA 3050B	1.78	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.16	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.59	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No -01& Issue Date-14/02/2013	21.1	%

Note: SOP-Standard Operating Procedure.

**MAMTA NAYAK**  
S.R. ANALYST  
(Tested By)  
*Mamta Nayak*

**ARJUN RAWAT**  
(Checked By)  
*Arjun Rawat*



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/IOCL/S/08	<b>Report No.:</b>	VEL/S/2012/21/008
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 5' 40.22"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 4' 5.30"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Kotbhara	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.50	--
2	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	25.08	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.24	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	42.16	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	48.44	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.08	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	145.49	kg/hect
11	Iron as Fe	USDA Method, 1968	0.64	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	39.47	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	228.00	kg/hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	20.39	kg/hect
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	83.15	mg/kg
17	Organic Carbon	USEPA 3050B	0.51	%
18	Lead (as Pb)	USEPA 3050B	0.64	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20	Chromium (as Cr)	USEPA 3050B	1.52	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.47	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.94	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No -01& Issue Date-14/02/2013	21.8	%

Note: SOP-Standard Operating Procedure.

**VIAMTA NAYAK**  
S.R. ANALYST  
*(Signature)*

**ARJUN RAWAT**  
(Checked By)  
*(Signature)*

(Approved By)  
**PRATAP SINGH**  
AUTHORIZED SIGNATURE  
*(Signature)*

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/09	<b>Report No.:</b>	VEL/S/2012/21/009
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 6' 34.53"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 0' 23.67"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Kot Kashmir	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.87	--
2.	Conductivity	IS:14767 by Conductivity meter	0.341	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	28.57	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.65	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	58.36	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	44.18	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.22	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	154.78	kg/hect
11.	Iron as Fe	USDA Method, 1968	0.79	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.70	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	23.61	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	229.00	kg /hect
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	26.54	kg /hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.47	mg/kg
17.	Organic Carbon	USEPA 3050B	0.55	%
18.	Lead (as Pb)	USEPA 3050B	0.91	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.95	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.65	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	22.5	%

Note: SOP-Standard Operating Procedure

**VAMTA NAYAK**  
SIR ANALYST  
*(Signature)*

**ARJUN RAWAT**  
(Checked By)  
*(Signature)*



Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/10	<b>Report No.:</b>	VEL/S/2012/21/009
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 6' 44.02"N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	74° 57' 21.06"E	<b>Reporting Date:</b>	26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sampling Location:</b>	Gehri Boghi	<b>Receipt Date:</b>	21/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Date:</b>	16/12/2020
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Type of Sampling:</b>	Composite
<b>Packing Status:</b>	Temp Sealed	<b>Sampling Quantity:</b>	2.0 Kg
		<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.59	--
2	Conductivity	IS:14767 by Conductivity meter	0.325	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	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	35.12	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.51	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.95	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	47.11	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	54.07	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	161.70	kg/hect
11	Iron as Fe	USDA Method, 1968	0.71	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.82	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	32.67	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	257.68	kg./hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	23.21	kg./hect.
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.99	mg/kg
17	Organic Carbon	USEPA 3050B	0.40	%
18	Lead (as Pb)	USEPA 3050B	0.75	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20	Chromium (as Cr)	USEPA 3050B	0.60	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.72	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.31	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.3	%

Note: SOP-Standard Operating Procedure.

MAMTA NAYAK  
S.R. ANAND  
*(Signature)*

ARJUN RAWAT  
(Checked By)  
*(Signature)*

(Approved By)  
PRATAP SINGH  
*(Signature)*

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/11	<b>Report No.:</b>	VEL/S/2012/21/011
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 3' 45.41"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 4' 6.08"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Chathewala	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.68	--
2	Conductivity	IS:14767 by Conductivity meter	0.318	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.86	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.75	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	63.28	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	47.31	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	48.28	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	139.18	kg/hect
11	Iron as Fe	USDA Method, 1968	0.75	mg/100g
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	21.49	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	207.00	kg./hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.67	kg./hect
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.71	mg/kg
17	Organic Carbon	USEPA 3050B	0.47	%
18	Lead (as Pb)	USEPA 3050B	1.06	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20	Chromium (as Cr)	USEPA 3050B	0.89	mg/kg
21	Copper (as Cu )	USEPA 3050B	6.37	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.39	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	22.5	%

Note: SOP-Standard Operating Procedure.

**MAMTA NAYAK**  
S.R. ANALYST  
(Tested By)  
*Mamta Nayak*

**ARJUN RAWAT**  
(Checked By)  
*Arjun Rawat*



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/12	<b>Report No.:</b>	VEL/S/2012/21/012
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
		<b>Party Reference No.:</b>	NIL
<b>Latitude:</b>	30° 6' 48.99"N	<b>Reporting Date:</b>	26/12/2020
<b>Longitude:</b>	75° 4' 54.51"E	<b>Period of Analysis :</b>	21/12/2020-26/12/2020
<b>Sample Description:</b>	Soil Sample	<b>Receipt Date:</b>	21/12/2020
<b>Sampling Location:</b>	Kot Fatta	<b>Sampling Date:</b>	16/12/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Type of Sampling:</b>	Composite
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Sampling Quantity:</b>	2.0 Kg
<b>Packing Status:</b>	Temp Sealed	<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.78	--
2	Conductivity	IS:14767 by Conductivity meter	0.347	mS/cm
3	Soil Texture	IS : 2720 (P-22, RA2003)	Silt	--
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	32.66	%
6	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.87	gm/cc
7	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	59.21	mg/100g
8	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	68.34	mg/100g
9	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.32	mg/kg
10	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	118.00	kg/hect
11	Iron as Fe	USDA Method, 1968	0.41	mg/100g
12	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.85	%
13	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	23.69	mg/100g
14	Available Nitrogen as N	IS:14684 Distillation Method	211.02	kg/hect
15	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	56.45	kg/hect
16	Zinc (as Zn)	SOP , SP-86,Issue No.-01	15.32	mg/kg
17	Organic Carbon	USEPA 3050B	0.51	%
18	Lead (as Pb)	USEPA 3050B	0.73	mg/kg
19	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20	Chromium (as Cr)	USEPA 3050B	1.81	mg/kg
21	Copper (as Cu )	USEPA 3050B	2.72	mg/kg
22	Molybdenum as MO	USEPA 3050B	0.49	mg/100g
23	Nickel	USEPA 3050B	*BDL	mg/100g
24	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	17.5	%

Note: SOP-Standard Operating Procedure.

**MIAMTA NAYAK**  
Sr. ANALYST  
(Tested By)  
*[Signature]*

**ARJUN RAWAT**  
(Checked By)  
*[Signature]*



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/AA/01 **Report No.:** VEL/AA/2103/19/001  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab **Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Latitude:** 30° 3' 13.34"N **Reporting Date:** 24/03/2021  
**Longitude:** 75° 0' 41.57"E **Period of Analysis:** 19/03/2020 - 24/03/2021  
**Receipt Date:** 19/03/2020

**Sample Description:** AMBIENT AIR QUALITY MONITORING

### General Information:-

**Sample collected by** : Vardan Enviro Lab Representative  
**Sampling Location** : Near Project Site  
**Instrument Used** : RDS & FPS sampler with all Accessories  
**Instrument Code** : VEL/RDS/01 & VEL/FPS/01  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 14/03/2021 to 15/03/2021  
**Time of Monitoring** : 10:15 AM – 10:15 AM  
**Ambient Temperature (°C)** : Min. 19°C Max. 35°C  
**Surrounding Activity** : Human & Vehicular Activities  
**Scope of Monitoring** : Regulatory Requirement  
**Control measure if Any** : No  
**Sampling & Analysis Protocol** : IS-5182 & CPCB Guideline  
**Parameter Required** : As per client requirement.

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>60</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	52.34	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	91.62	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	26.10	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.72	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.84	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	12.37	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	24.55	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	6
12.	Nickel Ni, ng/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL (*DL 0.2 ppm(v/v))	ppm(v/v)	--

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

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

AMITABH DUBEY  
(Tested By)  
Anil

ARJUN RAWAT  
(Checked By)  
Rohit

(Approved By)  
GAURAV  
PRATAP SINGH  
QUALITY MANAGER

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AA/02</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/002</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 3' 37.63"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 2' 75.30"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

**Sample Description:** AMBIENT AIR QUALITY MONITORING

**General Information:-**

<b>Sample collected by</b>	: Vardan Enviro Lab Representative
<b>Sampling Location</b>	: <b>Jiwan Singh Wala</b>
<b>Instrument Used</b>	: RDS & FPS sampler with all Accessories
<b>Instrument Code</b>	: VEL/RDS/03& VEL/FPS/03
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: <b>14/03/2021 to 15/03/2021</b>
<b>Time of Monitoring</b>	: 10:45 AM – 10:45 AM
<b>Ambient Temperature (°C)</b>	: Min. 19°C Max. 35°C
<b>Surrounding Activity</b>	: Human & Vehicular Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No
<b>Sampling &amp; Analysis Protocol</b>	: IS-5182 & CPCB Guideline
<b>Parameter Required</b>	: As per client requirement.

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	55.16	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	94.36	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	27.55	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	8.71	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.87	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	12.86	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	27.10	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	ppm(v/v)	--

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

<sup>#</sup>SOP- Laboratory Standard Operating Procedure., \*\*BDL- Below Detection Limit, \*DL- Detection Limit

(Tested By)  
**AMITABH DUBEY**  
SR ANALYST  
*Amitabh*

(Checked By)  
**ANJAN RAWAT**  
*Anjan*

(Approved By)  
**GAURAV PRATAP SINGH**  
*Gaurav*

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
NABL Accredited | 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.  
Village Nasibpura, Bhatinda Punjab  
**Report No.:** VEL/AA/2103/19/003  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis:** 19/03/2020 - 24/03/2021  
**Latitude:** 30° 2' 33.23"N  
**Longitude:** 75° 58' 6.88"E  
**Receipt Date:** 19/03/2020

**Sample Description:** AMBIENT AIR QUALITY MONITORING

### General Information:-

**Sample collected by** : Vardan Enviro Lab Representative  
**Sampling Location** : Maanwala  
**Instrument Used** : RDS & FPS sampler with all Accessories  
**Instrument Code** : VEL/RDS/04& VEL/FPS/04  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 14/03/2021 to 15/03/2021  
**Time of Monitoring** : 11:00 AM – 11:00 AM  
**Ambient Temperature (°C)** : Min. 19°C Max. 35°C  
**Surrounding Activity** : Human & Vehicular Activities  
**Scope of Monitoring** : Regulatory Requirement  
**Control measure if Any** : No  
**Sampling & Analysis Protocol** : IS-5182 & CPCB Guideline  
**Parameter Required** : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	51.97	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.20	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	23.10	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	7.88	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	1.13	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	9.24	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	25.60	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)  
SR ANALYST  
Amitebh

ARUN KAWAT  
(Checked By)  
Arun Kawat

(Approved By)  
GAIKAV  
PRAJAP SINGH  
www.vardan.co.in

Note: Terms & conditions refer on backside of test report.



# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AA/04</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/004</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 1' 13.05"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 1' 3.89"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

**Sample Description:** AMBIENT AIR QUALITY MONITORING

**General Information:-**

<b>Sample collected by</b>	: Vardan Enviro Lab Representative
<b>Sampling Location</b>	: Mahi Nangal
<b>Instrument Used</b>	: RDS & FPS sampler with all Accessories
<b>Instrument Code</b>	: VEL/RDS/02 & VEL/FPS/02
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: 14/03/2021 to 15/03/2021
<b>Time of Monitoring</b>	: 11:30 AM – 11:30 AM
<b>Ambient Temperature (°C)</b>	: Min. 19°C Max. 35°C
<b>Surrounding Activity</b>	: Human & Vehicular Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No
<b>Sampling &amp; Analysis Protocol</b>	: IS-5182 & CPCB Guideline
<b>Parameter Required</b>	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>60</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	54.20	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	93.05	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	26.20	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	12.58	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.99	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	14.18	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	23.02	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	ppm(v/v)	--

Note :-<sup>60</sup> 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

AMITABH DUBEY  
(Analyzed By)  
SA ANALYST

ARUN KAWAT  
(Checked By)  
SA

(Approved By)  
GALURAV  
PRATAP SINGH

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	<b>VEL/NMDCL/AA/05</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/005</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>29° 59' 40.64"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 1' 17.61"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: <b>Leleana</b>
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/02 & VEL/FPS/02
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: <b>15/03/2021 to 16/03/2021</b>
Time of Monitoring	: 10:15 AM – 10:15 AM
Ambient Temperature (°C)	: Min. 20°C – Max. 35°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	50.89	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	88.24	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	26.63	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.92	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.90	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	13.47	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	24.80	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)  
SR ANALYST  
*Ami*

ARJUN KAWAT  
(Checked By)  
*Arjun*

(Approved By)  
PRATAP SINGH  
*Pratap*

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

**Sample Number:** VEL/HPCL/AA/06 **Report No.:** VEL/AA/2103/19/006  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd. **Format No.:** 7.8 F-01  
Village Nasibpura, Bhatinda Punjab **Party Reference No.:** NIL  
**Latitude:** 30° 1' 27.46"N **Reporting Date:** 24/03/2021  
**Longitude:** 75° 4' 8.62"E **Period of Analysis:** 19/03/2020 - 24/03/2021  
**Receipt Date:** 19/03/2020

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

**Sample collected by** : Vardan Enviro Lab Representative  
**Sampling Location** : **Baghi Bandar**  
**Instrument Used** : RDS & FPS sampler with all Accessories  
**Instrument Code** : VEL/RDS/01& VEL/FPS/01  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 15/03/2021 to 16/03/2021  
**Time of Monitoring** : 10:35 AM – 10:35 AM  
**Ambient Temperature (°C)** : Min. 20°C Max. 35°C  
**Surrounding Activity** : Human & Vehicular Activities  
**Scope of Monitoring** : Regulatory Requirement  
**Control measure if Any** : No  
**Sampling & Analysis Protocol** : IS-5182 & CPCB Guideline  
**Parameter Required** : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>(a)</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	46.42	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	73.02	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	19.13	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.05	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.95	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	11.05	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	24.12	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)  
SR ANALYST  
Amitsb

(Checked By)  
ARUN KUMAR  
Arun

(Approved By)  
PRATAP SINGH  
Pratap Singh

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AA/07</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/007</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 4' 34.79"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>74° 59' 57.45"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

### Sample Description: AMBIENT AIR QUALITY MONITORING

#### General Information:-

Sample collected by	: Vardan Enviro Lab Representative
Sampling Location	: Nasibpura
Instrument Used	: RDS & FPS sampler with all Accessories
Instrument Code	: VEL/RDS/03& VEL/FPS/03
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 15/03/2021 to 16/03/2021
Time of Monitoring	: 10:50 AM – 10:50 AM
Ambient Temperature (°C)	: Min. 20°C Max. 35°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

S.No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	48.83	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	79.49	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.57	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	10.14	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.90	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	12.11	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	21.60	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
SR ANALYST  
*Amitebh*

ARJUN RAWAT  
(Checked By)  
*Arjun*

(Approved By)  
GAURAV PRATAP SINGH  
*Gaurav*

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number: **VEL/HPCL/AA/08** Report No.: **VEL/AA/2103/19/008**  
 Name & Address of the Project: **M/s Hindustan Petroleum Corporation Ltd.** Format No.: **7.8 F-01**  
**Village Nasibpura, Bhatinda Punjab** Party Reference No.: **NIL**  
 Reporting Date: **24/03/2021**  
 Latitude: **30° 5' 40.22"N** Period of Analysis: **19/03/2020 - 24/03/2021**  
 Longitude: **75° 4' 5.30"E** Receipt Date: **19/03/2020**

Sample Description: **AMBIENT AIR QUALITY MONITORING**

### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
 Sampling Location : **Kotbhara**  
 Instrument Used : RDS & FPS sampler with all Accessories  
 Instrument Code : **VEL/RDS/04& VEL/FPS/04**  
 Instrument Calibration Status : **Calibrated**  
 Meteorological condition during monitoring : **Clear Sky**  
 Date of Monitoring : **15/03/2021 to 16/03/2021**  
 Time of Monitoring : **11:25 AM – 11:25 AM**  
 Ambient Temperature (°C) : **Min. 20°C Max. 35°C**  
 Surrounding Activity : **Human & Vehicular Activities**  
 Scope of Monitoring : **Regulatory Requirement**  
 Control measure if Any : **No**  
 Sampling & Analysis Protocol : **IS-5182 & CPCB Guideline**  
 Parameter Required : **As per Work Order**

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	50.18	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	83.78	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	23.76	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	7.85	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.85	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	9.18	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	19.20	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
 SR ANALYST  
 (Tested By)

ARUN KUMAR  
 (Checked By)



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/HPCL/AA/09 Report No.: VEL/AA/2103/19/009  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Latitude: 30° 6' 34.53"N Reporting Date: 24/03/2021  
Longitude: 75° 0' 23.67"E Period of Analysis: 19/03/2020 - 24/03/2021  
Receipt Date: 19/03/2020

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample collected by : Vardan Enviro Lab Representative  
Sampling Location : Kot Kashmir  
Instrument Used : RDS & FPS sampler with all Accessories  
Instrument Code : VEL/RDS/01 & VEL/FPS/01  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/03/2021 to 17/03/2021  
Time of Monitoring : 10:35 AM – 10:35 AM  
Ambient Temperature (°C) : Min. 20°C Max. 36°C  
Surrounding Activity : Human & Vehicular Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No  
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline  
Parameter Required : As per Work Order

S.No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	49.17	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	82.10	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	20.30	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.14	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.96	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	11.59	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	21.55	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)  
SA ANALYST

A.RUN RAWAT  
(Checked By)

(Approved By)  
PRATAP SINGH

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number: VEL/HPCL/AA/10 Report No.: VEL/AA/2103/19/010  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Format No.: 7.8 F-01  
Village Nasibpura, Bhatinda Punjab Party Reference No.: NIL  
Latitude: 30° 6' 44.02"N Reporting Date: 24/03/2021  
Longitude: 74° 57' 21.06"E Period of Analysis: 19/03/2020 - 24/03/2021  
Receipt Date: 19/03/2020

Sample Description: AMBIENT AIR QUALITY MONITORING

### General Information:-

Sample collected by : Vardan Enviro Lab Representative  
Sampling Location : Gehri Boghi  
Instrument Used : RDS & FPS sampler with all Accessories  
Instrument Code : VEL/RDS/04& VEL/FPS/04  
Instrument Calibration Status : Calibrated  
Meteorological condition during monitoring : Clear Sky  
Date of Monitoring : 16/03/2021 to 17/03/2021  
Time of Monitoring : 09:00 AM – 09:00 AM  
Ambient Temperature (°C) : Min. 20°C Max. 36°C  
Surrounding Activity : Human & Vehicular Activities  
Scope of Monitoring : Regulatory Requirement  
Control measure if Any : No  
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline  
Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	54.34	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.14	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	23.10	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.72	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.84	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS: 11255(P-6) Indo Phenol Blue Method	12.37	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	22.41	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITARH DUBEY  
(Tested By)  
SR ANALYST

ARUN KAWAT  
(Checked By)

(Approved By)  
GAURAV  
\* ATAP SINGH

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AA/11</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/011</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 3' 45.41"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 4' 6.08"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

**Sample Description:** AMBIENT AIR QUALITY MONITORING

**General Information:-**

<b>Sample collected by</b>	: Vardan Enviro Lab Representative
<b>Sampling Location</b>	: <b>Chathewala</b>
<b>Instrument Used</b>	: RDS & FPS sampler with all Accessories
<b>Instrument Code</b>	: VEL/RDS/03& VEL/FPS/03
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: <b>16/03/2021 to 17/03/2021</b>
<b>Time of Monitoring</b>	: 09:30 AM – 09:30 AM
<b>Ambient Temperature (°C)</b>	: Min. 20°C Max. 36°C
<b>Surrounding Activity</b>	: Human & Vehicular Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No
<b>Sampling &amp; Analysis Protocol</b>	: IS-5182 & CPCB Guideline
<b>Parameter Required</b>	: As per Work Order

S.No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	49.75	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	74.22	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	15.88	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.12	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.91	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	8.79	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	17.78	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	**BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)  
SR ANALYST

ARON KENYAT  
(Checked By)

(Approved By)  
[Signature]

**Note:** Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	<b>VEL/HPDCL/AA/12</b>	<b>Report No.:</b>	<b>VEL/AA/2103/19/012</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
<b>Latitude:</b>	<b>30° 6' 48.99"N</b>	<b>Party Reference No.:</b>	<b>NIL</b>
<b>Longitude:</b>	<b>75° 4' 54.51"E</b>	<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Period of Analysis:</b>	<b>19/03/2020 - 24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2020</b>

**Sample Description:** AMBIENT AIR QUALITY MONITORING

**General Information:-**

<b>Sample collected by</b>	: Vardan Enviro Lab Representative
<b>Sampling Location</b>	: Kot Fatta
<b>Instrument Used</b>	: RDS & FPS sampler with all Accessories
<b>Instrument Code</b>	: VEL/RDS/02& VEL/FPS/02
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: 16/03/2021 to 17/03/2021
<b>Time of Monitoring</b>	: 11:00 AM – 11:00 AM
<b>Ambient Temperature (°C)</b>	: Min. 20°C Max. 36°C
<b>Surrounding Activity</b>	: Human & Vehicular Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No
<b>Sampling &amp; Analysis Protocol</b>	: IS-5182 & CPCB Guideline
<b>Parameter Required</b>	: As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS <sup>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	53.55	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	85.13	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	22.13	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	8.85	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.81	mg/m <sup>3</sup>	4
6.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	IS:11255(P-6) Indo Phenol Blue Method	9.90	µg/m <sup>3</sup>	400
7.	Lead (Pb), µg/m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 0.05 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	1
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-11)	**BDL (*DL 0.1 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	IS: 5182 (P-12)	**BDL (*DL 1.0 ng/m <sup>3</sup> )	ng/m <sup>3</sup>	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	IS: 5182 (P-9) Colorimetric Method	18.80	µg/m <sup>3</sup>	180
11.	Arsenic As, ng/ m <sup>3</sup>	IS: 5182 (P-22)	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	6
12.	Nickel Ni, ng/ m <sup>3</sup>	IS: 5182 (P-22) Air Acetylene Method	**BDL (*DL 5.0ng/ m <sup>3</sup> )	ng/ m <sup>3</sup>	20
13.	Volatile Organic Carbon (VOCs)	IS: 5182 (P-11)	**BDL (*DL 5.0 µg/m <sup>3</sup> )	µg/m <sup>3</sup>	--
14.	Hydrocarbon (as Methane)	IS: 5182 (P-17), 1979	*BDL(*DL 0.2 ppm(v/v))	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

AMITABH DUBEY  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/AN/01 **Report No.:** VEL/AN/2103/19/001  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab **Format No.:** 7.8 F-01  
**Party Reference No.:** NII  
**Reporting Date:** 24/03/2021  
**Receipt Date:** 19/03/2021

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

**Sample collected by** : Vardan EnviroLab Representative  
**Sampling Location** : Near Project Site  
**Latitude** : 30° 3' 13.34"N  
**Longitude** : 75° 0' 41.57"E  
**Instrument Used** : Sound Level Meter  
**Instrument Code** : VEL/S/SLM/01  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 14/03/2021 to 15/03/2021  
**Time of Monitoring** : 06:00 AM to 06:00AM  
**Surrounding Activity** : Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	76.8	60.7	dB(A)
2.	Lmin	IS 9989 R-2014	53.1	46.1	dB(A)
3.	Leq	IS 9989 R-2014	62.47	52.87	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.

AMITABH DUBEY

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/AN/02	Report No.:	VEL/AN/2103/19/002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	24/03/2021
		Receipt Date:	19/03/2021

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Jiwan Singh Wala
Latitude	: 30° 3' 37.63"N
Longitude	: 75° 2' 75.30"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/03
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 14/03/2021 to 15/03/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	62.2	53.7	dB(A)
2.	Lmin	IS 9989 R-2014	43.6	36.4	dB(A)
3.	Leq	IS 9989 R-2014	53.31	43.24	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.

AMITABH DUBEY

SR. ANALYST

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenvironet.com](mailto:lab@vardanenvironet.com), [bd@vardanenvironet.com](mailto:bd@vardanenvironet.com)



# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/AN/03	Report No.:	VEL/AN/2103/19/003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	24/03/2021
		Receipt Date:	19/03/2021

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Maanwala
Latitude	: 30° 2' 33.23"N
Longitude	: 75° 58' 6.88"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 14/03/2021 to 15/03/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	68.3	53.5	dB(A)
2.	Lmin	IS 9989 R-2014	42.5	35.8	dB(A)
3.	Leq	IS 9989 R-2014	51.33	42.60	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.

AMITABH DUBEY  
Sr. ANALYST  
(Tested By)  
*Amitch*

ARJUN RAWAT  
(Checked By)  
*Arjun*

(Approved By)  
*[Signature]*  
Circular stamp: VARDAN ENVIRONET PVT. LTD. MANESAR, GURUGRAM, HARYANA

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number: **VEL/HPCL/AN/04** Report No.: **VEL/AN/2103/19/004**  
Name & Address of the Project: **M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab** Format No.: **7.8 F-01**  
Party Reference No.: **NIL**  
Reporting Date: **24/03/2021**  
Receipt Date: **19/03/2021**

Sample Description: **AMBIENT NOISE LEVEL MONITORING**

### General Information:-

Sample collected by : Vardan EnviroLab Representative  
Sampling Location : **Mahi Nangal**  
Latitude : **30° 1' 13.05"N**  
Longitude : **75° 1' 3.89"E**  
Instrument Used : Sound Level Meter  
Instrument Code : **VEL/S/SLM/02**  
Instrument Calibration Status : **Calibrated**  
Meteorological condition during monitoring : **Clear Sky**  
Date of Monitoring : **14/03/2021 to 15/03/2021**  
Time of Monitoring : **06:00 AM to 06:00AM**  
Surrounding Activity : **Human, Vehicular and Cement 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**

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.	Lmax	IS 9989 R-2014	58.2	46.4	dB(A)
2.	Lmin	IS 9989 R-2014	40.1	36.6	dB(A)
3.	Leq	IS 9989 R-2014	46.50	41.20	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.

AMITABH DUBEY  
(Created By)

ARJUN RAWAT  
(Checked By)

GAURAV  
(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

**Sample Number:** VEL/HPCL/AN/05 **Report No.:** VEL/AN/2103/19/005  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd, Village Nasibpura, Bhatinda Punjab **Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Receipt Date:** 19/03/2021

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

**Sample collected by** : Vardan EnviroLab Representative  
**Sampling Location** : Leleana  
**Latitude** : 29° 59' 40.64"N  
**Longitude** : 75° 1' 17.61"E  
**Instrument Used** : Sound Level Meter  
**Instrument Code** : VEL/S/SLM/02  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 15/03/2021 to 16/03/2021  
**Time of Monitoring** : 06:00 AM to 06:00AM  
**Surrounding Activity** : Human, Vehicular and Rail 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

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.	Lmax	IS 9989 R-2014	63.3	52.2	dB(A)
2.	Lmin	IS 9989 R-2014	44.6	37.5	dB(A)
3.	Leq	IS 9989 R-2014	52.32	41.25	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.

AMITABH DUBEY

(Tested By)

ARJUN RAWAT

(Checked By)



Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AN/06</b>	<b>Report No.:</b>	<b>VEL/AN/2103/19/006</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
		<b>Party Reference No.:</b>	<b>NIL</b>
		<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2021</b>

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

<b>Sample collected by</b>	: Vardan EnviroLab Representative
<b>Sampling Location</b>	: <b>Baghi Bandar</b>
<b>Latitude</b>	: <b>30° 1' 27.46"N</b>
<b>Longitude</b>	: <b>75° 4' 8.62"E</b>
<b>Instrument Used</b>	: Sound Level Meter
<b>Instrument Code</b>	: VEL/S/SLM/03
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: <b>15/03/2021 to 16/03/2021</b>
<b>Time of Monitoring</b>	: <b>06:00 AM to 06:00AM</b>
<b>Surrounding Activity</b>	: Human, Vehicular and Rail Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No any
<b>Sampling &amp; Analysis Protocol</b>	: IS-9989 R-2014 & CPCB Guideline
<b>Sampling Duration</b>	: 24 Hours
<b>Parameter Required</b>	: As per Work Order

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.	Lmax	IS 9989 R-2014	59.8	54.6	dB(A)
2.	Lmin	IS 9989 R-2014	43.6	36.7	dB(A)
3.	Leq	IS 9989 R-2014	50.45	42.11	dB(A)
4.	CPCB Limits in dB(A) <sup>*</sup> Leq (Residential Area)	-	55.00	45.00	dB(A)

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

**AMITABH DUBEY**  
 (Tested By)

**ARJUN RAWAT**  
 (Checked By)

**(Approved By)**

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

<b>Sample Number:</b>	<b>VEL/HPCL/AN/07</b>	<b>Report No.:</b>	<b>VEL/AN/2103/19/007</b>
<b>Name &amp; Address of the Project:</b>	<b>M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab</b>	<b>Format No.:</b>	<b>7.8 F-01</b>
		<b>Party Reference No.:</b>	<b>NIL</b>
		<b>Reporting Date:</b>	<b>24/03/2021</b>
		<b>Receipt Date:</b>	<b>19/03/2021</b>

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

<b>Sample collected by</b>	: Vardan EnviroLab Representative
<b>Sampling Location</b>	: Nasibpura
<b>Latitude</b>	: 30° 4' 34.79"N
<b>Longitude</b>	: 74° 59' 57.45"E
<b>Instrument Used</b>	: Sound Level Meter
<b>Instrument Code</b>	: VEL/S/SLM/01
<b>Instrument Calibration Status</b>	: Calibrated
<b>Meteorological condition during monitoring</b>	: Clear Sky
<b>Date of Monitoring</b>	: 15/03/2021 to 16/03/2021
<b>Time of Monitoring</b>	: 06:00 AM to 06:00AM
<b>Surrounding Activity</b>	: Human, Vehicular and Cement plant Activities
<b>Scope of Monitoring</b>	: Regulatory Requirement
<b>Control measure if Any</b>	: No any
<b>Sampling &amp; Analysis Protocol</b>	: IS-9989 R-2014 & CPCB Guideline
<b>Sampling Duration</b>	: 24 Hours
<b>Parameter Required</b>	: As per Work Order

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.	Lmax	IS 9989 R-2014	62.8	56.9	dB(A)
2.	Lmin	IS 9989 R-2014	45.6	35.4	dB(A)
3.	Leq	IS 9989 R-2014	52.60	43.80	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.

**AMITABH DUBEY**  
SR. ANALYST  
(Tested By)

**ARJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample Number:	VEL/HPCL/AN/08	Report No.:	VEL/AN/2103/19/008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	24/03/2021
		Receipt Date:	19/03/2021

### Sample Description: AMBIENT NOISE LEVEL MONITORING

#### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Kotbhara
Latitude	: 30° 5' 40.22"N
Longitude	: 75° 4' 5.30"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 15/03/2021 to 16/03/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	60.3	53.7	dB(A)
2.	Lmin	IS 9989 R-2014	42.6	35.6	dB(A)
3.	Leq	IS 9989 R-2014	51.10	42.18	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.

AMITABH DUBEY

SR ANALYST

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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## Test Report

**Sample Number:** VEL/HPCL/AN/09 **Report No.:** VEL/AN/2103/19/009  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd. **Format No.:** 7.8 F-01  
Village Nasibpura, Bhatinda Punjab **Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Receipt Date:** 19/03/2021

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

**Sample collected by** : Vardan EnviroLab Representative  
**Sampling Location** : Kot Kashmir  
**Latitude** : 30° 6' 34.53"N  
**Longitude** : 75° 0' 23.67"E  
**Instrument Used** : Sound Level Meter  
**Instrument Code** : VEL/S/SLM/02  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 16/03/2021 to 17/03/2021  
**Time of Monitoring** : 06:00 AM to 06:00AM  
**Surrounding Activity** : Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	61.4	51.9	dB(A)
2.	Lmin	IS 9989 R-2014	46.7	37.2	dB(A)
3.	Leq	IS 9989 R-2014	52.57	42.68	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.

AMITABH DUBEY  
SR ANALYST  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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



# Vardan EnviroLab

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NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/AN/10 **Report No.:** VEL/AN/2103/19/010  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab **Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Receipt Date:** 19/03/2021

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

**Sample collected by** : Vardan EnviroLab Representative  
**Sampling Location** : Gehri Boghi  
**Latitude** : 30° 6' 44.02"N  
**Longitude** : 74° 57' 21.06"E  
**Instrument Used** : Sound Level Meter  
**Instrument Code** : VEL/S/SLM/01  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 16/03/2021 to 17/03/2021  
**Time of Monitoring** : 06:00 AM to 06:00AM  
**Surrounding Activity** : Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	63.4	52.6	dB(A)
2.	Lmin	IS 9989 R-2014	47.2	37.6	dB(A)
3.	Leq	IS 9989 R-2014	51.20	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.

AMITABH DUBEY  
Sr Analyst  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AN/11	Report No.:	VEL/AN/2103/19/011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	24/03/2021
		Receipt Date:	19/03/2021

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Chathewala
Latitude	: 30° 3' 45.41"N
Longitude	: 75° 4' 6.08"E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 16/03/2021 to 17/03/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Surrounding Activity	: Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	60.5	49.3	dB(A)
2.	Lmin	IS 9989 R-2014	42.7	35.9	dB(A)
3.	Leq	IS 9989 R-2014	50.10	41.60	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.

AMITABH DUBEY  
SR ANALYST

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)



Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://www.vardan.co.in)

Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenvironet.com](mailto:lab@vardanenvironet.com), [bd@vardanenvironet.com](mailto:bd@vardanenvironet.com)



# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

**Sample Number:** VEL/HPCL/AN/12 **Report No.:** VEL/AN/2103/19/012  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd. **Format No.:** 7.8 F-01  
Village Nasibpura, Bhatinda Punjab **Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Receipt Date:** 19/03/2021

**Sample Description:** AMBIENT NOISE LEVEL MONITORING

### General Information:-

**Sample collected by** : Vardan EnviroLab Representative  
**Sampling Location** : Kot Fatta  
**Latitude** : 30° 6' 48.99"N  
**Longitude** : 75° 4' 54.51"E  
**Instrument Used** : Sound Level Meter  
**Instrument Code** : VEL/S/SLM/03  
**Instrument Calibration Status** : Calibrated  
**Meteorological condition during monitoring** : Clear Sky  
**Date of Monitoring** : 16/03/2021 to 17/03/2021  
**Time of Monitoring** : 06:00 AM to 06:00AM  
**Surrounding Activity** : Human, Vehicular and Cement 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

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.	Lmax	IS 9989 R-2014	57.7	49.2	dB(A)
2.	Lmin	IS 9989 R-2014	41.9	36.5	dB(A)
3.	Leq	IS 9989 R-2014	48.20	41.12	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.

AMITABH DUBEY  
SR ANALYST  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/01	<b>Report No.:</b>	VEL/W/2103/19/001
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 3' 13.34" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 0' 41.57" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Near Project Site	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	14/03/2021
<b>Parameter Required:</b>	As per work order	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.84	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	312.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	79.82	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	242.51	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	56.88	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	27.42	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	951.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	34.10	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.82	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	7.56	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.17	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**MEENU KAUSHIK**  
(Tested By)

**ARJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: VEL/HPCL/W/01					Report No.: VEL/W/2103/19/001	
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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.24	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL (**DL 0.001 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1585	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	24.82	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	5.3	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

MEENU KAUSHIK  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/W/02  
**Name & Address of Party:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 3' 37.63" N  
**Longitude:** 75° 2' 75.30" E  
**Sample Description:** Ground Water Sample  
**Sample Location:** Jiwan Singh Wala  
**Sample Collected by:** Vardan Enviro Lab Representative  
**Parameter Required:** As per work order  
**Sampling & Analysis Protocol:** IS-3025, APHA

**Report No.:** VEL/W/2103/19/002  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis:** 19/03/2021 – 24/03/2021  
**Receipt Date:** 19/03/2021  
**Sampling Date:** 14/03/2021  
**Sampling Quantity:** 2.0 Ltr + 200 ml  
**Sampling Type:** Garb  
**Preservation:** Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.66	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	198.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	59.34	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	210.63	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	49.20	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.14	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	574.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	19.72	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.71	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.16	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.22	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL (**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

MEENU KAUSHIK

ANALYST

(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenvironet.com](mailto:lab@vardanenvironet.com), [bd@vardanenvironet.com](mailto:bd@vardanenvironet.com)



# Vardan EnviroLab

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

## Test Report

Sample No.: VEL/HPCL/W/02				Report No.: VEL/W/2103/19/002		
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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	*Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	*Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.42	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	957	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34), Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	20.8	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	4.9	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

MEENU KAUSHIK  
(Tested By)

ARJUN RAWAT

(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/03	<b>Report No.:</b>	VEL/W/2103/19/003
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 2' 33.23" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 58' 6.88" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Maanwala	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	14/03/2021
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.81	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	276.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	82.16	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	280.72	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	70.60	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	17.25	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	640.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	76.05	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.98	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.12	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.23	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**MOENU KAUSHIK**  
(Tested By)  
ANALYST

**ARUN RAJAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
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## Test Report

Sample No.: **VEL/HPCL/W/03**

Report No.: **VEL/W/2103/19/003**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	*Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	*Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.31	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1067	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	23.8	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	3.5	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

  
**MEENU KAUSHIK**  
(Tested By)  
S.S. ANALYST

  
**ARJUN RAWAT**  
(Checked By)

  
**GOURAV**  
(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/04	<b>Report No.:</b>	VEL/W/2103/19/004
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 1' 13.05" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 1' 3.89" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Mahi Nangal	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	14/03/2021
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.76	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	228.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	71.92	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	232.49	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	51.80	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	11.80	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	610.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	41.25	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.71	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.34	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.22	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

**MEENU KAUSHIK**  
(Tested By) ANALYST

**ARJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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



# Vardan EnviroLab

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## Test Report

Sample No.: **VEL/HPCL/W/04**

Report No.: **VEL/W/2103/19/004**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01 mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.48	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1017	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	27.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	7.1	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**MEENU KAUSHIK**  
(Tested By)  
ANALYST

**ARJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/05	<b>Report No.:</b>	VEL/W/2103/19/005
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 6' 34.53" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 0' 23.67" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Kot Kashmir	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	15/03/2021
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.68	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	283.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	74.63	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	276.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	80.19	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	23.52	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	711.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	60.44	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.76	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.53	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.26	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

MEENU KAUSHIK  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: **VEL/HPCL/W/05**

Report No.: **VEL/W/2103/19/005**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.55	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1185	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	24.1	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.7	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**MEENU KAUSHIK**  
(Tested By)

**ARJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/06	<b>Report No.:</b>	VEL/W/2103/19/006
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 4' 34.79" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	74° 59' 57.45" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Nasibpura	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	15/03/2021
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.53	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	214.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	69.16	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	224.05	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	61.51	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.07	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	620.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	50.19	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.71	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	8.13	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.20	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

  
MEENA KAUSHIK  
(Tested By)  
Sr. ANALYST

  
ARJUN RAWAT  
(Checked By)



**Note:** Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: **VEL/HPCL/W/06**

Report No.: **VEL/W/2103/19/006**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	<sup>#</sup> Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	<sup>#</sup> Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.63	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1033	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	25.1	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	6.2	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: \*BDL- Below Detection Limit, \*\*DL- Detection Limit. <sup>#</sup>These parameter are not covered in our NABL scope.

**MEENU KAUSHIK**  
(Tested By) ANALYST

**ARJUN RAWAT**  
(Checked By)

Approved By  
  
Stamp: VARDAN ENVIRONET PVT. LTD. QUALITY CONTROL

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/07	<b>Report No.:</b>	VEL/W/2103/19/007
<b>Name &amp; Address of Party:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 1' 27.46" N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 4' 8.62" E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	19/03/2021 – 24/03/2021
<b>Sample Location:</b>	Baghi Bandar	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	15/03/2021
<b>Parameter Required</b>	As per Client Requirement	<b>Sampling Quantity:</b>	2.0 Ltr + 200 ml
<b>Sampling &amp; Analysis Protocol:</b>	IS-3025, APHA	<b>Sampling Type:</b>	Garb
		<b>Preservation:</b>	Refrigerated

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)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.89	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	410.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	113.82	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	354.91	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	86.34	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.05 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	30.62	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1043.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	76.44	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.82	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	10.16	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l	0.3	No relaxation
17.	Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.03	0.2
18.	Boron	APHA, 4500B C, Carmine Method	*BDL(**DL 0.1 mg/l)	mg/l	0.5	1
19.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	No Relaxation

MEERU KAUSHIK  
(Tested By)

ASHUJEWAT  
(Checked By)



Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: **VEL/HPCL/W/07**

Report No.: **VEL/W/2103/19/007**

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	*BDL(**DL 0.001 mg/l)	mg/l	0.001	0.002
21.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BDL(**DL 0.01mg/l)	mg/l	0.5	No Relaxation
22.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BDL(**DL 0.02 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	APHA , 3111 B, Direct Air, Acetylene Flame Method	0.65	mg/l	5	15
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.05	1.5
25.	Manganese as Mn	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.06 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	APHA . 3114 B, Manual Hydride Generation	*BDL(**DL 0.13 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l	0.01	0.05
30.	Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1738	µS/cm	--	--
32.	Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	*BDL	mg/l	0.5	No Relaxation
33.	Sodium	APHA, 3500 Na B Flame Photometric Method	32.4	mg/l	--	--
34.	Potassium	APHA, 3500 Na B Flame Photometric Method	8.6	mg/l	--	--
35.	Total Coliform	IS 1622:2009 : 1987, RA:2019	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
36.	E. Coli	IS 1622:2009 : 1987, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**MOHINI KAUSHIK**  
(Tested By)

**ARJUN RAWAT**  
(Checked By)

(Approved By)

**GATISAV PRATAP SINGH**

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number:	VEL/HPCL/W/08	Report No.:	VEL/W/2103/19/008
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 6' 48.99" N	Party Reference No.:	NIL
Longitude:	75° 4' 54.51" E	Reporting Date:	24/03/2021
Sample Description:	Surface Water Sample	Period of Analysis:	19/03/2021 – 24/03/2021
Sample Location:	Kot Fatta	Receipt Date:	19/03/2021
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	16/03/2021
Parameter Required	As per Client Requirement	Sampling Quantity:	5.0 Ltr
Sampling & Analysis Protocol:	IS 3025, APHA	Sampling Type:	Grab
		Preservation:	Refrigerated

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.71	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 1Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	26	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	71.63	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	803	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	13.56	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.27	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	482.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.16	mg/l
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	14.46	mg/l
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.57	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	5.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	24.00	mg/l
17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	12.06	mg/l
18.	Total Coliform	IS 1622	29	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

MEENU KAUSHIK  
(Analyst)  
(Tested By)

ARJUN RAJAT  
(Checked By)

(Approved By)  
  
QUALITY CONTROL

Note: Terms & conditions refer on backside of test report.

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



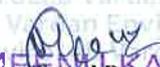
# Vardan EnviroLab

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

## Test Report

Sample No.: VEL/HPCL/W/08			Report No.: VEL/W/2103/19/008	
S. No.	Parameter	Test-Method	Result	Unit
20.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	173.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	51.22	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	161.02	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.98	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.1	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	76.40	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	29.88	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

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

  
MEENU KAUSHIK  
(Tested By)  
SR. ANALYST

  
ASHISH KUMAR  
(Checked By)

  
ANIL  
(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/W/09	Report No.:	VEL/W/2103/19/009
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30° 3' 45.41" N	Party Reference No.:	NIL
Longitude:	75° 4' 6.08" E	Reporting Date:	24/03/2021
Sample Description:	Surface Water Sample	Period of Analysis:	19/03/2021 – 24/03/2021
Sample Location:	Chathewala	Receipt Date:	19/03/2021
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	16/03/2021
Parameter Required	As per Client Requirement	Sampling Quantity:	5.0 Ltr
Sampling & Analysis Protocol:	IS 3025, APHA	Sampling Type:	Grab
		Preservation:	Refrigerated

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.83	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 1Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	20	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Taste	APHA , 2160 B, Threshold Test Method	None	--
6.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	69.41	mg/l
7.	Conductivity	APHA, 2510 B, Conductivity Meter Method	913	µS/cm
8.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	7.10	mg/l
9.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.31	mg/l
10.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	548.00	mg/l
11.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
12.	Boron	APHA, 4500B C, Carmine Method	0.11	mg/l
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	21.54	mg/l
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.45	mg/l
15.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
16.	COD	APHA, 5220 B, Open Reflux Method	29.00	mg/l
17.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	9.12	mg/l
18.	Total Coliform	IS 1622	25	MPN/100ml
19.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

MEENU KAUSHIK  
ANALYST  
(Tested By)

ASHU RANJAN  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample No.: VEL/HPCL/W/09			Report No.: VEL/W/2103/19/009	
S. No.	Parameter	Test-Method	Result	Unit
20.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	192.00	mg/l
21.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	65.74	mg/l
22.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	217.12	mg/l
23.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	6.80	mg/l
24.	Copper as Cu	APHA , 3111 B, Direct Air, Acetylene Flame Method	3.02	mg/l
25.	Sodium	APHA, 3500 Na B Flame Photometric Method	87.36	mg/l
26.	Potassium	APHA, 3500 Na B Flame Photometric Method	29.51	mg/l
27.	Total Chromium as Cr	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.03 mg/l)	mg/l

Note: \*BDL- Below Detection Limit, \*\*DL- Detection Limit. ^Due to Additional Parameter.

**MEENU KAUSHIK**  
(Tested By) ALYST

**A. N. SINGH**  
(Checked By)

**QAIRY**  
(Approved By)

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

Sample Number: VEL/HPCL/S/01  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
Latitude: 30° 3' 13.34"N  
Longitude: 75° 0' 41.57"E  
Sample Description: Soil Sample  
Sampling Location: Near Project Site  
Sample Collected by: Vardan Enviro Lab Team  
Sampling & Analysis Protocol: IS 2720 , USEPA & SOP

Report No.: VEL/S/2103/19/001  
Format No.: 7.8 F-01  
Party Reference No.: NIL  
Reporting Date: 24/03/2021  
Period of Analysis : 19/03/2021 - 24/03/2021  
Receipt Date: 19/03/2021  
Sampling Date: 14/03/2021  
Type of Sampling: Composite  
Sampling Quantity: 2.0 Kg  
Packing Status: Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.67	--
2.	Conductivity	IS:14767 by Conductivity meter	0.321	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	32.60	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.32	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	54.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	40.32	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	43.83	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	135.94	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.10	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.99	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	20.35	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	210.45	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	17.21	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.45	mg/kg
17.	Organic Carbon	USEPA 3050B	0.58	%
18.	Lead (as Pb)	USEPA 3050B	0.83	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.89	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.37	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01 & Issue Date-14/02/2013	15.6	%

Note: SOP-Standard Operating Procedure.

MEENU KAUSHIK  
ANALYST  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)  
PRATAP SINGH

Note: Terms & conditions refer on backside of test report.

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Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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

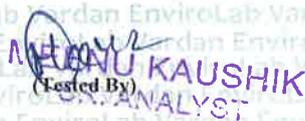
## Test Report

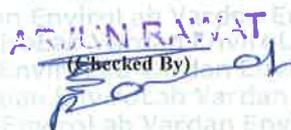
**Sample Number:** VEL/HPCL/S/02  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 3' 37.63"N  
**Longitude:** 75° 2' 75.30"E  
**Sample Description:** Soil Sample  
**Sampling Location:** Jiwan Singh Wala  
**Sample Collected by:** Vardan Enviro Lab Team  
**Sampling & Analysis Protocol:** IS 2720, USEPA & SOP  
**Packing Status:** Temp Sealed

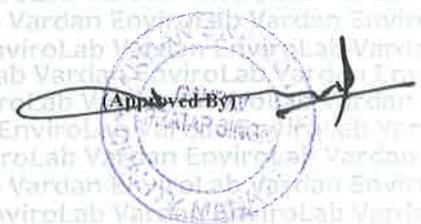
**Report No.:** VEL/S/2103/19/002  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Receipt Date:** 19/03/2021  
**Sampling Date:** 14/03/2021  
**Type of Sampling:** Composite  
**Sampling Quantity:** 2.0 Kg  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.49	--
2.	Conductivity	IS:14767 by Conductivity meter	0.335	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.20	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.34	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	50.18	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	36.75	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	52.06	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	151.02	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.60	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.91	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	28.17	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	238.00	kg /hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	21.53	kg /hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.27	mg/kg
17.	Organic Carbon	USEPA 3050B	0.53	%
18.	Lead (as Pb)	USEPA 3050B	0.78	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.82	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.47	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.78	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.43	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	14.8	%

Note: SOP-Standard Operating Procedure. ^Due to Additional Parameter.

  
(Tested By)  
ANSHU KAUSHIK  
ANALYST

  
(Checked By)  
ANSHU RAWAT

  
(Approved By)  
ANSHU RAWAT

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/S/03  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Report No.:** VEL/S/2103/19/003  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Latitude:** 30° 2' 33.23"N  
**Longitude:** 75° 58' 6.88"E  
**Receipt Date:** 19/03/2021  
**Sample Description:** Soil Sample  
**Sampling Location:** Maanwala  
**Sampling Date:** 14/03/2021  
**Sample Collected by:** Vardan Enviro Lab Team  
**Type of Sampling:** Composite  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Sampling Quantity:** 2.0 Kg  
**Packing Status:** Temp Sealed  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.68	--
2.	Conductivity	IS:14767 by Conductivity meter	0.328	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.27	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.26	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	40.25	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	61.19	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	56.30	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	129.72	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.40	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.72	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	23.15	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	225.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	31.49	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.56	mg/kg
17.	Organic Carbon	USEPA 3050B	0.42	%
18.	Lead (as Pb)	USEPA 3050B	0.63	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.49	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.12	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.44	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01 & Issue Date-14/02/2013	16.2	%

Note: SOP-Standard Operating Procedure.

**MEENU KAUSHIK**  
(Tested By) ANALYST

**ARJUN RAWAT**  
(Checked By)

(Approved By)  
**CHITRA P SINGH**

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/S/04  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Report No.:** VEL/S/2103/19/004  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Latitude:** 30° 1' 13.05"N  
**Longitude:** 75° 1' 3.89"E  
**Reporting Date:** 24/03/2021  
**Sample Description:** Soil Sample  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Sampling Location:** Mahi Nangal  
**Receipt Date:** 19/03/2021  
**Sample Collected by:** Vardan Enviro Lab Team  
**Sampling Date:** 14/03/2021  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Type of Sampling:** Composite  
**Packing Status:** Temp Sealed  
**Sampling Quantity:** 2.0 Kg  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.57	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	33.80	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.29	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	52.45	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	46.72	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	62.81	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	142.18	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.96	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.76	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	32.05	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	231.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.58	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	7.35	mg/kg
17.	Organic Carbon	USEPA 3050B	0.44	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.73	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.48	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.55	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.86	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.4	%

Note: SOP-Standard Operating Procedure.

**MEENU KAUSHIK**  
(Tested By)  
ANALYST

**ASJUN RAWAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/HPCL/S/05	Report No.:	VEL/S/2103/19/005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd, Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Latitude:	29° 59' 40.64"N	Reporting Date:	24/03/2021
Longitude:	75° 1' 17.61"E	Period of Analysis :	19/03/2021 - 24/03/2021
Sample Description:	Soil Sample	Receipt Date:	19/03/2021
Sampling Location:	Leleana	Sampling Date:	15/03/2021
Sample Collected by:	Vardan Enviro Lab Team	Type of Sampling:	Composite
Sampling & Analysis Protocol:	IS 2720 , USEPA & SOP	Sampling Quantity:	2.0 Kg
Packing Status:	Temp Sealed	Depth of Sampling:	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.73	--
2.	Conductivity	IS:14767 by Conductivity meter	0.341	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.28	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.31	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	63.24	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	49.31	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	58.16	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	152.46	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.76	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.75	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	28.13	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	242.72	kg /hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	26.86	kg /hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.73	mg/kg
17.	Organic Carbon	USEPA 3050B	0.43	%
18.	Lead (as Pb)	USEPA 3050B	0.96	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.85	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.83	mg/kg
21.	Copper (as Cu)	USEPA 3050B	7.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.54	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

Note: SOP-Standard Operating Procedure.

(Tested By)  
**ANU KAUSHIK**  
SR. ANALYST

(Checked By)  
**ARJUN RAWAT**

(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

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

## Test Report

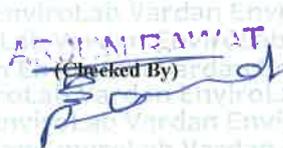
**Sample Number:** VEL/HPCL/S/06  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 1' 27.46"N  
**Longitude:** 75° 4' 8.62"E  
**Sample Description:** Soil Sample  
**Sampling Location:** Baghi Bandar  
**Sample Collected by:** Vardan Enviro Lab Team  
**Sampling & Analysis Protocol:** IS 2720, USEPA & SOP  
**Packing Status:** Temp Sealed

**Report No.:** VEL/S/2103/19/006  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis:** 19/03/2021 - 24/03/2021  
**Receipt Date:** 19/03/2021  
**Sampling Date:** 15/03/2021  
**Type of Sampling:** Composite  
**Sampling Quantity:** 2.0 Kg  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.54	--
2.	Conductivity	IS:14767 by Conductivity meter	0.335	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	42.18	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.34	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.74	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.12	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	54.79	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	163.41	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.84	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.78	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	35.80	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	245.26	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	19.78	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.72	mg/kg
17.	Organic Carbon	USEPA 3050B	0.45	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.74	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.43	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.61	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.39	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.3	%

Note: SOP-Standard Operating Procedure.

  
**ANNU KAUSHIK**  
(Tested By)  
S.N. ANALYST

  
(Checked By)

  
(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

**Sample Number:** VEL/HPCL/S/07  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Report No.:** VEL/S/2103/19/007  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Latitude:** 30° 4' 34.79"N  
**Longitude:** 74° 59' 57.45"E  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Sample Description:** Soil Sample  
**Receipt Date:** 19/03/2021  
**Sampling Location:** Nasibpura  
**Sampling Date:** 15/03/2021  
**Sample Collected by:** Vardan Enviro Lab Team  
**Type of Sampling:** Composite  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Sampling Quantity:** 2.0 Kg  
**Packing Status:** Temp Sealed  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.80	--
2.	Conductivity	IS:14767 by Conductivity meter	0.344	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	41.12	%
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	51.67	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	67.15	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	59.72	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	125.34	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.96	mg/100g
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	24.83	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	251.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	31.73	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	16.72	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.58	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.71	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.74	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.05	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.56	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	20.2	%

Note: SOP-Standard Operating Procedure.

**MEENU KAUSHIK**  
(Tested By) ANALYST

**ARJUN RAJAT**  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

<b>Sample Number:</b>	VEL/IOCL/S/08	<b>Report No.:</b>	VEL/S/2103/19/008
<b>Name &amp; Address of the Project:</b>	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	<b>Format No.:</b>	7.8 F-01
<b>Latitude:</b>	30° 5' 40.22"N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75° 4' 5.30"E	<b>Reporting Date:</b>	24/03/2021
<b>Sample Description:</b>	Soil Sample	<b>Period of Analysis :</b>	19/03/2021 - 24/03/2021
<b>Sampling Location:</b>	Kotbhara	<b>Receipt Date:</b>	19/03/2021
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Date:</b>	15/03/2021
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & SOP	<b>Type of Sampling:</b>	Composite
<b>Packing Status:</b>	Temp Sealed	<b>Sampling Quantity:</b>	2.0 Kg
		<b>Depth of Sampling:</b>	30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.45	--
2.	Conductivity	IS:14767 by Conductivity meter	0.331	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	31.06	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.26	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	41.48	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	46.12	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	50.65	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	141.49	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.06	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.71	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	37.25	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	221.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.45	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.25	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.61	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.47	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.38	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.92	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

Note: SOP-Standard Operating Procedure.

**MEENU KAUSHIK**  
(Tested By)  
**ANALYST**

**ANJAN KUMAR**  
(Checked By)  
**ANALYST**

**(Approved By)**  
**ANJAN KUMAR**

Note: Terms & conditions refer on backside of test report.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051, Haryana  
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## Test Report

Sample Number: VEL/HPCL/S/09  
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
Report No.: VEL/S/2103/19/009  
Format No.: 7.8 F-01  
Party Reference No.: NIL  
Reporting Date: 24/03/2021  
Period of Analysis : 19/03/2021 - 24/03/2021  
Receipt Date: 19/03/2021  
Sampling Date: 16/03/2021  
Type of Sampling: Composite  
Sample Description: Soil Sample  
Sampling Location: Kot Kashmir  
Sample Collected by: Vardan Enviro Lab Team  
Sampling & Analysis Protocol: IS 2720 , USEPA & SOP  
Packing Status: Temp Sealed  
Depth of Sampling: 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.82	--
2.	Conductivity	IS:14767 by Conductivity meter	0.337	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	32.60	%
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	56.46	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	42.15	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	48.52	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	153.19	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.61	mg/100g
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	22.17	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	223.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	25.43	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.41	mg/kg
17.	Organic Carbon	USEPA 3050B	0.34	%
18.	Lead (as Pb)	USEPA 3050B	0.87	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.91	mg/kg
21.	Copper (as Cu)	USEPA 3050B	6.56	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.38	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	18.2	%

Note: SOP-Standard Operating Procedure.

MEENU KAUSHIK  
(Tested By)

ARJUN RAWAT  
(Checked By)

(Approved By)

Note: Terms & conditions refer on backside of test report.

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Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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

## Test Report

**Sample Number:** VEL/HPCL/S/10  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 6' 44.02"N  
**Longitude:** 74° 57' 21.06"E  
**Sample Description:** Soil Sample  
**Sampling Location:** Gehri Boghi  
**Sample Collected by:** Vardan Enviro Lab Team  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Packing Status:** Temp Sealed

**Report No.:** VEL/S/2103/19/010  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Receipt Date:** 19/03/2021  
**Sampling Date:** 16/03/2021  
**Type of Sampling:** Composite  
**Sampling Quantity:** 2.0 Kg  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.56	--
2.	Conductivity	IS:14767 by Conductivity meter	0.319	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	34.72	%
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	54.16	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.72	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	51.06	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	157.23	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.95	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.82	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	31.46	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	251.75	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	21.78	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.83	mg/kg
17.	Organic Carbon	USEPA 3050B	0.47	%
18.	Lead (as Pb)	USEPA 3050B	0.71	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.79	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.57	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.25	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.29	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	15.6	%

Note: SOP-Standard Operating Procedure.

**MEENI KAUSHIK**  
(Tested By)  
SR. ANALYST

**ARJUN RAJAT**  
(Checked By)  
[Signature]

(Approved By) [Signature]

Note: Terms & conditions refer on backside of test report.

[www.vardan.co.in](http://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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/S/11  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Latitude:** 30° 3' 45.41"N  
**Longitude:** 75° 4' 6.08"E  
**Sample Description:** Soil Sample  
**Sampling Location:** Chathewala  
**Sample Collected by:** Vardan Enviro Lab Team  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Packing Status:** Temp Sealed

**Report No.:** VEL/S/2103/19/011  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Receipt Date:** 19/03/2021  
**Sampling Date:** 16/03/2021  
**Type of Sampling:** Composite  
**Sampling Quantity:** 2.0 Kg  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.61	--
2.	Conductivity	IS:14767 by Conductivity meter	0.313	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	33.60	%
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	61.43	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.78	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	45.16	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	132.87	kg/hect.
11.	Iron as Fe	USDA Method, 1968	2.45	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.54	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	20.78	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	201.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.63	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.42	mg/kg
17.	Organic Carbon	USEPA 3050B	0.31	%
18.	Lead (as Pb)	USEPA 3050B	0.97	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.82	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.28	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	20.5	%

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
(Tested By)

**ARUN KUMAR**  
(Checked By)

**(Approved By)**

Note: Terms & conditions refer on backside of test report.

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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  
NABL Accredited | MoEF&CC Recognized | ISO 9001|ISO 14001|ISO 45001

## Test Report

**Sample Number:** VEL/HPCL/S/12  
**Name & Address of the Project:** M/s Hindustan Petroleum Corporation Ltd.  
Village Nasibpura, Bhatinda Punjab  
**Report No.:** VEL/S/2103/19/012  
**Format No.:** 7.8 F-01  
**Party Reference No.:** NIL  
**Latitude:** 30° 6' 48.99"N  
**Longitude:** 75° 4' 54.51"E  
**Reporting Date:** 24/03/2021  
**Period of Analysis :** 19/03/2021 - 24/03/2021  
**Sample Description:** Soil Sample  
**Receipt Date:** 19/03/2021  
**Sampling Location:** Kot Fatta  
**Sampling Date:** 16/03/2021  
**Sample Collected by:** Vardan Enviro Lab Team  
**Type of Sampling:** Composite  
**Sampling & Analysis Protocol:** IS 2720 , USEPA & SOP  
**Sampling Quantity:** 2.0 Kg  
**Packing Status:** Temp Sealed  
**Depth of Sampling:** 30 cm

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.70	--
2.	Conductivity	IS:14767 by Conductivity meter	0.343	mS/cm
3.	Soil Texture	IS : 2720 (P-22, RA2003)	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	36.40	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.31	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.12	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	65.41	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	49.25	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	108.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	3.09	mg/100g
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	21.32	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	202.49	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	18.20	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	13.46	mg/kg
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.59	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.75	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.67	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.45	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g
24.	Moisture Content	SOP , SP-79,Issue No.-01& Issue Date-14/02/2013	16.2	%

Note: SOP-Standard Operating Procedure.

MEENU KAUSHIK  
(Tested By) ANALYST

ARUN RAJAT  
(Checked By)

(Approved By)

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