



# हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड

(भारत सरकार उपक्रम) रजिस्टर्ड ऑफिस : 17, जमशेदजी टाटा रोड, मुंबई - 400 020.

## HINDUSTAN PETROLEUM CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE : 17, JAMSHEDJI TATA ROAD, MUMBAI - 400 020.

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Date: 28<sup>th</sup> May 2020

SK/2G/Env Compliance/2

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

**Sub: Submission of six-monthly compliance report of stipulated conditions of Environmental Clearance for setting up 2G Ethanol Bio-refinery plant of capacity 100 KLPD at Village- Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab) for the period of June 2020**

**Ref: F.No. J-11011/221/2017-IA II (I) Dated- 14.08.2018**

Sir/ Madam

This has reference to the EC vide letter no. **J-11011/221/2017-IA II (I) Dated 14.08.2018** In this regard, we are submitting hereby status report of compliance with the specific and general conditions for period June 2020. Documents enclosed along with report are mentioned below as

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

Due to ongoing lockdown, we are submitting the compliance report via email only and uploading the report on Parivesh portal of MoEF & CC.

Thanking You

*S. Kumar*

**For M/s- Hindustan Petroleum Corporation Limited**

**(Authorized Signatory)**

Name -Sanjay Kumar  
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Copy to:

1. Member Secretary, Central Pollution Control Board, Parivesh Bhawan East Arjun Nagar, Delhi- 32 (mscb.cpcb@nic.in)
2. Member Secretary, Punjab Pollution Control Board, Vataran Bhawan, Nabha Road Patiyala, 147001 (Punjab) (msppcb@punjab.gov.in)
3. Director (Industry-2), MoEF & CC, Jor Bagh Road, New Delhi – 03 (rb.lal@nic.in)

# 1

## PURPOSE OF THE REPORT

### 1.0 Introduction

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

This Project has obtained Environmental Clearance 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>
[A]	The final product (Ethanol) shall be used exclusively for fuel blending only.	<i>Noted.</i>
[B]	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	<i>Consent to Establish (CTE) has been received from PPCB, Bathinda on 27<sup>th</sup> Nov'19 (Copy enclosed).</i>
[C]	As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises	<i>As proposed zero discharge of waste water will be met during operational phase.</i>
[D]	Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.	<i>Authorization required for hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid waste Management Rules, 2016 will be obtained as per the requirement.</i>
[E]	To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines	<i>Measures will be taken to control fugitive emission, pollution control devices will be installed as per the requirement. Stack of adequate height as per the guidelines will be installed for the gaseous emission dispersion.</i>
[F]	Total fresh water requirement shall not exceed 1800 cum/day, proposed to be met from canal supply.	<i>Prescribed water requirement will not be exceeded.</i>
[G]	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through a separate conveyance system.	<i>We will ensure that process water is not mixed with storm water.</i>
[H]	The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.	<i>Noted.</i>

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<b>[I]</b>	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.	<i>We will comply with the condition as per the requirement to minimise waste generation in the plant-</i>  <i>i. Metering and control of quantities of active ingredients will be done regularly.</i> <i>ii. By products will be reused as raw material as much as possible according to requirement.</i> <i>iii. Automated filling will be carried out to minimize spillage</i> <i>iv. Close feed system will be used into batch reactors.</i> <i>v. Water scrubber, vent bottle &amp; flame arrestors will be provided as per requirement.</i> <i>vi. High pressure hoses for equipment clearing will be used to reduce waste water generation.</i>
<b>[J]</b>	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.	<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>
<b>[K]</b>	All the commitments made regarding issues raised during the public hearing/ consultation meeting shall be satisfactorily implemented.	<i>Noted.</i>
<b>[L]</b>	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.	<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>
<b>[M]</b>	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.	<i>Acoustically enclosed DG sets will be installed and Stack height will be kept as per the CPCB guidelines.</i>
<b>[N]</b>	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.	<i>Fire Fighting system will be installed as per the condition.</i>
<b>[O]</b>	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	<i>Regular Health Check-up arrangement will be provided for the workers A qualified doctor will be appointed. .</i>
<b>[P]</b>	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.	<i>No parking will be done outside on public places. Plan in this regard has already been submitted to authority.</i>
<b>[Q]</b>	Storage of raw materials shall be either stored in silos or in covered areas to prevent dust pollution and other fugitive emissions.	<i>During operation phase, raw materials will be stored properly in covered areas</i>
<b>[R]</b>	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	<i>We will comply.</i>

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	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:-**

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

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	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.	<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 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.	<i>Separate funds will be kept for the implementation of the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government.</i>
xii.	A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zila Parishad/ 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 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	<i>Copy of advertisements attached.</i>

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	forwarded to the concerned Regional office of the Ministry.	
xvi.	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.	<i>Noted.</i>
xvii.	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 Trans boundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 read with subsequent amendments therein.	<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, 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
1.	AAQ1	Near Project site
2.	AAQ2	Jiwan Singh Wala
3.	AAQ3	Maawala
4.	AAQ4	Mahi Nangal
5.	AAQ5	Leleana
6.	AAQ6	Baghi Bandar
7.	AAQ7	Nasibpura
8.	AAQ8	Kothbhara
9.	AAQ9	Kot Kashmir
10.	AAQ10	Gehri Boghi
11.	AAQ11	Chathewala
12.	AAQ12	KotFatta

#### 3.1.2 Ambient Air Quality Monitoring Methodology

Monitoring was conducted in respect of the following parameters:

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1. Particulate Matter 2.5 (PM 2.5)
2. Particulate Matter 10 (PM 10)
3. Sulphur Dioxide (SO<sub>2</sub>)
4. Oxides of Nitrogen (NO<sub>2</sub>)
5. Carbon Monoxide (CO)
6. Ammonia (NH<sub>3</sub>)
7. Lead (Pb)
8. Benzene (C<sub>6</sub>H<sub>6</sub>)
9. Benzo(a)pyrene
10. Ozone (O<sub>3</sub>)
11. Arsenic (As)
12. Nickel (Ni)
13. Volatile Organic Carbon (VOCs)
14. 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 (PM<sub>2.5</sub> 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)

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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

**3.1.3 Ambient Air Quality Monitoring Results**

**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>	50.21	48.15	49.64	47.40	60
2.	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	89.76	87.91	90.26	84.69	100
3.	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	22.54	20.63	21.07	22.60	80
4.	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	11.02	12.01	13.01	9.96	80
5.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	9.37	13.84	10.16	9.45	400
6.	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m <sup>3</sup> )	1			
7.	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.92	0.83	0.97	0.89	4
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m <sup>3</sup> )	**BDL (*DL 0.1 µg/m <sup>3</sup> )	**BDL (*DL 0.1 µg/m <sup>3</sup> )	**BDL (*DL 0.1 µg/m <sup>3</sup> )	05
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 0.1 ng/m <sup>3</sup> )	**BDL (*DL 1.0 ng/m <sup>3</sup> )	**BDL (*DL 1.0 ng/m <sup>3</sup> )	**BDL (*DL 1.0 ng/m <sup>3</sup> )	01
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	22.14	21.50	19.87	17.90	180
11.	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	6			
12.	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	20			
13.	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m <sup>3</sup> )	--			
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 3.4 Ambient Air Quality Monitoring Results (5-8 Location)**

S. No.	Parameter	Test Result				NAAQS*
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		AAQ5	AAQ6	AAQ7	AAQ8	
1.	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	46.98	44.82	48.55	51.32	60
2.	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	81.45	81.66	85.70	92.54	100
3.	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	17.58	21.07	24.61	20.33	80
4.	Sulphur Dioxide (SO <sub>2</sub> ),	17.98	12.06	18.36	11.52	80
5.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	8.98	13.47	10.36	10.35	400
6.	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m <sup>3</sup> )	1			
7.	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.82	0.98	0.92	1.03	4
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m <sup>3</sup> )	05			
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m <sup>3</sup> )	01			
10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	20.54	19.86	22.45	18.79	180
11.	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	6			
12.	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	20			
13.	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m <sup>3</sup> )	--			
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

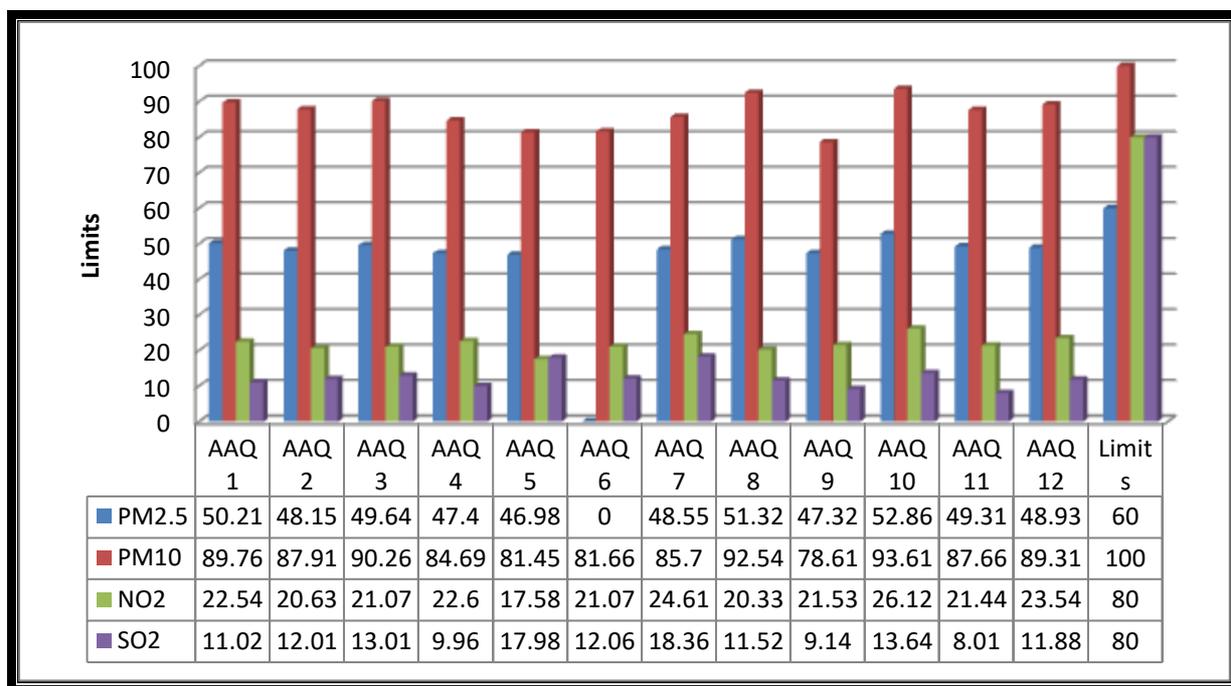
**Table 3.5 Ambient Air Quality Monitoring Results (9-12 Location)**

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1.	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	47.32	52.86	49.31	48.93	60
2.	Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	78.61	93.61	87.66	89.31	100
3.	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	21.53	26.12	21.44	23.54	80
4.	Sulphur Dioxide (SO <sub>2</sub> ),	9.14	13.64	8.01	11.88	80
5.	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	15.34	10.46	9.89	16.92	400
6.	Lead (Pb), µg/m <sup>3</sup>	**BDL (*DL 0.05 µg/m <sup>3</sup> )	1			
7.	Carbon Monoxide (CO) mg/m <sup>3</sup>	0.95	1.12	0.93	0.91	4
8.	Benzene(C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	**BDL (*DL 0.1 µg/m <sup>3</sup> )	05			
9.	Benzo(a)pyrene, ng/m <sup>3</sup>	**BDL (*DL 1.0 ng/m <sup>3</sup> )	01			

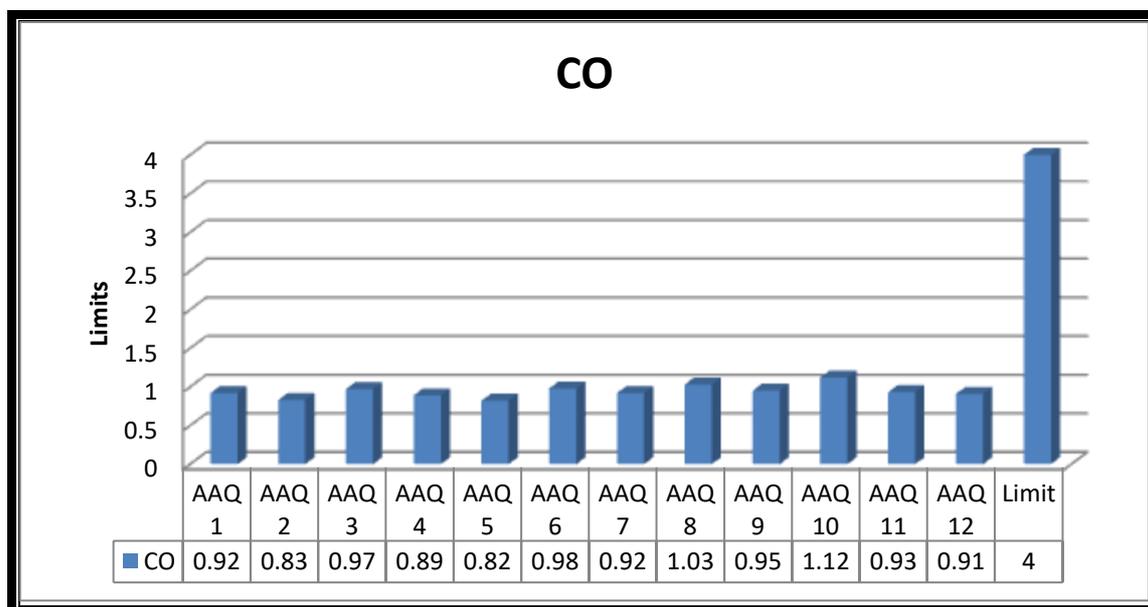
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10.	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	17.45	18.66	16.78	19.55	180
11.	Arsenic As, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	6			
12.	Nickel Ni, ng/ m <sup>3</sup>	**BDL (*DL 5.0ng/ m <sup>3</sup> )	20			
13.	Volatile Organic Carbon	**BDL (*DL 5.0 µg/m <sup>3</sup> )	**BDL (*DL 5.0 µg/m <sup>3</sup> )	**BDL (*DL 5.0 µg/m <sup>3</sup> )	**BDL (*DL 5.0µg/m <sup>3</sup> )	--
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 3.1 Location-wise Variation of Ambient Air Quality**



**Figure 3.2 Location-wise Variation of CO in Ambient Air Quality**

**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**

### 3.2 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 3 locations at the boundary of the project site as given in **Table 3.6**.

**Table 3.6 Details of Ambient Noise Monitoring Stations**

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

The location wise ambient noise monitoring results is summarized in **Table 3.7**. The location-wise variation of noise levels are graphically presented in **Figure**

**Table 3.7 Ambient Noise Monitoring Results (1-4 Location)**

Parameter	N1		N2		N3		N4	
	Day Time	Night Time						
<b>Lmax</b>	79.8	66.3	67.5	59.8	61.9	52.7	59.4	55.6
<b>Lmin</b>	55.7	40.1	45.2	33.6	43.2	33.5	41.3	32.2
<b>Leq</b>	67.49	49.18	51.40	41.20	52.40	42.80	50.30	42.60
<b>CPCB Limit (Leq in dB(A) Industrial Limit &amp; Residential Limit)</b>	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 3.8 Ambient Noise Monitoring Results (5-8 Location)**

Parameter	N5		N6		N7		N8	
	Day Time	Night Time						
<b>Lmax</b>	64.5	54.3	58.4	49.1	55.1	46.5	55.8	44.2
<b>Lmin</b>	44.7	34.8	38.5	33.8	36.3	31.7	31.2	26.5
<b>Leq</b>	52.65	41.90	48.54	40.50	47.60	37.20	45.20	33.50
<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

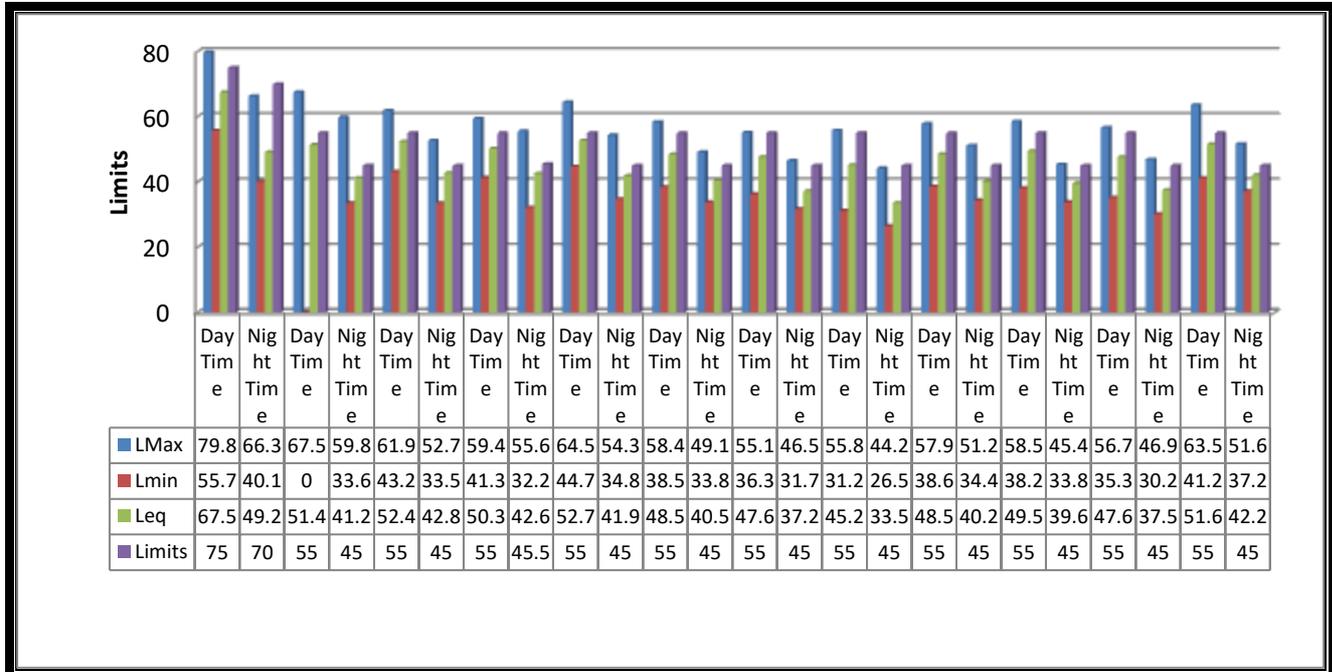
Note: \*A “decibel” is a unit in which noise is measured.

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**Table 3.9 Ambient Noise Monitoring Results (9-12 Location)**

Parameter	N9		N10		N11		N12	
	Day Time	Night Time						
<b>Lmax</b>	57.9	51.2	58.5	45.4	56.7	46.9	63.5	51.6
<b>Lmin</b>	38.6	34.4	38.2	33.8	35.3	30.2	41.2	37.2
<b>Leq</b>	48.50	40.20	49.50	39.60	47.60	37.49	51.64	42.15
<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 3.3 Location-wise Variation of Ambient Noise Levels**

**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).

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).

### 3.3 WATER QUALITY MONITORING

#### 3.3.1 Ground Water Quality Monitoring Locations

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

Water sample was collected from the project site. The sample was analyzed for various parameters to compare with the standards for ground water as per IS: 10500 for ground water sources. The details of water sampling locations are given in **Table 3.10**

**Table 3.10 Details of Water Quality Monitoring Station**

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

#### 3.3.2 Methodology of Groundwater Quality Monitoring

Sampling of ground water was carried out on **March 2020** 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 Drinking water are given in **Table 3.11**.

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**3.3.3 Ground Water Quality Monitoring Results**

The detailed ground water quality monitoring results are presented in Table

**Table 3.11 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 Method	7.58	--	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	314.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	79.96	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	218.37	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	86.51	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	27.82	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	952.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	51.34	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.95	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	12.05	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	*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	0.32	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

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30.	#Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL (**DL 0.001 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.12 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 Method	7.78	--	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	288.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	65.21	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	176.13	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	82.69	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	30.45	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	919.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	35.69	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.89	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	9,98	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	*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	0.56	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

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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.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.13 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 Method	7.83	--	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	467.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.67	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	311.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	215.93	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	59.11	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	995.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	129.54	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	1.38	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	15.43	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.38	mg/l	0.3	No relaxation
17.	#Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene	*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	0.49	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

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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 0.13 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.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.14 Ground water Quality Monitoring Result (Mahi Nangal)**

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2042	
					Requirement (Acceptable Limits)	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	*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	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	396.00	mg/l	200	600
7.	Calcium as Ca	APHA , 3500 Ca B, EDTA Titrimetric Method	96.35	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	296.32	mg/l	200	600
9.	Chloride as Cl	APHA , 4500-Cl <sup>-</sup> B, Argentometric Method	91.05	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	37.81	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	979.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	86.75	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.85	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	12.06	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	*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

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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.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.15 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 Method	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA , 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	APHA , 2340 C, EDTA Titrimetric Method	453.00	mg/l	200	600
7.	Calcium as Ca	APHA , 3500 Ca B, EDTA Titrimetric Method	102.86	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	334.02	mg/l	200	600
9.	Chloride as Cl	APHA , 4500-Cl <sup>-</sup> B, Argentometric Method	124.85	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	47.71	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1086.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	98.66	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.97	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	14.33	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.32	mg/l	0.3	No relaxation
17.	#Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene	*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

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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	0.76	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.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.16 Ground water Quality Monitoring Result (Nasibpura)**

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S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2010	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.93	--	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	421.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	115.63	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	285.32	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	108.12	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	32.20	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1010.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	109.50	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.90	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	11.32	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.38	mg/l	0.3	No relaxation
17.	#Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene	*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	0.84	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.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	

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32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample
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**Note:** - \*BDL-Below Detection Limit, \*\*DL- Detection Limit

**Table 3.17 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 Method	7.75	--	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 Method	*BDL (**DL 1 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeabl	Agreeable
6.	Total Hardness as	APHA , 2340 C, EDTA Titrimetric Method	454.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	104.47	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	269.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	93.44	mg/l	250	1000
10.	#Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	46.98	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1132.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	98.75	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.88	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	12.98	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.32	mg/l	0.3	No relaxation
17.	#Aluminium as Al	APHA , 3111 D Nitrous Oxide Acetylene	*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	0.71	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

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30.	#Mercury as Hg	APHA , 3112 B, Cold Vapour AAS Method	*BDL(**DL 0.01 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622	< 2	MPN/100 ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

**Table 3.18 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	7.91	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	23	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	121.05	mg/l
6.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1315	µS/cm
7.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	20.16	mg/l
8.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.39	mg/l
9.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	789.00	mg/l
10.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
11.	Boron	APHA, 4500B C, Carmine Method	0.22	mg/l
12.	Sulphate as SO <sub>4</sub> <sup>-</sup>	APHA , 4500 E, Turbidimetric Method	16.78	mg/l
13.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.61	mg/l
14.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	3.56	mg/l
15.	COD	APHA, 5220 B, Open Reflux Method	32.58	mg/l
16.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	14.95	mg/l
17.	Total Coliform	IS 1622	32	MPN/100ml
18.	#Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

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

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**Table 3.19 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	7.69	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	17	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	117.62	mg/l
6.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1270	µS/cm
7.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,ChromotropicMethod	9.92	mg/l
8.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.47	mg/l
9.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	762.00	mg/l
10.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
11.	Boron	APHA, 4500B C, Carmine Method	0.19	mg/l
12.	Sulphate as SO <sub>4</sub> <sup>-</sup>	APHA , 4500 E, Turbidimetric Method	32.54	mg/l
13.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.52	mg/l
14.	BOD (3 Daysat 27°C)	APHA, 5210 C / IS 3025,P-44	9.00	mg/l
15.	COD	APHA, 5220 B, Open Reflux Method	26.70	mg/l
16.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	12.63	mg/l
17.	Total Coliform	IS 1622	38	MPN/100ml
18.	#Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

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

### **3.4 SOIL MONITORING**

#### **3.4.1 Soil Monitoring Locations**

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

To assess impacts of ongoing project activities on the soil in the area, the physico-chemical characteristics of soils were examined by obtaining soil samples from selected points and analysis of the same. Single sample of soil was collected from the project site for studying soil characteristics, the location of which is listed in **Table 3.20**.

**Table 3.20 Details of Soil Quality Monitoring Location**

<b>S. No.</b>	<b>Location Code</b>	<b>Location Name/ Description</b>
1.	S1	Near Project Site
2.	S2	Jiwan Singh wala
3.	S3	MaanWala
4.	S4	Mahi Nangal
5.	S5	Leleana
6.	S6	Baghi Bandar
7.	S7	NasibPura
8.	S8	Kotbhara
9.	S9	Kot Kashmir
10.	S10	GehriBoghi
11.	S11	Chathewala
12.	S12	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 **March 2020**.

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**

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

**Table 3.21 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	7.82	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	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	27.64	%
6.	Bulk density	SOP , SP-80, Issue No.-01 & Issue Date-14/02/2013	1.66	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No.-01 & Issue Date-14/02/2013	57.52	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No.-01 & Issue Date-14/02/2013	42.37	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	142.84	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.73	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.61	%
13.	Magnesium as Mg	SOP , SP-83, Issue No.-01 & Issue Date-14/02/2013	20.61	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.34	kg./hect.
15.	Available Phosphorus	SOP , SP-86, Issue No.-01 & Issue Date-14/02/2013	19.45	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No.-01	11.51	mg/kg
17.	Organic Carbon	USEPA 3050B	0.42	%
18.	Lead (as Pb)	USEPA 3050B	0.86	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.97	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.76	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.22 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	0.329	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	31.05	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.53	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	51.03	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	42.65	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	53.12	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	156.84	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.53	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.57	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	31.33	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	249.52	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	22.16	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.65	mg/kg
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.76	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.54	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.87	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.43	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.23 Physico-Chemical Characteristics of Soil in the Study Area (Maanwala)**

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.71	--
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	33.51	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.83	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	45.12	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	65.47	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	60.72	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	135.04	kg/hec.
11.	Iron as Fe	USDA Method, 1968	0.35	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	24.33	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	234.12	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	33.85	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	14.59	mg/kg
17.	Organic Carbon	USEPA 3050B	0.27	%
18.	Lead (as Pb)	USEPA 3050B	0.63	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.69	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.49	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.24 Physico-Chemical Characteristics of Soil in the Study Area (Mahi Nangal)**

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.55	--
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	26.38	%
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	51.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	45.98	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	61.42	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	146.35	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.71	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	33.15	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	236.12	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	19.87	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.96	mg/kg
17.	Organic Carbon	USEPA 3050B	0.25	%
18.	Lead (as Pb)	USEPA 3050B	0.67	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.72	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.45	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.45	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.86	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.26 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	7.78	--
2.	Conductivity	IS:14767 by Conductivity meter	0.349	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	37.54	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.89	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	67.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	54.88	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	61.67	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	163.15	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.84	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	28.00	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	240.26	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	28.32	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.94	mg/kg
17.	Organic Carbon	USEPA 3050B	0.27	%
18.	Lead (as Pb)	USEPA 3050B	0.97	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.98	mg/kg
21.	Copper (as Cu )	USEPA 3050B	7.32	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.51	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.27 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	0.353	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	41.02	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.71	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	56.87	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	45.23	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	57.49	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	167.52	kg/hec.
11.	Iron as Fe	USDA Method, 1968	0.69	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	37.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	257.89	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	22.15	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.98	mg/kg
17.	Organic Carbon	USEPA 3050B	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.78	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.57	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.92	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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**Table 3.28 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	7.82	--
2.	Conductivity	IS:14767 by Conductivity meter	0.361	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	42.53	%
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	56.49	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	73.21	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	60.54	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	135.62	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.59	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	27.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	249.80	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	39.32	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	20.12	mg/kg
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.68	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.88	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.31	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.62	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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

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**Table 3.29 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	7.37	--
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	25.86	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.20	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	1.20	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	40.31	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	46.00	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	143.25	kg/hec.
11.	Iron as Fe	USDA Method, 1968	0.58	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.65	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	36.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	218.00	kg./hec.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	16.25	kg./hec.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	78.12	mg/kg
17.	Organic Carbon	USEPA 3050B	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.41	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.28	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.87	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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

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**Table 3.30 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	7.75	--
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	26.12	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.61	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	57.36	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	50.01	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	153.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.78	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.65	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	23.00	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.00	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	22.68	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.23	mg/kg
17.	Organic Carbon	USEPA 3050B	0.45	%
18.	Lead (as Pb)	USEPA 3050B	0.84	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	6.41	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.37	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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

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**Table 3.31 Physico-Chemical Characteristics of Soil in the Study Area (Gehri Boghi)**

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.53	--
2.	Conductivity	IS:14767 by Conductivity meter	0.327	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	35.42	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.57	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	58.66	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	48.13	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	59.74	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	167.65	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.77	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	36.21	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	260.10	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	23.65	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	12.37	mg/kg
17.	Organic Carbon	USEPA 3050B	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.76	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.64	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.98	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

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

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi sabo, Bhatinda Punjab  
(F.No. J-11011/221/2017-IA II (I) Dated-14/08/2018)**

**Table 3.32 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	7.81	--
2.	Conductivity	IS:14767 by Conductivity meter	0.322	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	32.64	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.84	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	65.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	49.33	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	50.74	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	144.55	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.78	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.67	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	25.36	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.12	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	27.61	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	8.93	mg/kg
17.	Organic Carbon	USEPA 3050B	0.55	%
18.	Lead (as Pb)	USEPA 3050B	1.02	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.89	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.99	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.58	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.47	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*SOP-Laboratory Standard Operating Procedure.

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil TalwandiSaboo, Bhatinda Punjab  
(F.No. J-11011/221/2017-IA II (I) Dated-14/08/2018)**

**Table 3.33 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	7.89	--
2.	Conductivity	IS:14767 by Conductivity meter	0.351	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	35.76	%
6.	Bulk density	SOP , SP-80,Issue No.-01 & Issue Date-14/02/2013	1.98	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01 & Issue Date-14/02/2013	60.45	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01 & Issue Date-14/02/2013	71.24	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	53.22	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01 & Issue Date-14/02/2013	116.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.37	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.89	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01 & Issue Date-14/02/2013	26.19	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.86	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01 & Issue Date-14/02/2013	55.26	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	15.91	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.78	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.73	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.48	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

\*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.

### **3.5 SITE PHOTOGRAPH**



**Ambient Air Quality Monitoring**



**Ambient Air Quality Monitoring**



**Ambient Noise Level Monitoring**



**Ambient Noise Level Monitoring**



**Water Sampling**



**Water Sampling**



**Soil Sampling**



**Soil Sampling**

## Test Report

Sample Number:	VEL/HPCL/AA/01	Report No.:	VEL/AA/2002/24/001
Name & Address of the Project:	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:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
Time of Monitoring	: 10:15 AM – 10:15 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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>6a</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	<sup>6</sup> SOP No. VEL/SOP/01, Section No. SP 63	50.21	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.76	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	22.54	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	0.92	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	9.37	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	22.14	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 1:- @ NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.  
 # SOP- Laboratory Standard Operating Procedure, ~ This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

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SR. ANALYST

ARJUN RAJAWAT  
ANALYST



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## Test Report

Sample Number:	VEL/HPCL/AA/02	Report No.:	VEL/AA/2002/24/002
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:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
Time of Monitoring	: 10:30 AM – 10:30 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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>®</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	#SOP No. VEL/SOP/01, Section No. SP 63	48.15	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.91	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	20.63	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	12.01	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	13.84	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	21.50	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.  
 # SOP- Laboratory Standard Operating Procedure, ^- This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

Tested By  
**MEENU KAUSHIK**  
 SR. ANALYST

Checked By  
**ARJUN RAWAT**



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## Test Report

Sample Number: VEL/HPCL/AA/03 Report No.: VEL/AA/2002/24/003  
 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: 29/02/2020  
 Latitude: 30°2'33.23"N Period of Analysis: 24/02/2020 - 29/02/2020  
 Longitude: 75°58'6.88"E Receipt Date: 24/02/2020

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 : 19/02/2020 to 20/02/2020  
 Time of Monitoring : 09:15 AM – 09:15 AM  
 Ambient Temperature (°C) : Min. 12°C Max. 22°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> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	49.64	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	90.26	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.07	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	13.01	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	10.16	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	19.87	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  
 # SOP- Laboratory Standard Operating Procedure, ^- This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENKA KUSHIK  
SR. ANALYST

ARJUN RAWAT



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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AA/04	Report No.:	VEL/AA/2002/24/004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30°1'13.05"N	Party Reference No.:	NIL
Longitude:	75°0'3.89"E	Reporting Date:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
Time of Monitoring	: 09:30 AM – 09:30 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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>01</sup> Limit
1.	Particulate Matter (PM <sub>2.5</sub> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	47.40	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	84.69	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	22.60	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	9.96	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	9.45	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	17.90	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)] & 1.1.2009.  
# SOP- Laboratory Standard Operating Procedure, ^- This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KAUSHIK  
SR ANALYST

Checked By  
ARJUN RAMAT



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## Test Report

Sample Number:	VEL/NMDCL/AA/05	Report No.:	VEL/AA/2002/24/005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	29°59'40.64"N	Party Reference No.:	NIL
Longitude:	75°1'17.61"E	Reporting Date:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
Time of Monitoring	: 10:45 AM – 10:45 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	46.98	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	81.45	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	17.58	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.96	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	9.22	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	20.96	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, <sup>^</sup> This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KAUSHIK  
ANALYST

ARJUN BAWAT  
ANALYST



NOTE: a) The results listed refer only to the tested samples & applicable parameters  
 b) Total liabilities of our lab will be restricted to the invoice amount only  
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## Test Report

Sample Number: VEL/HPCL/AA/06 Report No.: VEL/AA/2002/24/006  
 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: 29/02/2020  
 Latitude: 30°1'27.46"N Period of Analysis: 24/02/2020 - 29/02/2020  
 Longitude: 75°4'8.62"E Receipt Date: 24/02/2020

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/05& VEL/FPS/05  
 Instrument Calibration Status : Calibrated  
 Meteorological condition during monitoring : Clear Sky  
 Date of Monitoring : 19/02/2020 to 20/02/2020  
 Time of Monitoring : 11:15 AM – 11:15 AM  
 Ambient Temperature (°C) : Min. 12°C Max. 22°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	44.82	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	81.66	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.52	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	12.06	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	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	19.86	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)]&11.2009.  
 # SOP- Laboratory Standard Operating Procedure, ^- This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KAUSHIK  
 ANALYST

ARIJUN RAJWAT  
 Analyst



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## Test Report

Sample Number:	VEL/HPCL/AA/07	Report No.:	VEL/AA/2002/24/007
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°4'34.79"N	Reporting Date:	29/02/2020
Longitude:	74°59'57.45"E	Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

### 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	: 20/02/2020 to 21/02/2020
Time of Monitoring	: 09:15 AM – 09:15 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	48.55	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	85.70	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	24.61	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	18.36	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	0.92	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	10.36	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	22.45	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 1:-@ NAAQS – National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

# SOP: Laboratory Standard Operating Procedure. ^ This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENI KAWCHIK  
ANALYST

ARJUN BAWAT



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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AA/08	Report No.:	VEL/AA/2002/24/008
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:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 20/02/2020 to 21/02/2020
Time of Monitoring	: 10:00 AM -- 10:00 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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	51.32	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	92.54	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	20.33	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.52	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	1.03	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	10.35	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	18.79	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: \*DL- Below Detection Limit, \*\*BDL- Below Detection Limit, #DL- Detection Limit  
Reference: NABL Accredited, Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec-3(i)]18.11.2009.  
Laboratory Standard Operating Procedure, ~ This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KUMAR  
SR. ANALYST  
(Tested By)

ARJUN RAWAT  
(Checked By)

VARDAN ENVIROLAB  
(Approved By)  
Authorised Signatory

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## Test Report

Sample Number: VEL/HPCL/AA/09 Report No.: VEL/AA/2002/24/009  
 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: 29/02/2020  
 Latitude: 30°6'34.53"N Period of Analysis: 24/02/2020 - 29/02/2020  
 Longitude: 75°0'23.67"E Receipt Date: 24/02/2020

### 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 : 20/02/2020 to 21/02/2020  
 Time of Monitoring : 10:30 AM – 10:30 AM  
 Ambient Temperature (°C) : Min. 12°C Max. 22°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> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	47.32	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	78.61	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.53	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	0.95	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	15.34	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	17.45	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.

# – as per Sampling Procedure, ^ This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KAUSHIK  
 Sr. Analyst

(Checked by)

(Signature)

ARJUN RAWAT  
 Sr. Analyst

(Checked by)

(Approved By)  
 (Signature)  
 Authorised Signatory

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## Test Report

Sample Number: VEL/HPCL/AA/10 Report No.: VEL/AA/2002/24/010  
 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  
 Reporting Date: 29/02/2020  
 Latitude: 30°6'44.02"N Period of Analysis: 24/02/2020 - 29/02/2020  
 Longitude: 74°57'21.06"E Receipt Date: 24/02/2020

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 : 20/02/2020 to 21/02/2020  
 Time of Monitoring : 10:45 AM – 10:45 AM  
 Ambient Temperature (°C) : Min. 12°C Max. 22°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	52.86	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	93.61	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	26.12	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	13.64	µg/m <sup>3</sup>	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10) Gas Chromatography	1.12	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	18.66	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)	--

Noted: 1. All test results are based on National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009.

2. #SR ANALYSIS: Operating Procedure. ~ This parameter is not Covered in our NABL scope. \*\*BDL- Below Detection Limit, \*DL- Detection Limit

(Tested By)



(Checked By)



(Approved By)




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## Test Report

Sample Number: VEL/HPCL/AA/11 Report No.: VEL/AA/2002/24/011  
 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: 29/02/2020  
 Latitude: 30°3'45.41"N Period of Analysis: 24/02/2020 - 29/02/2020  
 Longitude: 75°4'6.08"E Receipt Date: 24/02/2020

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 : 20/02/2020 to 21/02/2020  
 Time of Monitoring : 11:15 AM – 11:15 AM  
 Ambient Temperature (°C) : Min. 12°C Max. 22°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> )	<sup>#</sup> SOP No. VEL/SOP/01, Section No. SP 63	49.31	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	87.66	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	21.44	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	8.01	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	9.89	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	16.78	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 :-<sup>@</sup> NAAQS – National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009  
<sup>#</sup> In-house SOP, <sup>^</sup> IS: 11255 (P-6) Gravimetric Method, <sup>~</sup> This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KASHIK  
 SR. ANALYST  
 (Signature)

ARJUN RAWAT  
 (Signature)

(Approved By)  
 (Signature)  
 Authorised Signatory

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## Test Report

Sample Number:	VEL/HPDCL/AA/12	Report No.:	VEL/AA/2002/24/012
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:	29/02/2020
		Period of Analysis:	24/02/2020 - 29/02/2020
		Receipt Date:	24/02/2020

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	: 20/02/2020 to 21/02/2020
Time of Monitoring	: 11:40 AM – 11:40 AM
Ambient Temperature (°C)	: Min. 12°C Max. 22°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	48.93	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23) Gravimetric Method	89.31	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6) Jacob & Hochheiser	23.54	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2) Modified West and Gaeke	11.88	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	16.92	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	19.55	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, ^- This parameter is not Covered in our NABL scope, \*\*BDL- Below Detection Limit, \*DL- Detection Limit

MEENU KAUSHIK  
SR. ANALYST

Checked By: ARJUN RAWAT



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## Test Report

Sample Number:	VEL/HPCL/AN/01	Report No.:	VEL/AN/2002/24/001
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
		Reporting Date:	29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
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	79.8	66.3	dB(A)
2.	Lmin	IS 9989 R-2003	55.7	40.1	dB(A)
3.	Leq	IS 9989 R-2003	67.49	49.18	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.

**MEENU KAUSHIK**  
SR. ANALYST

(Tested By)



**ARJUN RAWAT**

(Checked By)




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## Test Report

Sample Number:	VEL/HPCL/AN/02	Report No.:	VEL/AN/2002/24/002
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
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	67.5	59.8	dB(A)
2.	Lmin	IS 9989 R-2003	45.2	33.6	dB(A)
3.	Leq	IS 9989 R-2003	51.40	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.

**MEENU KAUSHIK**  
 SR ANALYST

(Checked By)

**ARJUN RAWAT**

(Checked By)



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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/HPCL/AN/03	Report No.:	VEL/AN/2002/24/003
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
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	61.9	52.7	dB(A)
2.	Lmin	IS 9989 R-2003	43.2	33.5	dB(A)
3.	Leq	IS 9989 R-2003	52.40	42.80	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.

MEENU KAUSHIK  
SR. ANALYST  
(Tested By)

ARJUN RAWAT  
(Checked By)



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## Test Report

Sample Number: VEL/HPCL/AN/04 Report No.: VEL/AN/2002/24/004  
 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: 29/02/2020  
 Receipt Date: 24/02/2020

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 : 19/02/2020 to 20/02/2020  
 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	59.4	55.6	dB(A)
2.	Lmin	IS 9989 R-2003	41.3	32.2	dB(A)
3.	Leq	IS 9989 R-2003	50.30	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.

**MEENU KAUSHIK**  
 SR. ANALYST

(Tested By)  


**ARJUN RAWAT**  
 (Checked By)  




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## Test Report

Sample Number:	VEL/HPCL/AN/05	Report No.:	VEL/AN/2002/24/005
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 19/02/2020 to 20/02/2020
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	64.5	54.3	dB(A)
2.	Lmin	IS 9989 R-2003	44.7	34.8	dB(A)
3.	Leq	IS 9989 R-2003	52.65	41.90	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

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

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

**ARJUN RAWAT**  
 (Checked By)



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## Test Report

Sample Number:	VEL/HPCL/AN/06	Report No.:	VEL/AN/2002/24/006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.3 F-01
		Party Reference No.:	NIL
		Reporting Date:	29/02/2020
		Receipt Date:	24/02/2020

Sample Description: AMBIENT NOISE LEVEL MONITORING

### General Information:-

Sample collected by	: Vardan EnviroLab Representative
Sampling Location	: Baghi Bandar
Latitude	: 30°12'27.46"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	: 19/02/2020 to 20/02/2020
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	58.4	49.1	dB(A)
2.	Lmin	IS 9989 R-2003	38.5	33.8	dB(A)
3.	Leq	IS 9989 R-2003	48.54	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.

**MEENU KAUSHIK**  
SR. ANALYST

(Tested By)  


**ARJUN RAWAT**  
(Checked By)  




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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number: VEL/HPCL/AN/07 Report No.: VEL/AN/2002/24/007  
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: 29/02/2020  
Receipt Date: 24/02/2020

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 : 20/02/2020 to 21/02/2020  
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	55.1	46.5	dB(A)
2.	Lmin	IS 9989 R-2003	36.3	31.7	dB(A)
3.	Leq	IS 9989 R-2003	47.60	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.

MEENU KAUSHIK  
SR. ANALYST

(Tested By)

ARJUN RAWAT  
(Checked By)



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## Test Report

Sample Number:	VEL/HPCL/AN/08	Report No.:	VEL/AN/2002/24/008
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 20/02/2020 to 21/02/2020
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	55.8	44.2	dB(A)
2.	Lmin	IS 9989 R-2003	31.2	26.5	dB(A)
3.	Leq	IS 9989 R-2003	45.20	35.50	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.

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 SR ANALYST  
 (Tested By)

**ARJUN RAWAT**  
 (Checked By)



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## Test Report

Sample Number:	VEL/HPCL/AN/09	Report No.:	VEL/AN/2002/24/009
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 20/02/2020 to 21/02/2020
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	57.9	51.2	dB(A)
2.	Lmin	IS 9989 R-2003	38.6	34.4	dB(A)
3.	Leq	IS 9989 R-2003	48.50	40.20	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.

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number: VEL/HPCL/AN/10 Report No.: VEL/AN/2002/24/010  
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  
Reporting Date: 29/02/2020  
Receipt Date: 24/02/2020

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 : 20/02/2020 to 21/02/2020  
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	58.5	45.4	dB(A)
2.	Lmin	IS 9989 R-2003	38.2	33.8	dB(A)
3.	Leq	IS 9989 R-2003	49.50	39.60	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.

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SR ANALYST  
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## Test Report

Sample Number:	VEL/HPCL/AN/11	Report No.:	VEL/AN/2002/24/011
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:	29/02/2020
		Receipt Date:	24/02/2020

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	: 20/02/2020 to 21/02/2020
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	56.7	46.9	dB(A)
2.	Lmin	IS 9989 R-2003	35.3	30.2	dB(A)
3.	Leq	IS 9989 R-2003	47.60	37.49	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.

**MEENU KAUSHIK**  
 SR. ANALYST

(Tested By)



(Approved By)




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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
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## Test Report

Sample Number: VEL/HPCL/AN/12 Report No.: VEL/AN/2002/24/012  
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: 29/02/2020  
Receipt Date: 24/02/2020

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 : 20/02/2020 to 21/02/2020  
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	63.5	51.6	dB(A)
2.	Lmin	IS 9989 R-2003	41.2	37.2	dB(A)
3.	Leq	IS 9989 R-2003	51.64	42.15	dB(A)
4.	CPCB Limits in dB(A <sup>1</sup> ) Leq (Residential Area)	-	55.00	45.00	dB(A)

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

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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/01	<b>Report No.:</b>	VEL/W/2002/24/001
<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>	29/02/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	24/02/2020 – 29/02/2020
<b>Sample Location:</b>	Near Project Site	<b>Receipt Date:</b>	24/02/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	20/02/2020
<b>Parameter Required</b>	As per work order	<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	7.58	--	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	314.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	79.96	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	218.37	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	86.51	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	27.82	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	952.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	51.34	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.95	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) , Chromotropic Method	12.05	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

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## Test Report

Sample No.: VEL/HPCL/W/01			Report No.: VEL/W/2002/24/001			
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	0.32	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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## Test Report

Sample Number:	VEL/HPCL/W/02	Report No.:	VEL/W/2002/24/002
Name & Address of Party:	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:	29/02/2020
Sample Description:	Ground Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Jiwan Singh Wala	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
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' B Electrometric Method	7.78	--	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	288.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	65.21	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	176.13	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl' B, Argentometric Method	82.69	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN' D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	30.45	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	919.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	35.69	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F'D, SPADNS Method	0.89	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.98	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

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## Test Report

Sample No.: VEL/HPCL/W/02				Report No.: VEL/W/2002/24/002		
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 0.01 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	0.56	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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SR. ANALYST

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## Test Report

Sample Number:	VEL/HPCL/W/03	Report No.:	VEL/W/2002/24/003
Name & Address of Party:	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:	29/02/2020
Sample Description:	Ground Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Maanwala	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	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' B Electrometric Method	7.83	--	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	467.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	89.67	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	311.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl B, Argentometric Method	215.93	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN' D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	59.11	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	995.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	129.54	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F'D, SPADNS Method	1.38	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34), Chromotropic Method	15.43	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.39	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

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## Test Report

Sample No.: VEL/HPCL/W/03			Report No.: VEL/W/2002/24/003			
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	0.49	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/HPCL/W/04	Report No.:	VEL/W/2002/24/004
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30°1'13.05"N	Party Reference No.:	NIL
Longitude:	75°1'3.89"E	Reporting Date:	29/02/2020
Sample Description:	Ground Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Mahi Nangal	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	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	7.68	--	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	396.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	96.35	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	296.32	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-CF B, Argentometric Method	91.05	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN <sup>-</sup> D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	37.81	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	979.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	86.75	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.85	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	12.06	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

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SR ANALYST

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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample No.: VEL/HPCL/W/04				Report No.: VEL/W/2002/24/004		
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	0.68	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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## Test Report

Sample Number:	VEL/HPCL/W/05	Report No.:	VEL/W/2002/24/005
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30°6'34.53"N	Party Reference No.:	NIL
Longitude:	75°0'23.67"E	Reporting Date:	29/02/2020
Sample Description:	Ground Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Kot Kashmir	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	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' 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	453.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	102.86	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	334.02	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl B, Argentometric Method	124.85	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN' D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	47.71	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1086.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	98.66	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F' D, SPADNS Method	0.97	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	14.33	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.32	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

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## Test Report

Sample No.: VEL/HPCL/W/05				Report No.: VEL/W/2002/24/005		
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	0.76	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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 SR. ANALYST  
 (Tested By)

ARJUN KAMAT  
 (Checked By)



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## Test Report

Sample Number:	VEL/HPCL/W/06	Report No.:	VEL/W/2002/24/006
Name & Address of Party:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	30°43'4.79"N	Party Reference No.:	NIL
Longitude:	74°59'57.45"E	Reporting Date:	29/02/2020
Sample Description:	Ground Water Sample	Period of Analysis:	24/02/2020 -- 29/02/2020
Sample Location:	Nasibpura	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	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	7.93	--	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	421.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	115.63	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	285.32	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl B, Argentometric Method	108.12	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	32.20	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1010.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	109.50	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.90	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	11.32	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.38	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



ARJUN RAJWAT

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## Test Report

Sample No.: VEL/HPCL/W/06				Report No.: VEL/W/2002/24/006		
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	0.84	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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SR. ANALYST

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## Test Report

<b>Sample Number:</b>	VEL/HPCL/W/07	<b>Report No.:</b>	VEL/W/2002/24/007
<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>	29/02/2020
<b>Sample Description:</b>	Ground Water Sample	<b>Period of Analysis:</b>	24/02/2020 – 29/02/2020
<b>Sample Location:</b>	Baghi Bandar	<b>Receipt Date:</b>	24/02/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Representative	<b>Sampling Date:</b>	20/02/2020
<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	7.75	--	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	454.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	104.47	mg/l	75	200
8.	Alkalinity as CaCO <sub>3</sub>	APHA , 2320 B, Titrimetric Method	269.54	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl B, Argentometric Method	93.44	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN D	*BDL (**DL 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	46.98	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1132.00	mg/l	500	2000
13.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	98.75	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.88	mg/l	1.0	1.5
15.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34), Chromotropic Method	12.98	mg/l	45	No Relaxation
16.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.32	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

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## Test Report

Sample No.: VEL/HPCL/W/07			Report No.: VEL/W/2002/24/007			
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	0.71	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.	Total Coliform	IS 1622	< 2	MPN/100ml	Shall not be detectable in any 100ml sample	
32.	E. Coli	IS 1622	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

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

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SR. ANALYST

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## Test Report

Sample Number:	VEL/HPCL/W/08	Report No.:	VEL/W/2002/24/008
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:	29/02/2020
Sample Description:	Surface Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Kot Fatta	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	Sampling Quantity:	2.0 Ltr
Sampling & Analysis Protocol:	IS 2296 & CPCB, 1979, APHA	Sampling Type:	--
		Preservation:	Refrigerated

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H' B Electrometric Method	7.91	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	23	NTU
4.	Odour	APHA, 2150 B, Threshold Test Method	Agreeable	--
5.	Chloride as Cl	APHA, 4500-Cl' B, Argentometric Method	121.05	mg/l
6.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1315	µS/cm
7.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	20.16	mg/l
8.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.39	mg/l
9.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	789.00	mg/l
10.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL (**DL 0.01 mg/l)	mg/l
11.	Boron	APHA, 4500B C, Carmine Method	0.22	mg/l
12.	Sulphate as SO <sub>4</sub>	APHA , 4500 E, Turbidimetric Method	16.78	mg/l
13.	Fluoride as F	APHA , 4500-F' D, SPADNS Method	0.61	mg/l
14.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	3.56	mg/l
15.	COD	APHA, 5220 B, Open Reflux Method	32.58	mg/l
16.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	14.95	mg/l
17.	Total Coliform	IS 1622	32	MPN/100ml
18.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL (**DL 0.01 mg/l)	mg/l

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

**MEENU KAUSHIK**  
 SR. ANALYST  
 (For Bd BA)

**ARJUN RAWAT**  
 (Checked By)



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## Test Report

Sample Number:	VEL/HPCL/W/09	Report No.:	VEL/W/2002/24/009
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:	29/02/2020
Sample Description:	Surface Water Sample	Period of Analysis:	24/02/2020 – 29/02/2020
Sample Location:	Chathewala	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	20/02/2020
Parameter Required	As per Client Requirement	Sampling Quantity:	2.0 Ltr
Sampling & Analysis Protocol:	IS 2296 & CPCB, 1979, APHA	Sampling Type:	--
		Preservation:	Refrigerated

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H <sup>+</sup> B Electrometric Method	7.69	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BDL (**DL 5Hazen)	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	17	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Chloride as Cl	APHA, 4500-Cl <sup>-</sup> B, Argentometric Method	117.62	mg/l
6.	Conductivity	APHA, 2510 B, Conductivity Meter Method	1270	µS/cm
7.	Nitrate as NO <sub>3</sub>	IS 3025 (P-34) ,Chromotropic Method	9.92	mg/l
8.	Iron as Fe	APHA , 3500-Fe B 1,10 Phenanthroline Method	0.47	mg/l
9.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	762.00	mg/l
10.	Lead as Pb	APHA , 3111 B, Direct Air, Acetylene Flame Method	*BDL(**DL 0.01 mg/l)	mg/l
11.	Boron	APHA, 4500B C, Carmine Method	0.19	mg/l
12.	Sulphate as SO <sub>4</sub> <sup>-</sup>	APHA , 4500 E, Turbidimetric Method	32.54	mg/l
13.	Fluoride as F	APHA , 4500-F <sup>-</sup> D, SPADNS Method	0.52	mg/l
14.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	9.00	mg/l
15.	COD	APHA, 5220 B, Open Reflux Method	26.70	mg/l
16.	Free Ammonia as NH <sub>3</sub>	IS 3025 (P-34) , Titrimetric Method	12.63	mg/l
17.	Total Coliform	IS 1622	38	MPN/100ml
18.	Arsenic as As	APHA , 3114 B, Manual Hydride Generation	*BDL(**DL 0.01 mg/l)	mg/l

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

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SR. ANALYST

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# Vardan EnviroLab

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 Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
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## Test Report

Sample Number:	VEL/HPCL/S/01	Report No.:	VEL/S/2002/24/001
Name & Address of the Project:	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:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Near Project Site	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	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	7.82	--
2.	Conductivity	IS:14767 by Conductivity meter	0.336	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	27.64	%
6.	Bulk density	SOP , SP-80, Issue No -01 & Issue Date-14/02/2013	1.66	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No -01 & Issue Date-14/02/2013	57.52	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No -01 & Issue Date-14/02/2013	42.37	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	142.84	kg/hect
11.	Iron as Fe	USDA Method, 1968	0.73	mg/100g
12.	Organic Matter	IS:2720 (P-22) Turimetric Method	0.61	%
13.	Magnesium as Mg	SOP , SP-83, Issue No -01 & Issue Date-14/02/2013	20.61	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.34	kg./hect.
15.	Available Phosphorus	SOP , SP-86, Issue No -01 & Issue Date-14/02/2013	19.45	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No -01	11.51	mg/kg
17.	Organic Carbon	USEPA 3050B	0.42	%
18.	Lead (as Pb)	USEPA 3050B	0.86	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.75	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.97	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.76	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
 ANALYST

**ARJUN RAJWAT**  
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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/02	<b>Report No.:</b>	VEL/S/2002/24/002
<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>Latitude:</b>	30°3'37.63"N	<b>Party Reference No.:</b>	NIL
<b>Longitude:</b>	75°2'75.30"E	<b>Reporting Date:</b>	29/02/2020
<b>Sample Description:</b>	Soil Sample	<b>Period of Analysis :</b>	24/02/2020-29/02/2020
<b>Sampling Location:</b>	Jiwan Singh Wala	<b>Receipt Date:</b>	24/02/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Date:</b>	20/02/2020
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720, USEPA & USDA	<b>Type of Sampling:</b>	Composite
		<b>Sampling Quantity:</b>	2.0 Kg
		<b>Depth of Sampling:</b>	30 cm
		<b>Packing Status:</b>	Temp Sealed

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	0.329	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	31.05	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.53	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	51.03	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	42.65	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	53.12	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	156.84	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.53	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.57	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	31.33	mg/100g
14.	Available Nitrogen as N	IS 14684 Distillation Method	249.52	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.16	kg/hect
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	11.65	mg/kg
17.	Organic Carbon	USEPA 3050B	0.35	%
18.	Lead (as Pb)	USEPA 3050B	0.76	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.54	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.87	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.43	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
SR. ANALYST

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*[Signature]*

**ARJUN RAWAT**

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## Test Report

Sample Number:	VEL/HPCL/S/03	Report No.:	VEL/S/2002/24/003
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:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Maanwala	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Type of Sampling:	Composite
		Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.71	--
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	33.51	%
6.	Bulk density	SOP , SP-80, Issue No.-01 & Issue Date-14/02/2013	1.83	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No.-01 & Issue Date-14/02/2013	45.12	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No.-01 & Issue Date-14/02/2013	65.47	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	133.12	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.35	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	24.33	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	234.12	kg/hect.
15.	Available Phosphorus	SOP , SP-86, Issue No.-01 & Issue Date-14/02/2013	33.85	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No.-01	14.59	mg/kg
17.	Organic Carbon	USEPA 3050B	0.27	%
18.	Lead (as Pb)	USEPA 3050B	0.63	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.78	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.69	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.21	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.49	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
 Analyst



**ARJUN RAWAT**  
 Analyst




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## Test Report

Sample Number:	VEL/HPCL/S/04	Report No.:	VEL/S/2002/24/004
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
Latitude:	30°1'13.05"N	Reporting Date:	29/02/2020
Longitude:	75°1'3.89"E	Period of Analysis :	24/02/2020-29/02/2020
Sample Description:	Soil Sample	Receipt Date:	24/02/2020
Sampling Location:	Mahi Nangal	Sampling Date:	20/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Type of Sampling:	Composite
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.55	--
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	26.38	%
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	51.21	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No.-01& Issue Date-14/02/2013	45.98	mg/100g
9.	Sodium as Na	SOP , SP-84, Issue No.-01& Issue Date-14/02/2013	61.42	mg/kg
10.	Potassium as K	SOP , SP-84, Issue No.-01& Issue Date-14/02/2013	146.35	kg/hect
11.	Iron as Fe	USDA Method, 1968	0.71	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83, Issue No.-01& Issue Date-14/02/2013	33.15	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	236.12	kg./hect.
15.	Available Phosphorus	SOP , SP-86, Issue No.-01& Issue Date-14/02/2013	19.87	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No.-01	8.96	mg/kg
17.	Organic Carbon	USEPA 3050B	0.25	%
18.	Lead (as Pb)	USEPA 3050B	0.67	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.72	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.45	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.87	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.86	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

MEENU KAUSHIK  
 SR. ANALYST



ARUN KAWAT



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## Test Report

Sample Number:	VEL/HPCL/S/05	Report No.:	VEL/S/2002/24/005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Village Nasibpura, Bhatinda Punjab	Format No.:	7.8 F-01
Latitude:	29°59'40.64"N	Party Reference No.:	NIL
Longitude:	75°1'17.61"E	Reporting Date:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Leleana	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Type of Sampling:	Composite
		Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

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	0.349	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	37.54	%
6.	Bulk density	SOP , SP-80,Issue No -01& Issue Date-14/02/2013	1.89	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No -01& Issue Date-14/02/2013	67.21	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No -01& Issue Date-14/02/2013	54.88	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	61.67	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	163.15	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.84	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.79	%
13.	Magnesium as Mg	SOP , SP-83,Issue No -01& Issue Date-14/02/2013	28.00	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	240.26	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No -01& Issue Date-14/02/2013	28.32	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No -01	8.94	mg/kg
17.	Organic Carbon	USEPA 3050B	0.27	%
18.	Lead (as Pb)	USEPA 3050B	0.97	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.98	mg/kg
21.	Copper (as Cu )	USEPA 3050B	7.32	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.51	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
 Analyst



**ARJUN RAMAT**  
 Checked By




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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/06	<b>Report No.:</b>	VEL/S/2002/24/006
<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>	29/02/2020
<b>Longitude:</b>	75°4'8.62"E	<b>Period of Analysis :</b>	24/02/2020-29/02/2020
		<b>Receipt Date:</b>	24/02/2020
<b>Sample Description:</b>	Soil Sample	<b>Sampling Date:</b>	20/02/2020
<b>Sampling Location:</b>	Baghi Bandar	<b>Type of Sampling:</b>	Composite
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Quantity:</b>	2.0 Kg
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Depth of Sampling:</b>	30 cm
		<b>Packing Status:</b>	Temp Sealed

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	0.353	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	41.02	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.71	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	56.87	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	45.23	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	57.49	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	167.52	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.69	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	37.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	257.89	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	22.15	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	9.98	mg/kg
17.	Organic Carbon	USEPA 3050B	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.78	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.57	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.92	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.41	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
 SR ANALYST



**ARJUN RAWAT**



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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/07	<b>Report No.:</b>	VEL/S/2002/24/007
<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>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>	29/02/2020
<b>Sample Description:</b>	Soil Sample	<b>Period of Analysis :</b>	24/02/2020-29/02/2020
<b>Sampling Location:</b>	Nasibpura	<b>Receipt Date:</b>	24/02/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Date:</b>	20/02/2020
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Type of Sampling:</b>	Composite
		<b>Sampling Quantity:</b>	2.0 Kg
		<b>Depth of Sampling:</b>	30 cm
		<b>Packing Status:</b>	Temp Sealed

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	0.361	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	42.53	%
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	56.49	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No.-01 & Issue Date-14/02/2013	73.21	mg/100g
9.	Sodium as Na	SOP , SP-84, Issue No.-01 & Issue Date-14/02/2013	60.54	mg/kg
10.	Potassium as K	SOP , SP-84, Issue No.-01 & Issue Date-14/02/2013	135.62	kg/hect
11.	Iron as Fe	USDA Method, 1968	0.59	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	27.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	249.80	kg /hect
15.	Available Phosphorus	SOP , SP-86, Issue No.-01 & Issue Date-14/02/2013	39.32	kg /hect
16.	Zinc (as Zn)	SOP , SP-86, Issue No.-01	20.12	mg/kg
17.	Organic Carbon	USEPA 3050B	0.46	%
18.	Lead (as Pb)	USEPA 3050B	0.68	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.88	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.31	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.62	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
 SR ANALYST  
 (Checked By)

**ARJUN RAWAT**  
 (Checked By)



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## Test Report

Sample Number:	VEL/IOCL/S/08	Report No.:	VEL/S/2002/24/008
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:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Kotbhara	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Type of Sampling:	Composite
		Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.43	--
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	25.86	%
6.	Bulk density	SOP , SP-80, Issue No -01 & Issue Date-14/02/2013	1.20	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No -01 & Issue Date-14/02/2013	40.31	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No -01 & Issue Date-14/02/2013	46.00	mg/100g
9.	Sodium as Na	SOP , SP-84, Issue No -01 & Issue Date-14/02/2013	50.54	mg/kg
10.	Potassium as K	SOP , SP-84, Issue No -01 & Issue Date-14/02/2013	143.25	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.58	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.65	%
13.	Magnesium as Mg	SOP , SP-83, Issue No -01 & Issue Date-14/02/2013	36.12	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	218.00	kg /hect.
15.	Available Phosphorus	SOP , SP-86, Issue No -01 & Issue Date-14/02/2013	16.25	kg /hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No -01	78.12	mg/kg
17.	Organic Carbon	USEPA 3050B	0.49	%
18.	Lead (as Pb)	USEPA 3050B	0.57	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.68	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.41	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.28	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.87	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

**MEENU KAUSHIK**  
SR ANALYST

(Responsible By)

**GARUN RAWAT**  
(Approved By)



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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122052, Haryana  
Branch Off: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur - 302035, Rajasthan  
NABL Accredited | MoEF&CC Recognized | ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/HPCL/S/09	Report No.:	VEL/S/2002/24/009
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
Latitude:	30°6'34.53"N	Reporting Date:	29/02/2020
Longitude:	75°0'23.67"E	Period of Analysis :	24/02/2020-29/02/2020
		Receipt Date:	24/02/2020
Sample Description:	Soil Sample	Sampling Date:	20/02/2020
Sampling Location:	Kot Kashmir	Type of Sampling:	Composite
Sample Collected by:	Vardan Enviro Lab Team	Sampling Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

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	0.324	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	26.12	%
6.	Bulk density	SOP , SP-80, Issue No -01 & Issue Date-14/02/2013	1.61	gm/cc
7	Chloride as Cl	SOP , SP-85, Issue No -01 & Issue Date-14/02/2013	57.36	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	50.01	mg/kg
10.	Potassium as K	SOP , SP-84, Issue No -01 & Issue Date-14/02/2013	153.00	kg/hect
11.	Iron as Fe	USDA Method, 1968	0.78	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.65	%
13.	Magnesium as Mg	SOP , SP-83, Issue No -01 & Issue Date-14/02/2013	23.00	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	219.00	kg/hect.
15.	Available Phosphorus	SOP , SP-86, Issue No -01 & Issue Date-14/02/2013	22.68	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No -01	8.23	mg/kg
17.	Organic Carbon	USEPA 3050B	0.45	%
18.	Lead (as Pb)	USEPA 3050B	0.84	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	6.41	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.37	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

MEENU KAUSHIK  
ANALYST

ARJUN RAWAT  
Checked By



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## Test Report

<b>Sample Number:</b>	VEL/HPCL/S/10	<b>Report No.:</b>	VEL/S/2002/24/010
<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>	29/02/2020
<b>Sample Description:</b>	Soil Sample	<b>Period of Analysis :</b>	24/02/2020-29/02/2020
<b>Sampling Location:</b>	Gehri Boghi	<b>Receipt Date:</b>	24/02/2020
<b>Sample Collected by:</b>	Vardan Enviro Lab Team	<b>Sampling Date:</b>	20/02/2020
<b>Sampling &amp; Analysis Protocol:</b>	IS 2720 , USEPA & USDA	<b>Type of Sampling:</b>	Composite
		<b>Sampling Quantity:</b>	2.0 Kg
		<b>Depth of Sampling:</b>	30 cm
		<b>Packing Status:</b>	Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.53	--
2.	Conductivity	IS:14767 by Conductivity meter	0.327	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	35.42	%
6.	Bulk density	SOP , SP-80,Issue No -01& Issue Date-14/02/2013	1.57	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No -01& Issue Date-14/02/2013	58.66	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No -01& Issue Date-14/02/2013	48.13	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	59.74	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No -01& Issue Date-14/02/2013	167.65	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.77	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	36.21	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	260.10	kg/hect.
15.	Available Phosphorus	SOP , SP-86,Issue No -01& Issue Date-14/02/2013	23.65	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No -01	12.37	mg/kg
17.	Organic Carbon	USEPA 3050B	0.37	%
18.	Lead (as Pb)	USEPA 3050B	0.76	mg/kg
19.	Cadmium (as Cd)	USEPA 3050B	0.86	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.64	mg/kg
21.	Copper (as Cu)	USEPA 3050B	2.98	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.35	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

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



**APRIL RANJIT**  
 (Approved By)



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## Test Report

Sample Number:	VEL/HPCL/S/11	Report No.:	VEL/S/2002/24/011
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:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Chathewala	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Type of Sampling:	Composite
		Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Scaled

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 OC)	IS : 2720 (P-26) by pH Meter	7.81	--
2.	Conductivity	IS:14767 by Conductivity meter	0.322	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	32.64	%
6.	Bulk density	SOP , SP-80, Issue No -01 & Issue Date-14/02/2013	1.84	gm/cc
7.	Chloride as Cl	SOP , SP-85, Issue No -01 & Issue Date-14/02/2013	65.21	mg/100g
8.	Calcium as Ca	SOP , SP-82, Issue No -01 & Issue Date-14/02/2013	49.33	mg/100g
9.	Sodium as Na	SOP , SP-84, Issue No -01 & Issue Date-14/02/2013	50.74	mg/kg
10.	Potassium as K	SOP , SP-84, Issue No -01 & Issue Date-14/02/2013	144.55	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.78	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.67	%
13.	Magnesium as Mg	SOP , SP-83, Issue No -01 & Issue Date-14/02/2013	25.36	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.12	kg /hect.
15.	Available Phosphorus	SOP , SP-86, Issue No -01 & Issue Date-14/02/2013	27.61	kg/hect.
16.	Zinc (as Zn)	SOP , SP-86, Issue No -01	8.93	mg/kg
17.	Organic Carbon	USEPA 3050B	0.55	%
18.	Lead (as Pb)	USEPA 3050B	1.02	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.89	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	0.99	mg/kg
21.	Copper (as Cu )	USEPA 3050B	6.58	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.47	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

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

**ADHIK BAWAT**  
 (Checked By)



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## Test Report

Sample Number:	VEL/HPCL/S/12	Report No.:	VEL/S/2002/24/012
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:	29/02/2020
Sample Description:	Soil Sample	Period of Analysis :	24/02/2020-29/02/2020
Sampling Location:	Kot Fatta	Receipt Date:	24/02/2020
Sample Collected by:	Vardan Enviro Lab Team	Sampling Date:	20/02/2020
Sampling & Analysis Protocol:	IS 2720 , USEPA & USDA	Type of Sampling:	Composite
		Sampling Quantity:	2.0 Kg
		Depth of Sampling:	30 cm
		Packing Status:	Temp Sealed

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 0C)	IS : 2720 (P-26) by pH Meter	7.89	--
2.	Conductivity	IS:14767 by Conductivity meter	0.351	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	35.76	%
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	1.98	gm/cc
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	60.45	mg/100g
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	71.24	mg/100g
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	53.22	mg/kg
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	116.00	kg/hect.
11.	Iron as Fe	USDA Method, 1968	0.37	mg/100g
12.	Organic Matter	IS:2720 (P-22) Titrimetric Method	0.89	%
13.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	26.19	mg/100g
14.	Available Nitrogen as N	IS:14684 Distillation Method	216.86	kg./hect.
15.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	55.26	kg./hect.
16.	Zinc (as Zn)	SOP , SP-86,Issue No.-01	15.91	mg/kg
17.	Organic Carbon	USEPA 3050B	0.48	%
18.	Lead (as Pb)	USEPA 3050B	0.69	mg/kg
19.	Cadmium (as Cd )	USEPA 3050B	0.81	mg/kg
20.	Chromium (as Cr)	USEPA 3050B	1.78	mg/kg
21.	Copper (as Cu )	USEPA 3050B	2.73	mg/kg
22.	Molybdenum as MO	USEPA 3050B	0.48	mg/100g
23.	Nickel	USEPA 3050B	*BDL	mg/100g

Note: SOP-Standard Operating Procedure

MEENU KAUSHIK  
ANALYST

ARJUN RAWAT  
(Checked By)



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