

# **Gujarat Industries Power Company Limited**



At. : Nani Naroli, Ta: Mangrol  
Dist.: Surat -394112

**Six Monthly Report of Vatsan Lignite Mine**

## **ENVIRONMENTAL MONITORING & ANALYSIS REPORT**

**For the period of July 2018 to December-2018**

Prepared By

**ECOSYSTEM RESOURCE MANAGEMENT PVT. LTD.**



**OFFICE FLOOR, ASHOKA PAVILLION-A, OPP. KAPADIA HEALTH CLUB,  
NEW CIVIL ROAD, SURAT – 395 001  
Tel: 0261-2231630, 2236223 Fax: 0261-2231630**

## PREFACE

Consciousness at national level in the industrial sector is increasing day by day with the focus on environment and sustainable development. A good environment management policy requires a constant effort to analyses and monitors various operations and processes, to generate and transmit this information to the inspecting authority.

As per the Air & Water Consent Orders issued by **Gujarat Pollution Control Board** (GPCB) Gandhinagar & also as per the Environment Clearance certificate issued by Ministry of Environment, Forest and Climate Change (MoEF & CC), Govt. of India, New Delhi, it is mandatory to collect the samples of Air/Gaseous emissions and effluent, to analyses the samples from a recognized laboratory and submit the analysis reports to GPCB & MoEF.

**Gujarat Industries Power Company Limited** (GIPCL) - Surat Lignite Power Plant is situated at Village – Nani Naroli, Tal. Mangrol, Dist. Surat. This company engaged in the generation of Electricity. The Industry has awarded the contract for bimonthly monitoring and analysis to M/s. Ecosystem Resource Management Pvt. Ltd. Surat.

**Ecosystem Resource Management Pvt. Ltd.** is one of the leading companies in the field of Environmental Consultancy Service Providers in India. ERM has a well-equipped and developed **NABL Accredited and MoEF & CC** recognized laboratory to carry out the analysis in air, stack emission, fugitive emission, water & waste water, noise, soil, and solid waste etc.

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## Scope of work for Vastan Lignite Mine

### I. Ambient Air Monitoring

Sr. No.	No. of stations & Location	Duration	Frequency	Parameters	Method of Analysis
1.	8 Nos. within the Core & Buffer Zone.	24 hours	Bi-Monthly	PM <sub>10</sub>	IS 5182 Part 23 2006/Reaffirmed 2017
				PM <sub>2.5</sub>	SOP No.WI/5.4/02-B/03, Issue No.1 Date:01/01/2010
				SO <sub>2</sub>	IS 5182 Part II 2001/Reaffirmed 2017
				NO <sub>x</sub>	IS 5182(Part VI):2006/Reaffirmed 2017
				CO	IS 5182(Part 10):1999/Reaffirmed 2014

### II. Dust Fall Measurement

Sr. No.	No. of station and locations	Duration	Frequency	Parameters	Method of analysis
1.	7 Nos. within the Core & Buffer Zone.	One Month	Bi-Monthly	Dust fall	As per IS-5182

### III. Noise Monitoring:

Sr. No.	Noise of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	8 Nos. at various location within the plant premises	24 hours	Bi-Monthly	Day & night Noise level	As per IS 9989 using the Noise level meter.

### Weather Monitoring Data

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	1 No. at Site.	24 hours	Bi-Monthly	Dry Bulb & Wet Bulb Temp., Atmospheric Pressure, Relative Humidity, Wind Speed, Wind Direction, Rain Fall and its Min. Max. & Avg. Value	As per IS 8829 on hourly basis for 24 hrs by using mechanical Instrument.

### Water Quality Monitoring

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	5 Nos. of Bore well & 1 No. of Surface Water sample located both in Core & Buffer Zone	1	Bi-Monthly	Physical parameters, Chemical Parameters, Heavy metals	As per the standard methods for the examination of water and waste water APHA 23 <sup>rd</sup> Edition 2017 and various Indian standards IS 3025.



### Six Monthly Variations in Ambient Air Quality

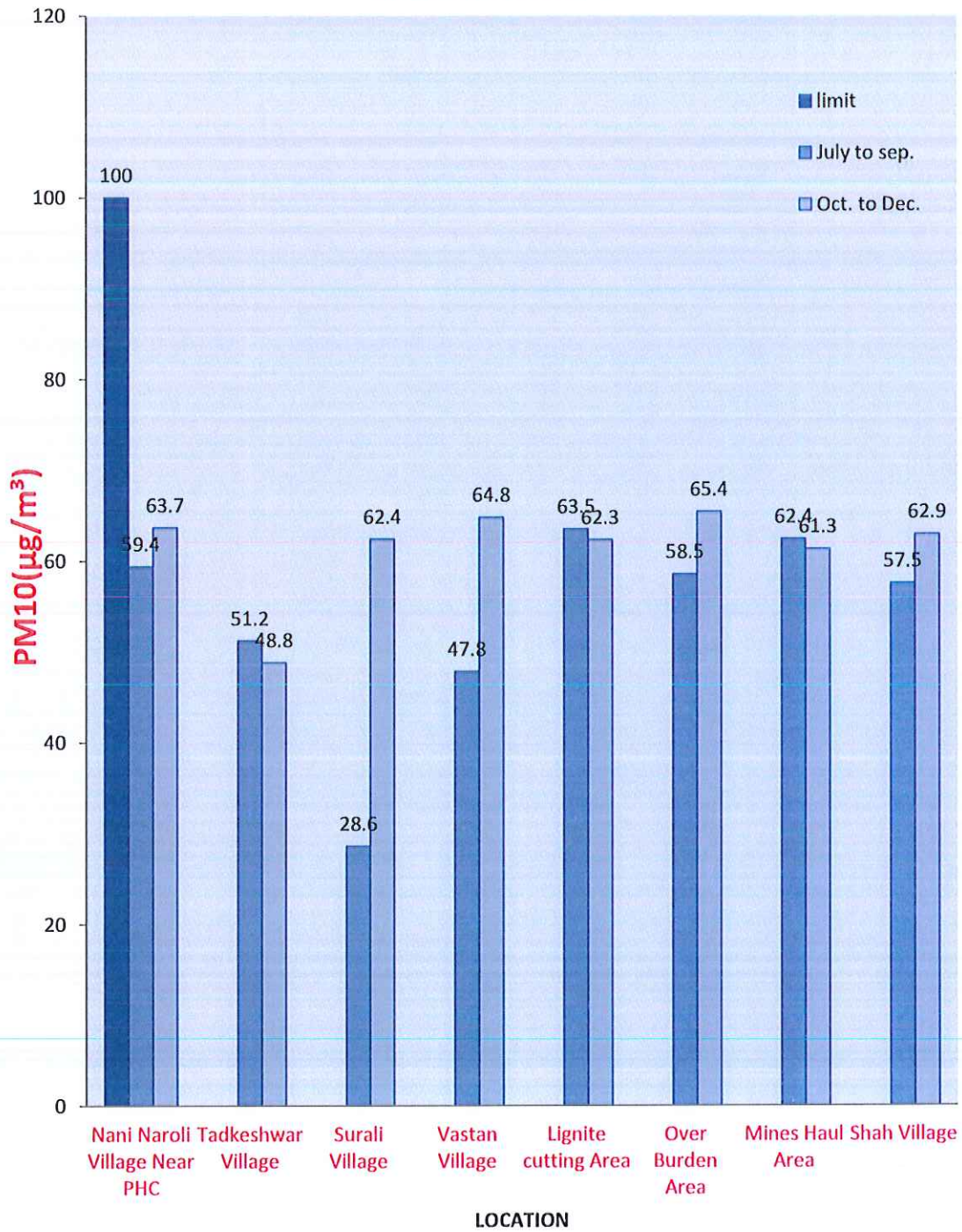
Parameter: PM<sub>10</sub> (Respirable Particulate Matter)

Period: July – 2018 to December – 2018

Sr. No.	Location	Results ( $\mu\text{g}/\text{m}^3$ )	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Nani Naroli Village Near PHC	59.4	63.7
2	Tadkeshwar Village	51.2	48.8
3	Surali Village	28.6	62.4
4	Vastan Village	47.8	64.8
5	Lignite cutting Area	63.5	62.3
6	Over Burden Area	58.5	65.4
7	Mines Haul Area	62.4	61.3
8	Shah Village	57.5	62.9
	Limit	100	



## Graphical presentation for the variation of PM<sub>10</sub> in Ambient Air





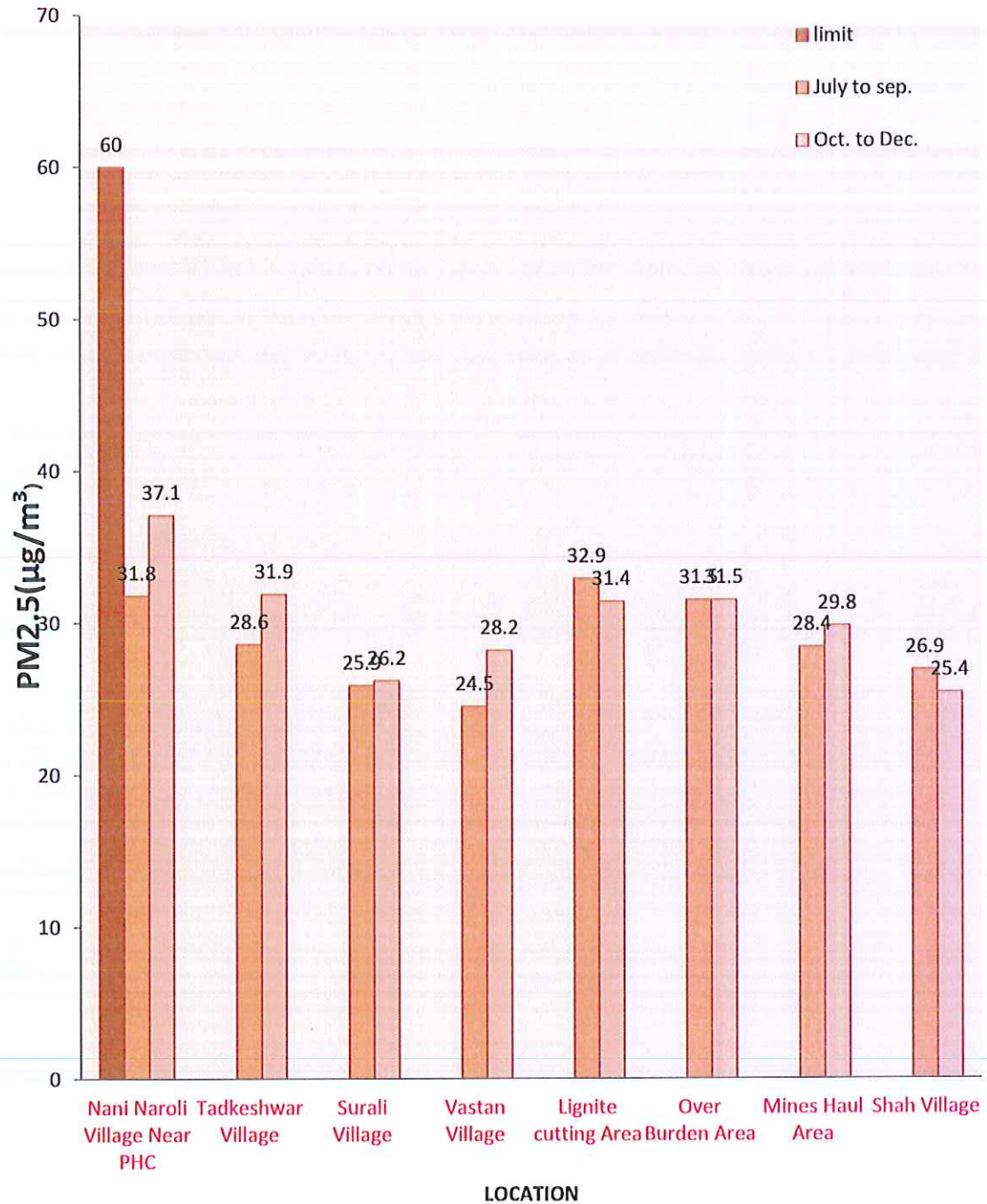
### Six Monthly Variations in Ambient Air Quality

Parameter: PM<sub>2.5</sub> (Respirable Particulate Matter)

Period: July – 2018 to December – 2018

Sr. No.	Location	Results ( $\mu\text{g}/\text{m}^3$ )	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Nani Naroli Village Near PHC	31.8	37.1
2	Tadkeshwar Village	28.6	31.9
3	Surali Village	25.9	26.2
4	Vastan Village	24.5	28.2
5	Lignite cutting Area	32.9	31.4
6	Over Burden Area	31.5	31.5
7	Mines Haul Area	28.4	29.8
8	Shah Village	26.9	25.4
	Limit	60	

## Graphical presentation for the variation of PM<sub>2.5</sub> in Ambient Air







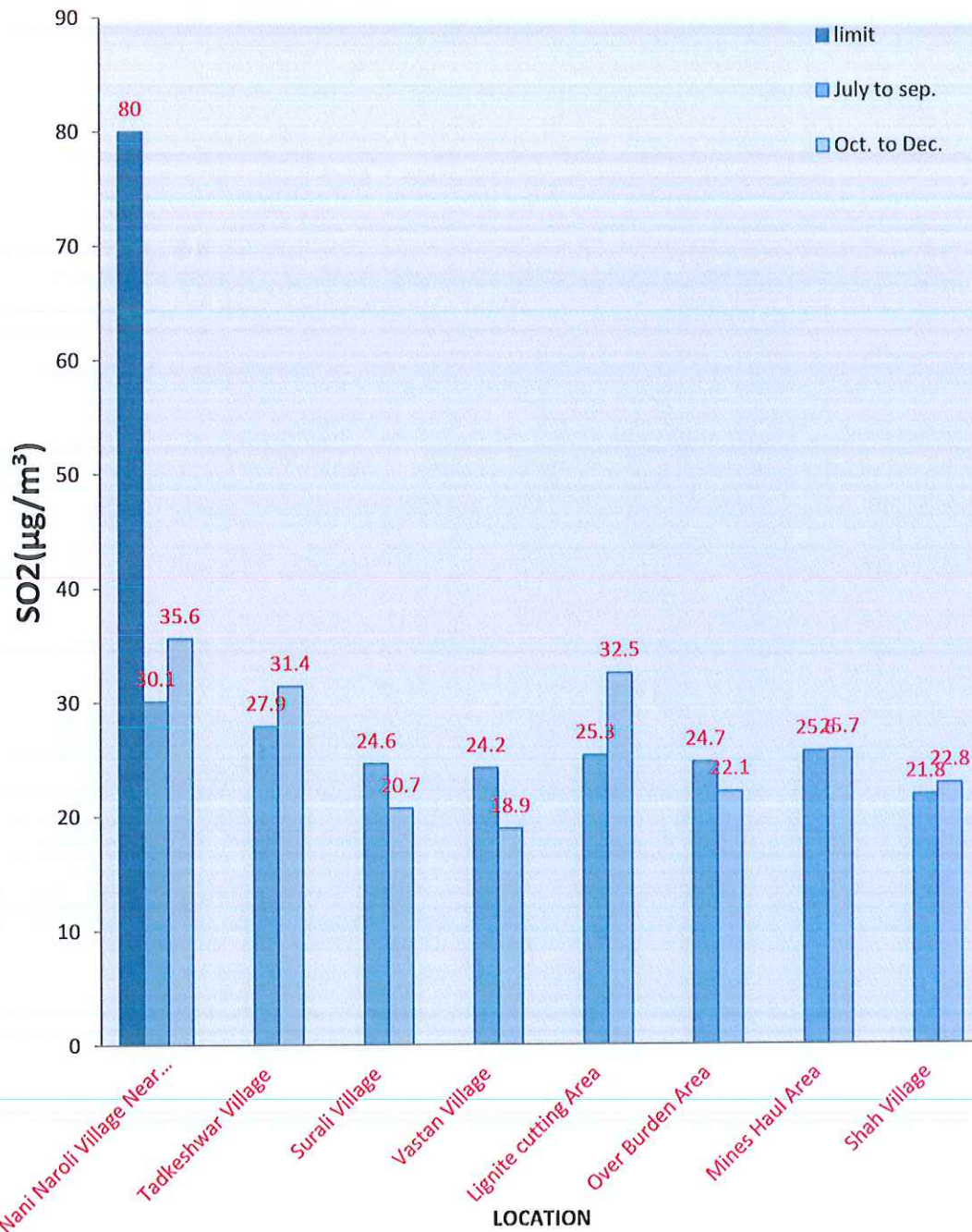
### Six Monthly Variations in Ambient Air Quality

Parameter: SO<sub>2</sub> (Sulphur Dioxide)

Period: July – 2018 to December – 2018

Sr. No.	Location	Results ( $\mu\text{g}/\text{m}^3$ )	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Nani Naroli Village Near PHC	30.1	35.6
2	Tadkeshwar Village	27.9	31.4
3	Surali Village	24.6	20.7
4	Vastan Village	24.2	18.9
5	Lignite cutting Area	25.3	32.5
6	Over Burden Area	24.7	22.1
7	Mines Haul Area	25.6	25.7
8	Shah Village	21.8	22.8
	Limit	80	

## Graphical presentation for the variation of SO<sub>2</sub> in Ambient Air





### Six Monthly Variations in Ambient Air Quality

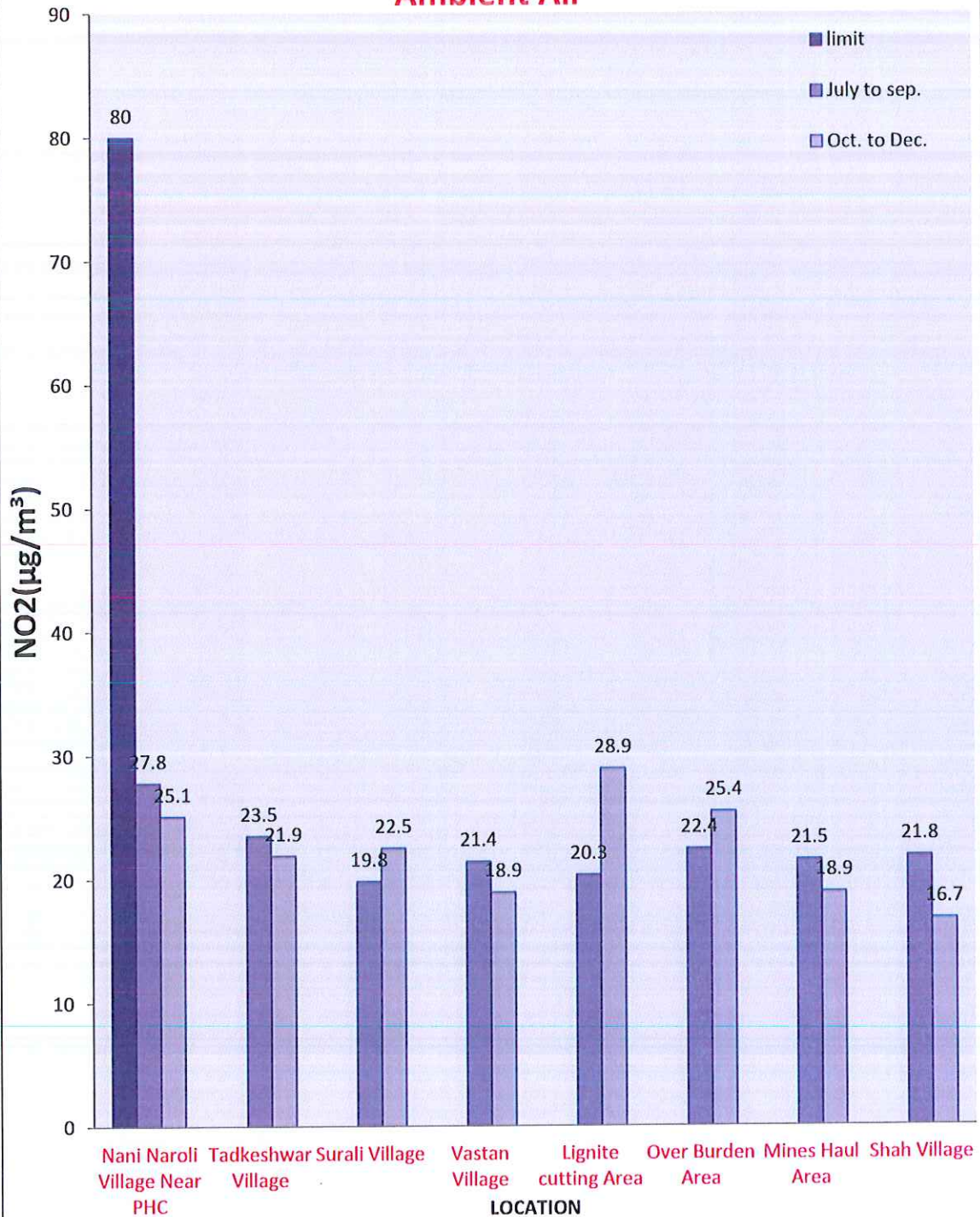
Parameter: NO<sub>2</sub> ( Nitrogen dioxide)

Period: July – 2018 to December – 2018

Sr. No.	Location	Results ( $\mu\text{g}/\text{m}^3$ )	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Nani Naroli Village Near PHC	27.8	25.1
2	Tadkeshwar Village	23.5	21.9
3	Surali Village	19.8	22.5
4	Vastan Village	21.4	18.9
5	Lignite cutting Area	20.3	28.9
6	Over Burden Area	22.4	25.4
7	Mines Haul Area	21.5	18.9
8	Shah Village	21.8	16.7
	Limit	80	



## Graphical presentation for the variation of NO<sub>2</sub> in Ambient Air





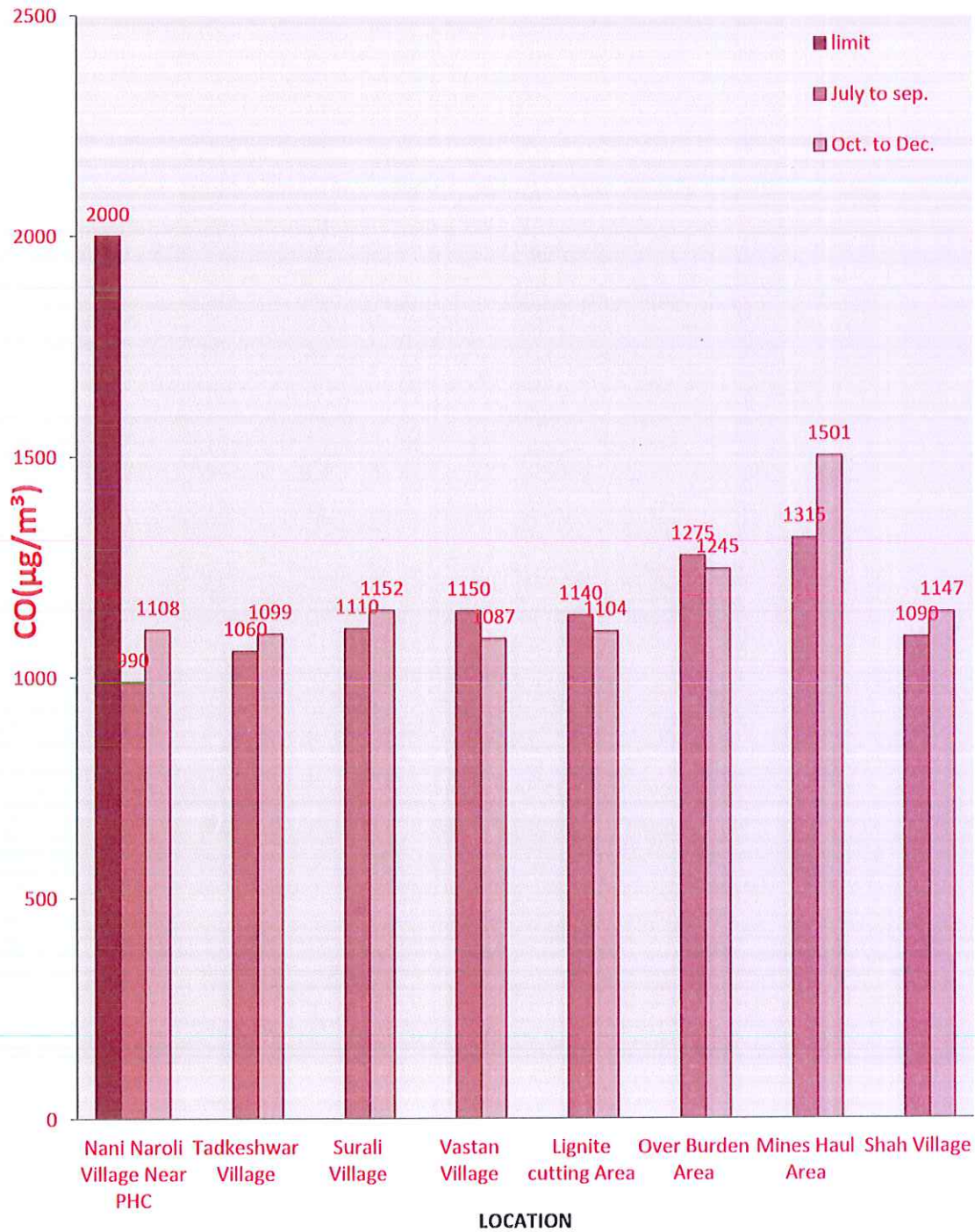
### Six Monthly Variations in Ambient Air Quality

Parameter: CO (Carbon Monoxide)

Period: July – 2018 to December – 2018

Sr. No.	Location	Results ( $\mu\text{g}/\text{m}^3$ )	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Nani Naroli Village Near PHC	990	1108
2	Tadkeshwar Village	1060	1099
3	Surali Village	1110	1152
4	Vastan Village	1150	1087
5	Lignite cutting Area	1140	1104
6	Over Burden Area	1275	1245
7	Mines Haul Area	1315	1501
8	Shah Village	1090	1147
	Limit	2000	

## Graphical presentation for the variation of CO in Ambient Air







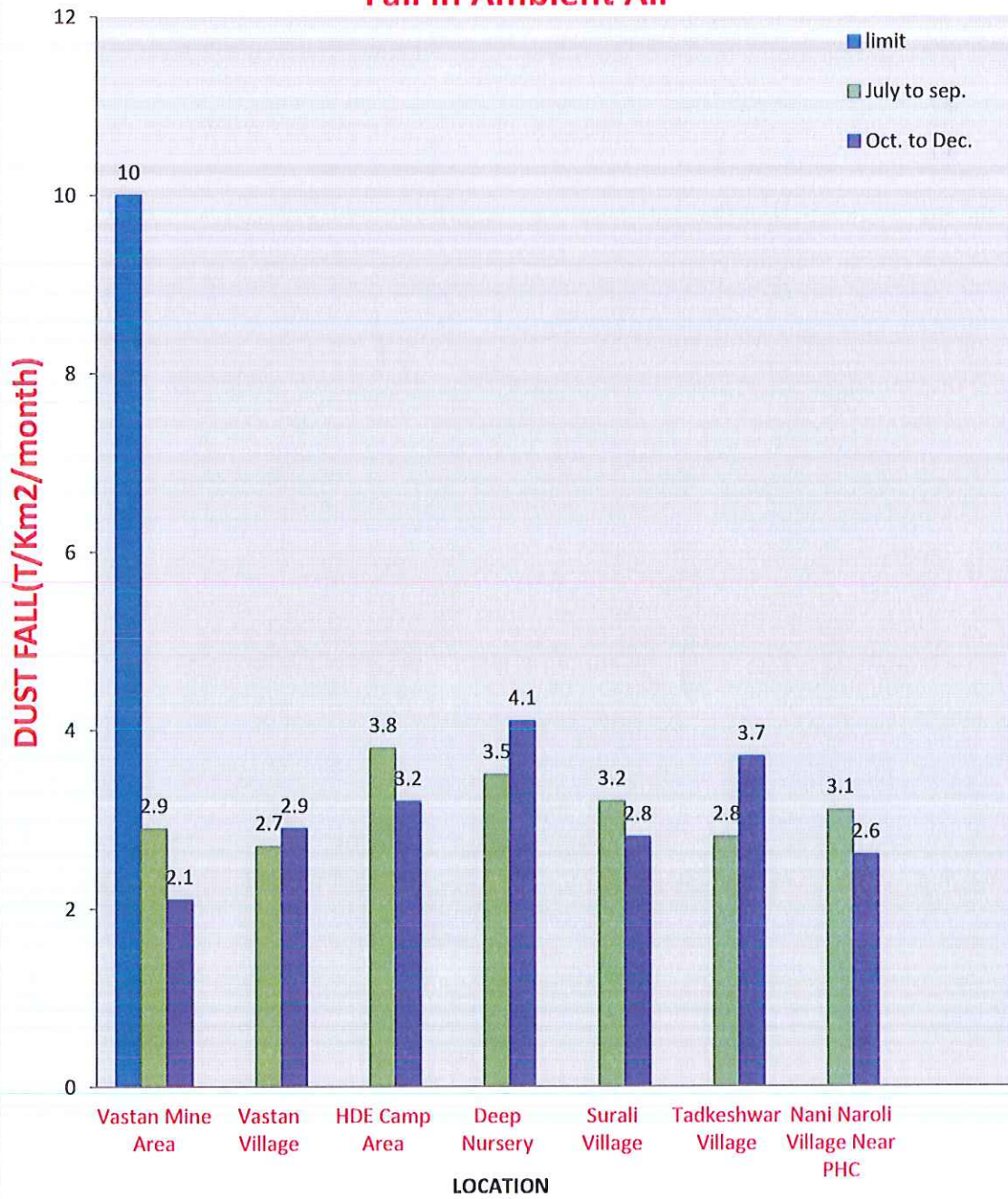
### Six Monthly Variations in Ambient Air Quality

Parameter: Dust Fall

Period: July – 2018 to December – 2018

Sr. No.	Location	Results (T/Km <sup>2</sup> /month)	
		Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
1	Vastan Mine Area	2.9	2.1
2	Vastan Village	2.7	2.9
3	HDE Camp Area	3.8	3.2
4	Deep Nursery	3.5	4.1
5	Surali Village	3.2	2.8
6	Tadkeshwar Village	2.8	3.7
7	Nani Naroli Village Near PHC	3.1	2.6
	Limit	10	

## Graphical presentation for the variation of Dust Fall in Ambient Air







### Six Monthly Variations in Bore water

Sampling point: Bore well (Ansodla Village)

Period: July – 2018 to December – 2018

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018	MoEF Limit
1	Temperature	°C	25	25	Shall not exceed 5°c above the receiving water temp.
2	pH@ 25°C	pH unit	7.48	7.35	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	03	5.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1796	1604	2100
6	Total volatile Solids	mg/L	6	3	--
7	COD	mg/L	---	--	250
8	BOD (5 days at 20° C)	mg/L	---	--	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	835	535	1000
11	Sulphate	mg/L	142	151	300
12	Fluoride	mg/L	0.6	0.6	2.0
13	Phosphate as PO <sub>4</sub> <sup>3-</sup>	mg/L	2.3	2.8	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	248	185	--
24	Magnesium	mg/L	102	104	--
25	Percentage Sodium	%	23.2	25.8	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	95	90%Survival of fish after 96 Hours in 100% of effluent

Regd. Off.: Office Floor, Ashoka Pavillion-A, Opp. Kapadia Health Club, New Civil Road, SURAT-395 001.

Telofax : 01 - 261 - 2231630 - 2236223 Phone : 04605 45050, 00660 69161

e-mail : eoo@ecoshrilpad.com Website : www.ecosystemindia.com CIN No.: U72200GJ2000PTC030266

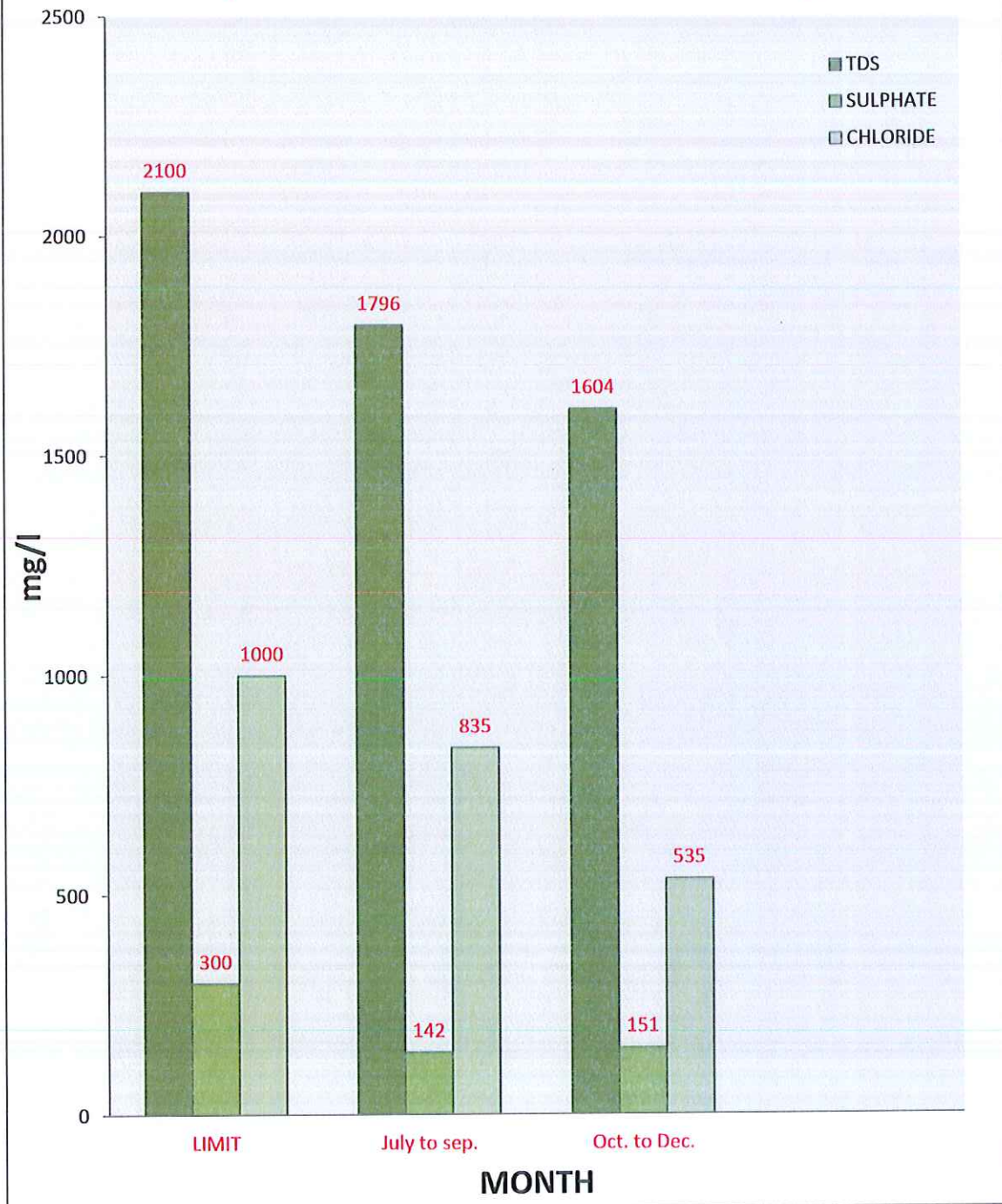
Bharuch Branch : Shop No. 7/8, Saffron City, Opp. Bharat Petrol Pump, Vill. Jolwa, Dahej - Bharuch Road, Bharuch. Mo.: 98250 94443

Vapi Branch : 131, Ashapura Complex, Near New Telephone Exchange Road, GIDC Vapi-396 195 Tel.: 0260-2970305 / 94262 63005

Vadodara Branch : 216, Race Course Tower, Gotri Road, Vadodara-390007. Tel.: 0265-2121215, 2331215



## Graphical presentation for the variation of TDS,SO4 & Cl in bore water Ansodla village





### Six Monthly Variations in Bore water Data

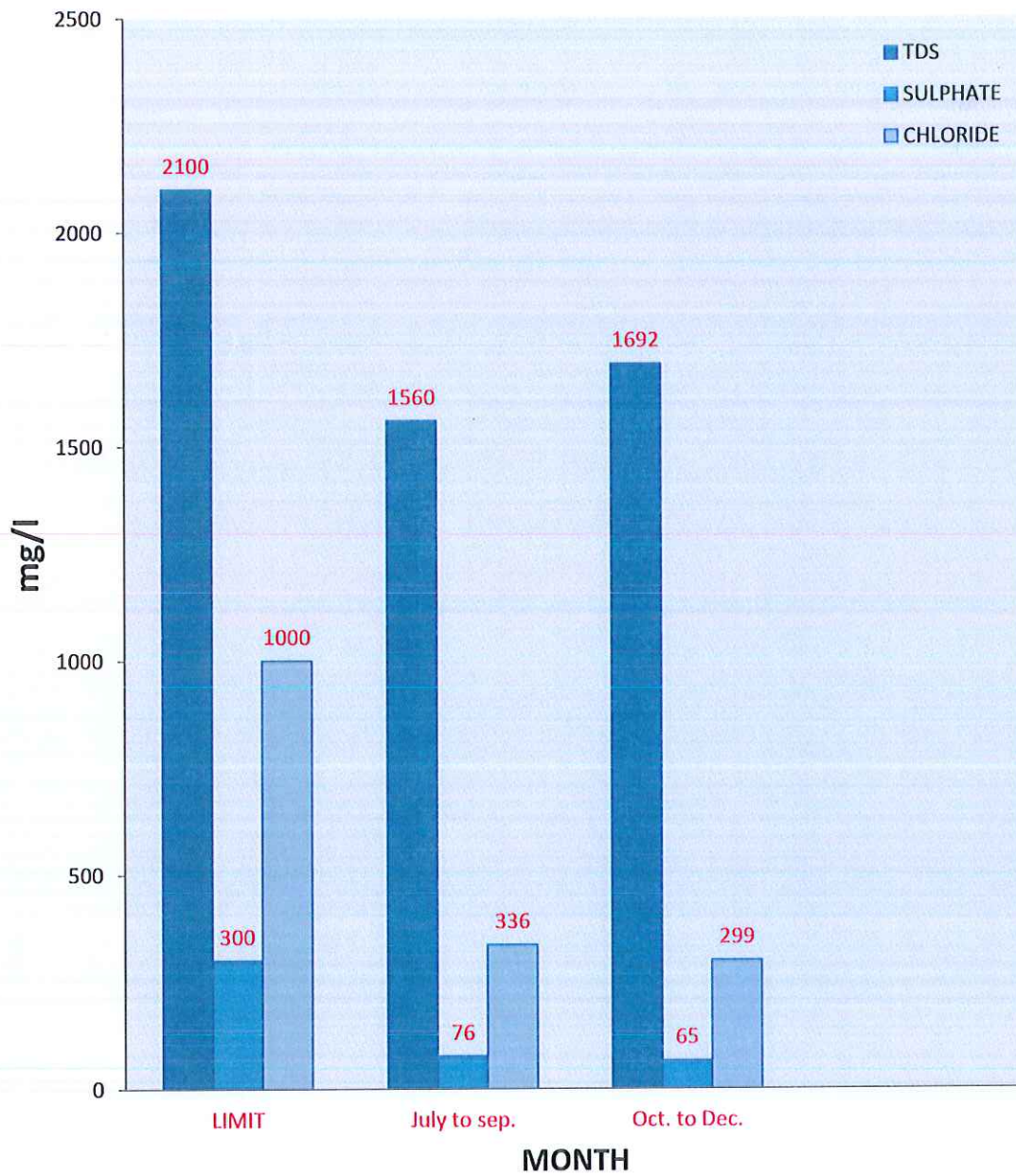
Sampling point: Bore well (Hand pump in surali Village)

Period: July – 2018 to December – 2018

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018	MoEF Limit
1	Temperature	°C	24	25	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.98	7.96	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	22	21.8	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1560	1692	2100
6	Total volatile Solids	mg/L	BDL	BDL	--
7	COD	mg/L	---	---	250
8	BOD (5 days at 20° C)	mg/L	---	---	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	336	299	1000
11	Sulphate	mg/L	76	65	300
12	Fluoride	mg/L	0.6	0.7	2.0
13	Phosphate as PO <sub>4</sub> <sup>-</sup>	mg/L	5.2	5.7	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	140	10.4	--
24	Magnesium	mg/L	25	2.5	--
25	Percentage Sodium	%	32.5	61	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	90	90%Survival of fish after 96 Hours in 100% of effluent



### Graphical presentation for the variation of TDS,SO4 & Cl in bore water Hand pump in Surali village







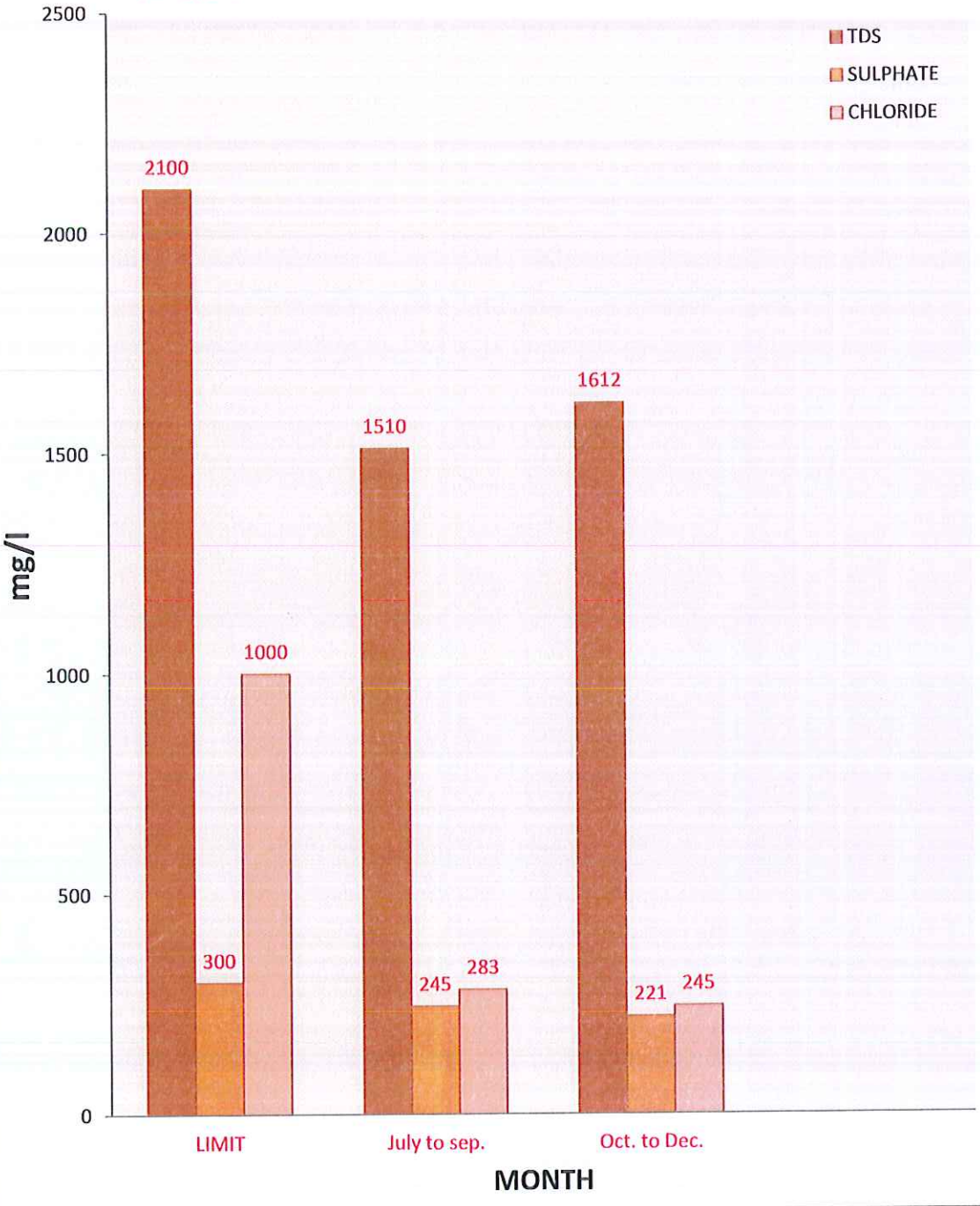
### Six Monthly Variations in Bore water

Sampling point: Bore well (Mosali char rasta)

Period: July – 2018 to December – 2018

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018	MoEF Limit
1	Temperature	°C	25	25	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.36	7.33	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	02	5.0	100
5	Total Dissolved Solids (TDS) @180°C	mg/L	1510	1612	2100
6	Total volatile Solids	mg/L	5	4	--
7	COD	mg/L	---	---	250
8	BOD (5 days at 20°C)	mg/L	----	---	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	283	245	1000
11	Sulphate	mg/L	245	221	300
12	Fluoride	mg/L	0.7	0.9	2.0
13	Phosphate as PO <sub>4</sub> <sup>3-</sup>	mg/L	2.9	2.5	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	60	65.2	--
24	Magnesium	mg/L	35	39.2	--
25	Percentage Sodium	%	22.4	20.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	90	90% Survival of fish after 96 Hours in 100% of effluent

### Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mosali char rasta







### Six Monthly Variations in Bore water

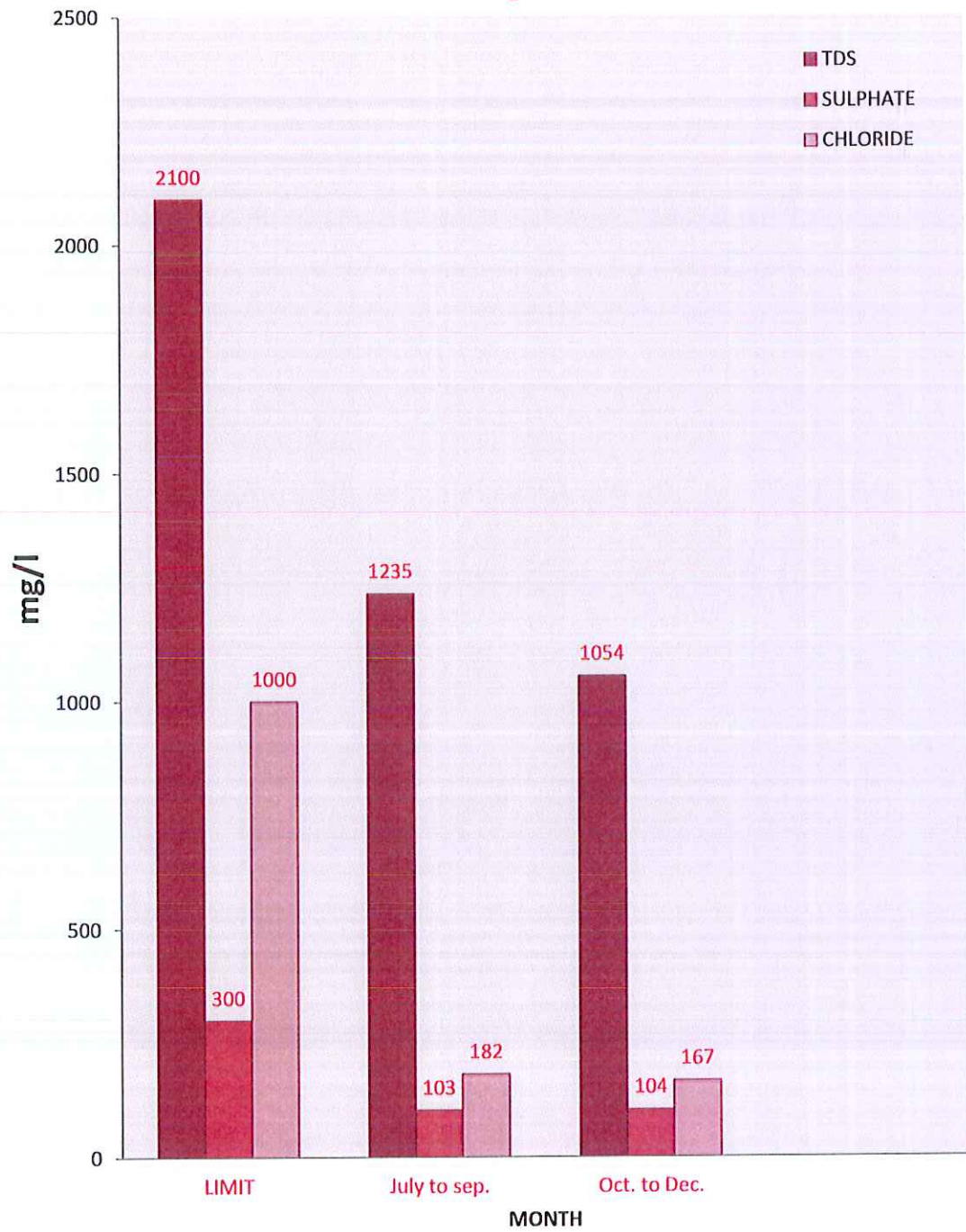
Sampling point: Bore well (Near Tadkeshwar char rasta)

Period: July – 2018 to December – 2018

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018	MoEF Limit
1	Temperature	°C	25	25	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.38	7.41	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	6	5	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1235	1054	2100
6	Total volatile Solids	mg/L	4	4	--
7	COD	mg/L	---	---	250
8	BOD (5 days at 20° C)	mg/L	---	---	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	182	167	1000
11	Sulphate	mg/L	103	104	300
12	Fluoride	mg/L	0.6	0.5	2.0
13	Phosphate as PO <sub>4</sub> <sup>3-</sup>	mg/L	2.1	2.9	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	80	88.5	--
24	Magnesium	mg/L	51	42.6	--
25	Percentage Sodium	%	19.8	20.5	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	90	92	90%Survival of fish after 96 Hours in 100% of effluent



### Graphical presentation for the variation of TDS,SO4 & Cl in bore water Near Tadkeshwar village





### Six Monthly Variations in Bore water

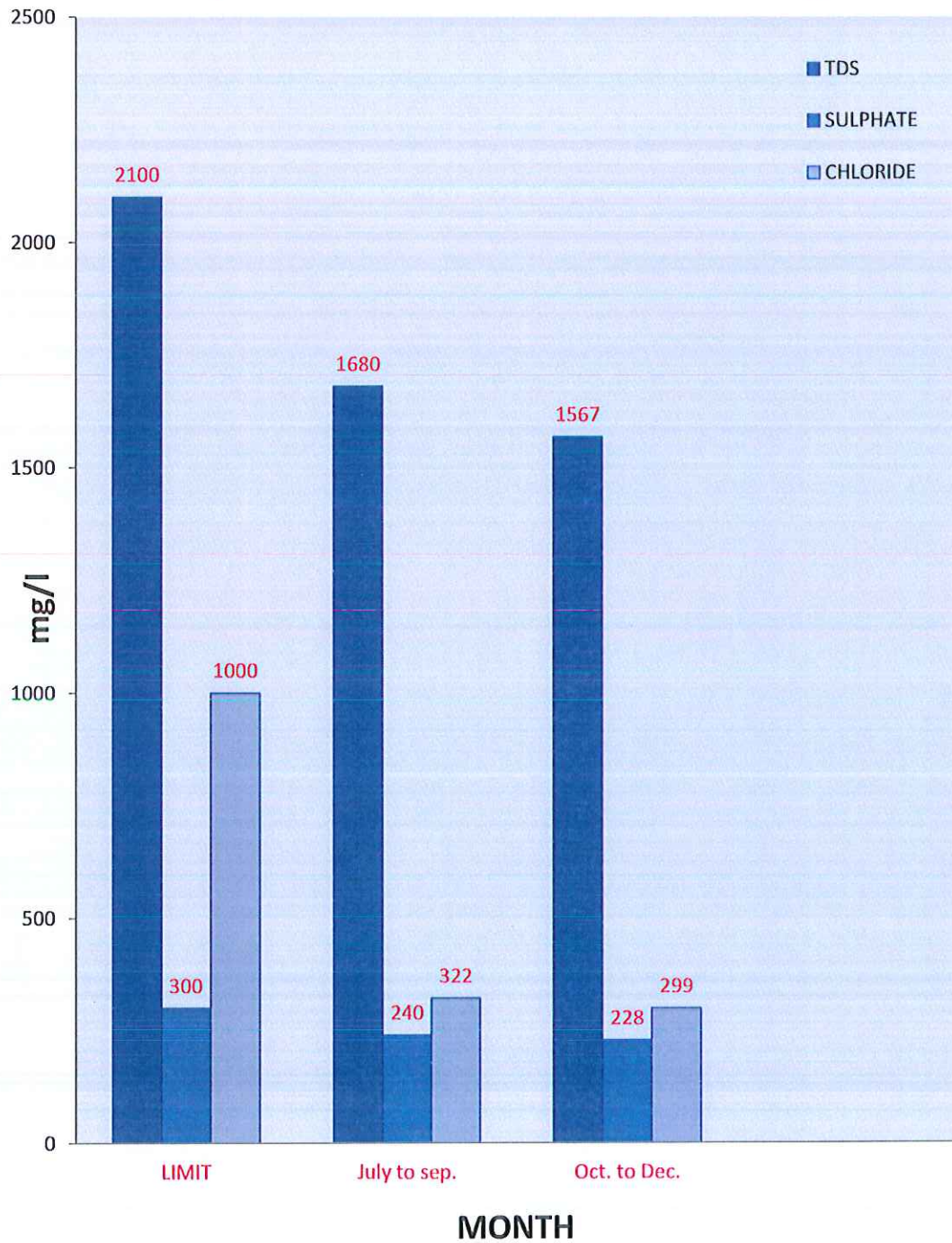
Sampling point: Bore well (Vatsan Village)

Period: July – 2018 to December – 2018

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018	MoEF Limit
1	Temperature	°C	24	26	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.26	7.35	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	6	3.7	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1680	1567	2100
6	Total volatile Solids	mg/L	06	4.9	--
7	COD	mg/L	---	---	250
8	BOD (5 days at 20° C)	mg/L	---	---	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	322	299	1000
11	Sulphate	mg/L	240	228	300
12	Fluoride	mg/L	0.6	0.8	2.0
13	Phosphate as PO <sub>4</sub> <sup>3-</sup>	mg/L	3.1	1.9	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	90	78.5	--
24	Magnesium	mg/L	55	22.1	--
25	Percentage Sodium	%	20.3	21.4	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	95	90%Survival of fish after 96 Hours in 100% of effluent



### Graphical presentation for the variation of TDS,SO4 & Cl in bore water Vatsan village







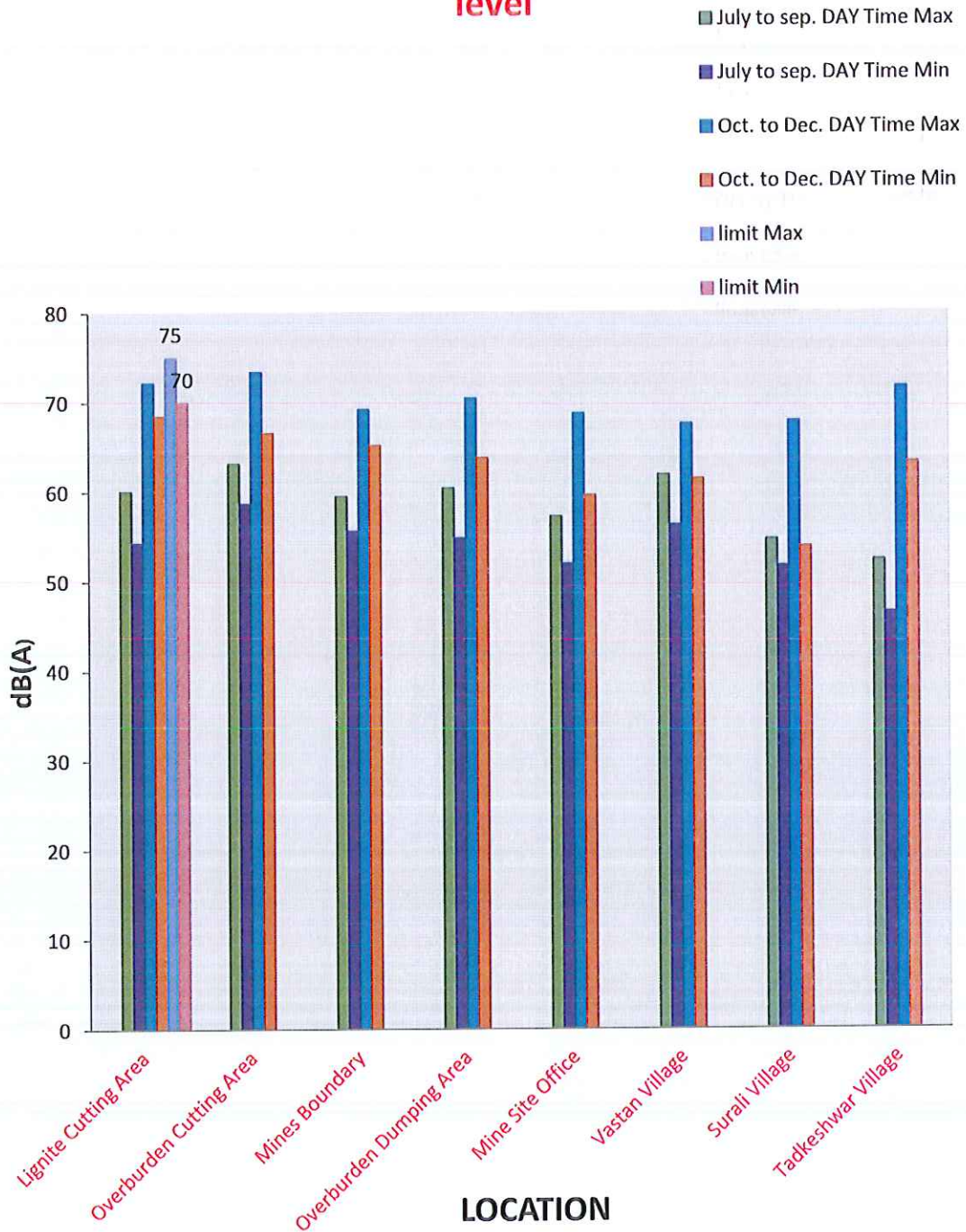
### Six Monthly Variations in Noise Level

Parameter: Noise

Period: July – 2018 to December – 2018

SR. NO	LOCATION	NOISE LEVEL, dB [A]							
		Quarterly July to Sept - 2018				Quarterly Oct to Dec - 2018			
		DAY Time		Night Time		DAY Time		Night Time	
		Max	Min	Max	Min	Max	Min	Max	Min
1	Lignite Cutting Area	60.1	54.3	57.8	52.5	72.2	68.5	65.2	62.3
2	Overburden Cutting Area	63.2	58.7	58.9	55.3	73.4	66.6	58.6	51.6
3	Mines Boundary	59.5	55.6	57.6	52.6	69.2	65.2	54.2	53.1
4	Overburden Dumping Area	60.4	54.8	57.6	53.8	70.4	63.8	52.6	50.8
5	Mine Site Office	57.2	51.9	54.3	49.7	68.7	59.6	50.4	48.6
6	Vastan Village	61.8	56.2	59.5	50.2	67.5	61.4	57.2	55.3
7	Surali Village	54.6	51.6	52.8	47.6	67.8	53.8	52.1	48.9
8	Tadkeshwar Village	52.3	46.4	50.9	45.3	71.6	63.2	55.5	50.3
	<b>GPCB limit</b>	<b>75 (dB)</b>		<b>70(dB)</b>		<b>75 (dB)</b>		<b>70(dB)</b>	

## Graphical presentation for the variation in Noise level







**Six Monthly Variations in Micrometeorological data**

**Period: July – 2018 to December – 2018**

Dry Bulb Temperature ( <sup>0</sup> C)		
Time in Hrs.	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
10.00	28	27
11.00	28	27
12.00	28	28
13.00	29	29
14.00	30.0	30.0
15.00	30.0	30.0
16.00	29.0	29.0
17.00	29.0	29.0
18.00	28.0	26.0
19.00	28.0	26.0
20.00	28.0	24.0
21.00	26.0	24.0
22.00	26.0	23.0
23.00	26.0	23.0
00.00	27.0	23.0
01.00	27.6	22.6
02.00	28.2	22.2
03.00	28.0	21.5
04.00	27.0	21.3
05.00	27.0	21.2
06.00	27.0	20.0
07.00	28.0	22.0
08.00	28.0	23.0
09.00	29.0	23.0
<b>Maximum</b>	<b>30</b>	<b>30</b>
<b>Minimum</b>	<b>26</b>	<b>26</b>
<b>Average</b>	<b>27.9</b>	<b>24.8</b>





### Six Monthly Variations in Micrometeorological data

Period: July – 2018 to December – 2018

Wet Bulb Temperature (°C)		
Time in Hrs.	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
10.00	27.5	25
11.00	27.5	25
12.00	27.5	27
13.00	27	27
14.00	27	27.5
15.00	27	27
16.00	25	27.5
17.00	26	26
18.00	25	24.5
19.00	25	24.8
20.00	24.4	22
21.00	24	22
22.00	25.1	21
23.00	24	21
00.00	24	21
01.00	24	20
02.00	24	20
03.00	24	19
04.00	26	19
05.00	26	19
06.00	26	18.8
07.00	26	20.0
08.00	26	21.5
09.00	26	21.5
<b>Maximum</b>	<b>27.5</b>	<b>29</b>
<b>Minimum</b>	<b>24</b>	<b>18.8</b>
<b>Average</b>	<b>25.5</b>	<b>23.8</b>



**Six Monthly Variations in Micrometeorological data**

**Period: July – 2018 to December – 2018**

Relative Humidity %		
Time in Hrs.	Quarterly July to Sept - 2018	Quarterly Oct to Dec - 2018
10.00	88	31
11.00	88	32
12.00	86	25
13.00	86	24
14.00	88	24
15.00	86	28
16.00	80	28
17.00	80	32
18.00	80	38
19.00	79	40
20.00	79	42
21.00	79	42
22.00	87	44
23.00	87	40
00.00	87	40
01.00	71	42
02.00	70	42
03.00	71	43
04.00	71	42
05.00	72	39
06.00	70	39
07.00	82	38
08.00	82	36
09.00	84	36
<b>Maximum</b>	<b>88</b>	<b>44</b>
<b>Minimum</b>	<b>70</b>	<b>24</b>
<b>Average</b>	<b>80.5</b>	<b>36.1</b>



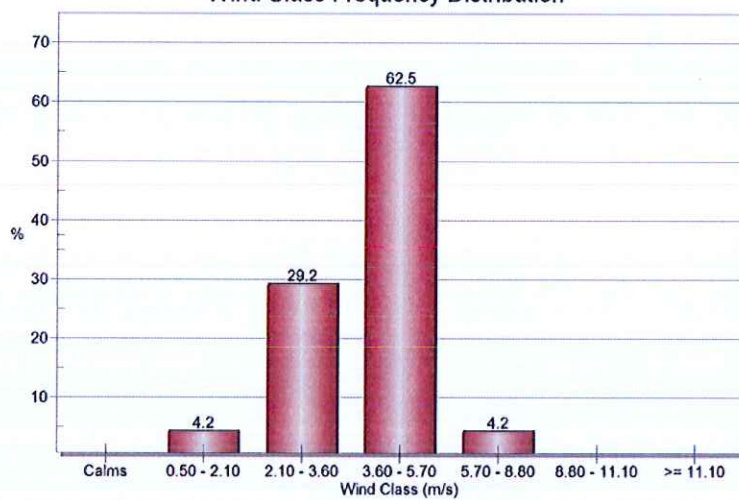
### Six Monthly Variations in Micrometeorological data

Period: July – 2018 to December – 2018

Wind Speed (km/hour)		
Time in Hrs.	July to sept. – 2018	Oct. to Dec – 2018
10.00	14	11
11.00	15	11
12.00	11	8
13.00	4.2	8
14.00	3.6	10
15.00	10	10
16.00	17	10
17.00	16	15
18.00	20	15
19.00	20.4	11
20.00	19	12
21.00	19	12
22.00	19	13
23.00	17	13
00.00	19	14
01.00	18	14
02.00	19	14
03.00	20	15
04.00	16	15
05.00	20	14
06.00	17	15
07.00	26	14
08.00	18	12
09.00	20	12
<b>Maximum</b>	<b>26</b>	<b>15</b>
<b>Minimum</b>	<b>3.6</b>	<b>8</b>
<b>Average</b>	<b>16.5</b>	<b>13.1</b>



Wind Class Frequency Distribution

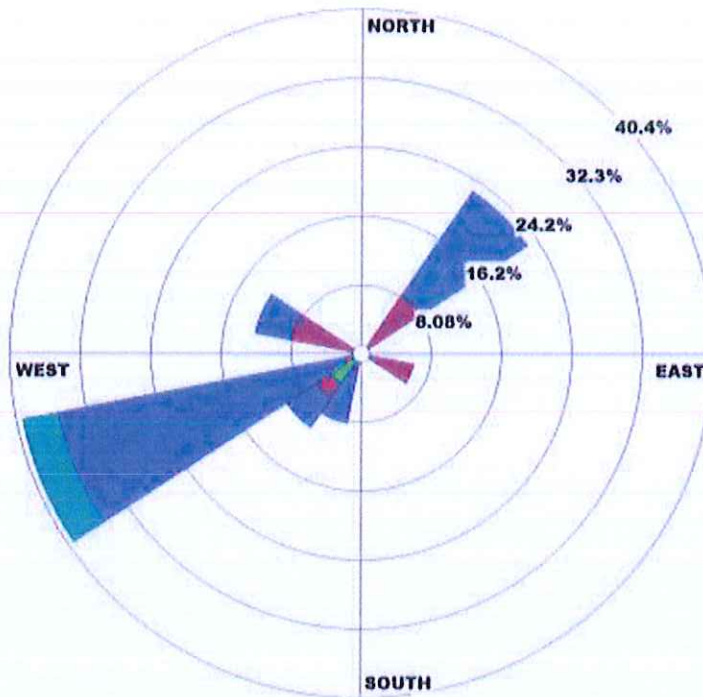


WIND ROSE PLOT

**M/s. Gujarat Industries Power Company Limited  
Vastan Lignite Mine**

DISPLAY

Wind Speed  
Direction (blowing from)



WIND SPEED  
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

COMMENTS

DATA PERIOD

Start Date: 24-09-2018 - 10:00  
End Date: 21-12-2018 - 09:00

COMPANY NAME

**M/s. Gujarat Industries Power Company Limited**

MOODELER

**Ecosystem Resource  
Management Pvt. Ltd.**

CALM WINDS

**0.00%**

TOTAL COUNT

**48 hrs.**

AVG WIND SPEED

**4.04 m/s**

DATE

**19-01-2019**

PROJECT NO.