

MONITORING OF ENVIRONMENTAL PARAMETERS

(INTERIM REPORT FOR POST MONSOON SEASON -2019)

FOR

JAGGAYYAPETA LIMESTONE MINE

of

M/s. Rashtriya Ispat Nigam Limited.

(GOVERNMENT OF INDIA ENTERPRISE)

VISAKHAPATNAM STEEL PLANT

Budawada (V), Jaggayapeta(M), Krishna (Dist)

Andhra Pradesh.

Prepared By

M/s. SV ENVIRO LABS & CONSULTANTS

(MOEF Recognized, NABL & NABET Accredited And
ISO 9001 Certified Laboratory)

Enviro House, B1, Block-B, Autonagar, Visakhapatnam -12



TABLE OF CONTENTS

CONTENTS

Sl.No.	Description	Pg.No
1.0	Introduction	5
1.1.	Location of Project	5
2.0	Scope of Work	7
3.0	Methodology	10
4.0	Environmental Monitoring Studies	12
4.1	Meteorological Data	14
4.2	Ambient Air Quality Monitoring	22
4.3	Dust Fall Measurement	22
4.4	Noise Level Monitoring	23
4.5	Water Quality	23

LISTS OF FIGURES

Fig.No.	Description	Pg.No
Fig – 1	Graphical presentation of Minimum and Maximum of Temperature	15
Fig – 2	Graphical presentation of Minimum and Maximum of Relative humidity	15
Fig – 3	Wind rose –(00.00 – 07.00 hrs) November'19 – 8 hrly	17
Fig – 4	Wind rose –(08.00 – 15.00 hrs) November'19 – 8 hrly	18
Fig – 5	Wind rose –(16.00 – 23.00 hrs) November'19 – 8 hrly	19
Fig - 6	Wind rose –(00.00 – 23.00 hrs) November'19 – 24 hrly	20

LIST OF ANNEXURES

Annexure. No.	Description	Pg.No
Annexure – 1	Ambient Air Quality	27
Annexure – 2	Dustfall measurement	33
Annexure – 3	Noise Level Monitoring	39
Annexure – 4	Water Quality	42

CHAPTER – 1

INTRODUCTION

1.0 INTRODUCTION

Rashtriya Ispat Nigam Limited, the corporate entity of Visakhapatnam Steel Plant is a Navratna PSE under the Ministry of Steel. Visakhapatnam Steel Plant fondly called Vizag steel. It is the first shore based Integrated Steel Plant in the country and is known for its quality products delighting the customers. It is a market leader in long products and it caters to the needs of diverse industrial sectors. It is the first Steel plant to be certified ISO 9001:2008 (presently 2015), ISO 14001:2004 (presently 2015), OHSAS 18001:2007 and ISO/IEC 27001:2013 Standards. It is also the first PSE to be certified ISO 50001:2011 – Energy Management Systems and has acquired CMMI Level 3 Certification for S/W development.

The Infrastructure of Visakhapatnam Steel Plant comprises of Coke Ovens and Coal Chemical Plant, Sinter Plant, Blast furnace, Calcining and Refractory Material Plant, Steel Melt Shop and Continuous Casting, Light and Medium Merchant Mill, Medium Merchant and Structural Mill, Wire rod mill, Steel melt shop, Thermal power plant.

Rashtriya Ispat Nigam Limited, has captive mines namely Jaggayyapeta Limestone Mine, Madharam Dolomite Mine, Garbham Manganese Mine, Saripalli Sand Mine and Kintada Quartz Mine.

RINL has retained M/s. SV ENVIRO LABS & CONSULTANTS, to carry out the environmental monitoring studies at Jaggayyapeta Limestone Mine.

This report presents the environmental monitoring data of Post Monsoon Season – November '2019 at Jaggayyapeta Limestone Mine.

1.1 LOCATION OF THE PROJECT

The Project site is located at Jaggayyapeta Limestone Mine of M/s. Rashtriya Ispat Nigam Limited located at Tehsil Jaggayyapeta, District Krishna, Andhra Pradesh.

CHAPTER – 2
SCOPE OF WORK

2.0 SCOPE OF WORK

The scope of the studies include monitoring of the following environmental components

1. Meteorological data
2. Ambient Air Quality
3. Dustfall Rate
4. Noise Level monitoring at Work zones
5. Water quality

The parameters covered under the scope for each of the above attributes are given below:

SCOPE OF WORK

S.No	Attribute	Scope
1.	Meteorological Data	<p>Collection of micrometeorological data at project site for 15 days in a season by installing an weather monitoring station at plant site covering the following parameters :</p> <ul style="list-style-type: none"> • Temperature • Relative humidity • Wind speed • Wind direction • Rainfall <p>Frequency : Micro-meteorological data for 15days continuously in a season for three seasons i.e. Post Monsoon, Winter and Summer seasons. Yearly rainfall data to be collected.</p>
2.	Ambient Air Quality	<p>Sampling of ambient air at 05 stations for analyzing the following parameters:</p> <ul style="list-style-type: none"> • SPM • PM10

		<ul style="list-style-type: none"> • PM2.5 • SO2 • NOx • CO <p>Frequency : At each station samples will be collected on 8 hourly basis for 24hrs duration, 2days per week for two weeks alternatively in a month for three seasons i.e. Post Monsoon, Winter and Summer seasons</p>
3.	Dustfall Rate	<p>Collection of dustfall at 5 locations for 15days continuously in a month.</p> <ul style="list-style-type: none"> • Dustfall <p>Frequency : 15 days continuously in a month for three seasons i.e. Post Monsoon, Winter and Summer seasons</p>
4.	Noise Levels	<p>Monitoring of noise levels at seven locations at work zones.</p> <p>Frequency : Readings recorded on 8 hourly basis at one hour interval at all locations in a month of a season for three seasons i.e. Post Monsoon, Winter and Summer seasons.</p>
5.	Water quality	<p>Collection and analysis of river water/mine discharge water/well water and treated water as per</p> <ul style="list-style-type: none"> • IS 10500 (Drinking water specifications) • GSR 422 (E) –Inland surface water <p>Frequency : Once in a season for all the four seasons at all locations</p>

CHAPTER – 3

METHODOLOGY

3.0 METHODOLOGY

Methodologies adopted for sampling and analysis for each of the above parameters are detailed below

Methods of monitoring and analysis for various parameters

S.No	Attributes	Measurement Technique		
1.	Meteorological parameters	WEATHER STATION		
2.	Ambient Air Quality	SPM	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part-IV)
		PM ₁₀	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part-XXIII)
		PM _{2.5}	Fine Particulate Sampler (Gravimetric method)	IS-5182 (Part-XXIV)
		Sulphur dioxide	Modified West and Gaeke	IS-5182 (Part-II)
		Oxides of Nitrogen	Jacob & Hochheiser	IS-5182 (Part-VI)
		CO	Grab sample	IS-5182 (Part – X)
3.	Dustfall Rate	IS-5182 (Part – 1) (Gravimetric method)		
4.	Noise Monitoring	Pre calibrated Sound Level Meter		
5.	Water Quality (Surface water, Mine discharge water, Well Water and Treated water)	As per APHA 23 rd Edition'2017		

CHAPTER – 4

ENVIRONMENTAL MONITORING STUDIES

4.0 ENVIRONMENTAL MONITORING STUDIES – NOVEMBER - 2019

S.No	ATTRIBUTE	SCOPE	STUDIES CARRIED OUT
1.	Ambient Air Quality	Collection of ambient air at five locations (3 locations in core zone and two locations in buffer zone.)	Ambient Air samples collected at five locations at Mines Site Office - 15 th , 16 th , 22 nd and 23 rd November'2019 Ore Handling Plant - 15 th , 16 th , 22 nd and 23 rd November'2019 Loading point 15 th , 16 th , 22 nd and 23 rd November'2019 VSP Township - 13 th , 14 th , 24 th and 25 th November'2019 Budawada Village - 13 th , 14 th , 24 th and 25 th November'2019 for SPM, PM10, SO ₂ , NO _x & CO.
2.	Meteorological parameters	Collection of micrometeorological data at project site for 15 days continuously	Collected for the period of 13.11.2019 to 27.11.2019.
3.	Dustfall rate	Collection of dustfall at five locations (3 locations in core zone and two locations in buffer zone.)	Dust fall samples were collected at five locations for the period of 13.11.2019 to 27.11.2019. <ul style="list-style-type: none"> • Mines Site Office • Ore Handling Plant • Loading point • VSP Township • Budawada Village

4.	Water Quality	Collection of Surface water, Mine discharge water, Well Water and Treated water	Surface water of Paleru river upstream and downstream, Mine discharge water, VSP township tap water and Budawada borewell water samples have been collected on 14-11-2019.
5.	Noise Level Monitoring	Monitoring of noise levels at seven locations at work zones.	Monitoring of noise levels at seven locations at work zones. <ul style="list-style-type: none"> • Mining Area • Admin Office • Ore Handling Plant • Loading Plant • VSP Township • Near Hydraulic Excavator • Near DTH Drill

4.1 METEOROLOGICAL DATA

Meteorological data was collected on hourly basis by installing a weather monitoring station at Plant site. The report depicted hereunder represents the data for 13th November to 27th November '2019.

The following parameters were recorded

- Wind speed
- Wind direction
- Temperature
- Relative humidity
- Rainfall

MINIMUM AND MAXIMUM VALUES OF RELATIVE HUMIDITY, TEMPERATURE AND RAINFALL DURING STUDY PERIOD

	Temperature in °C	Relative Humidity %	Rainfall in mm
Minimum	20	56	-
Maximum	31	96	-
Mean	25.2	78	-
Total	-	-	Nil

Fig – 1 .Graphical interpretation of Minimum and Maximum values of Temperature during study period.

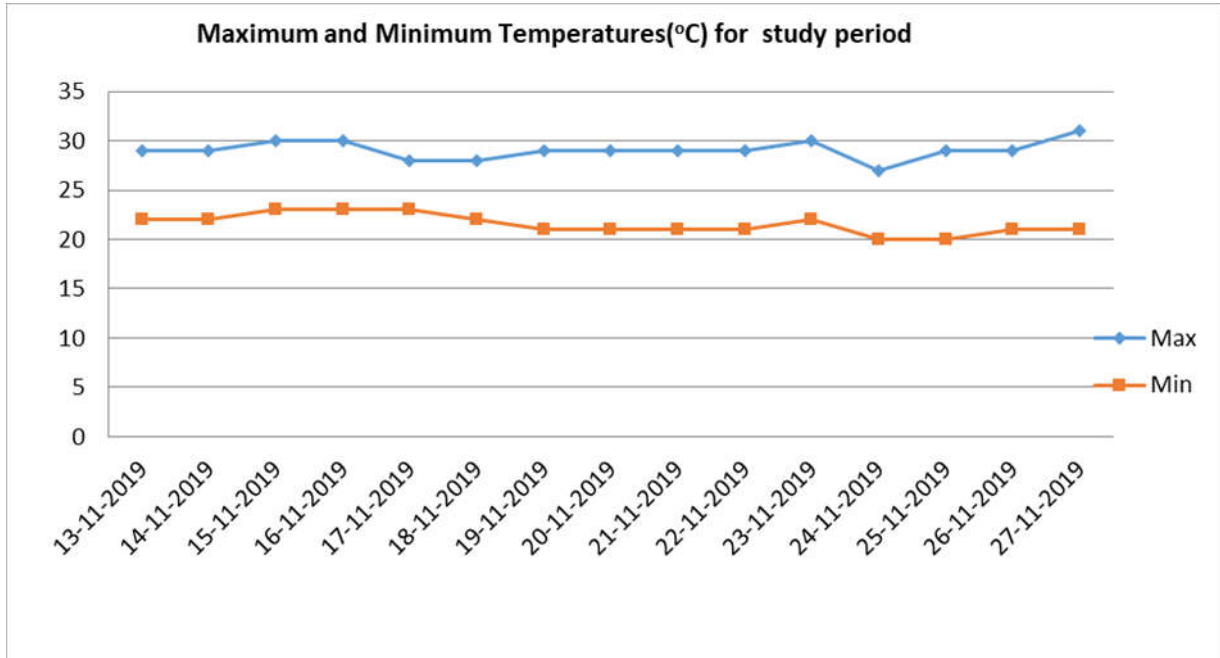
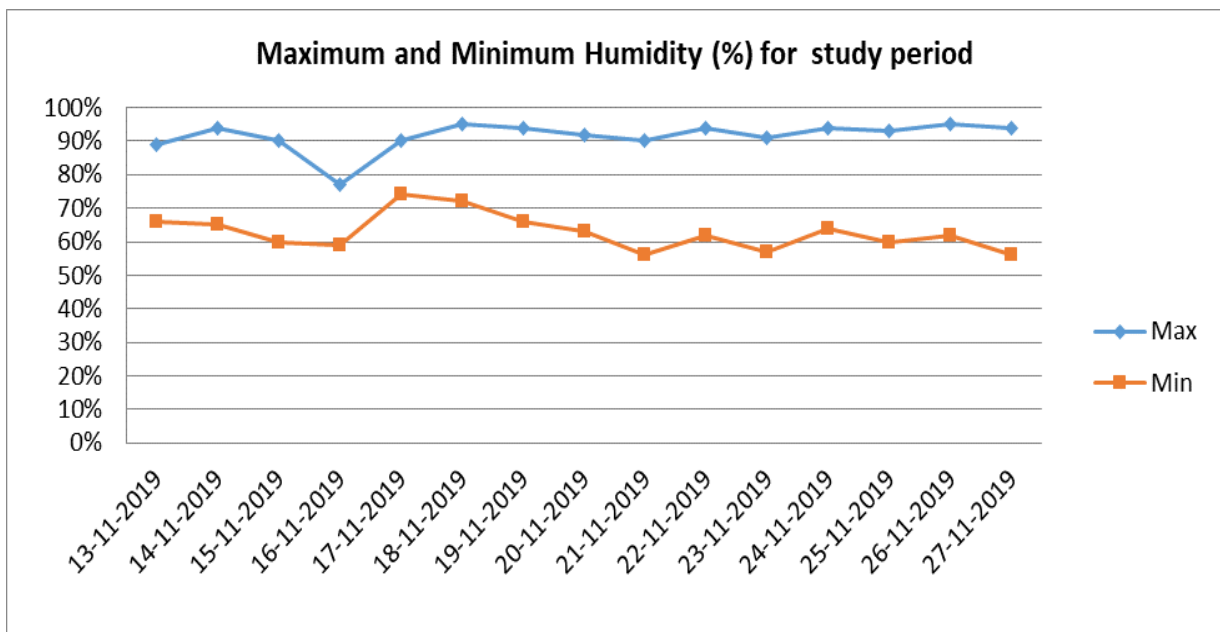


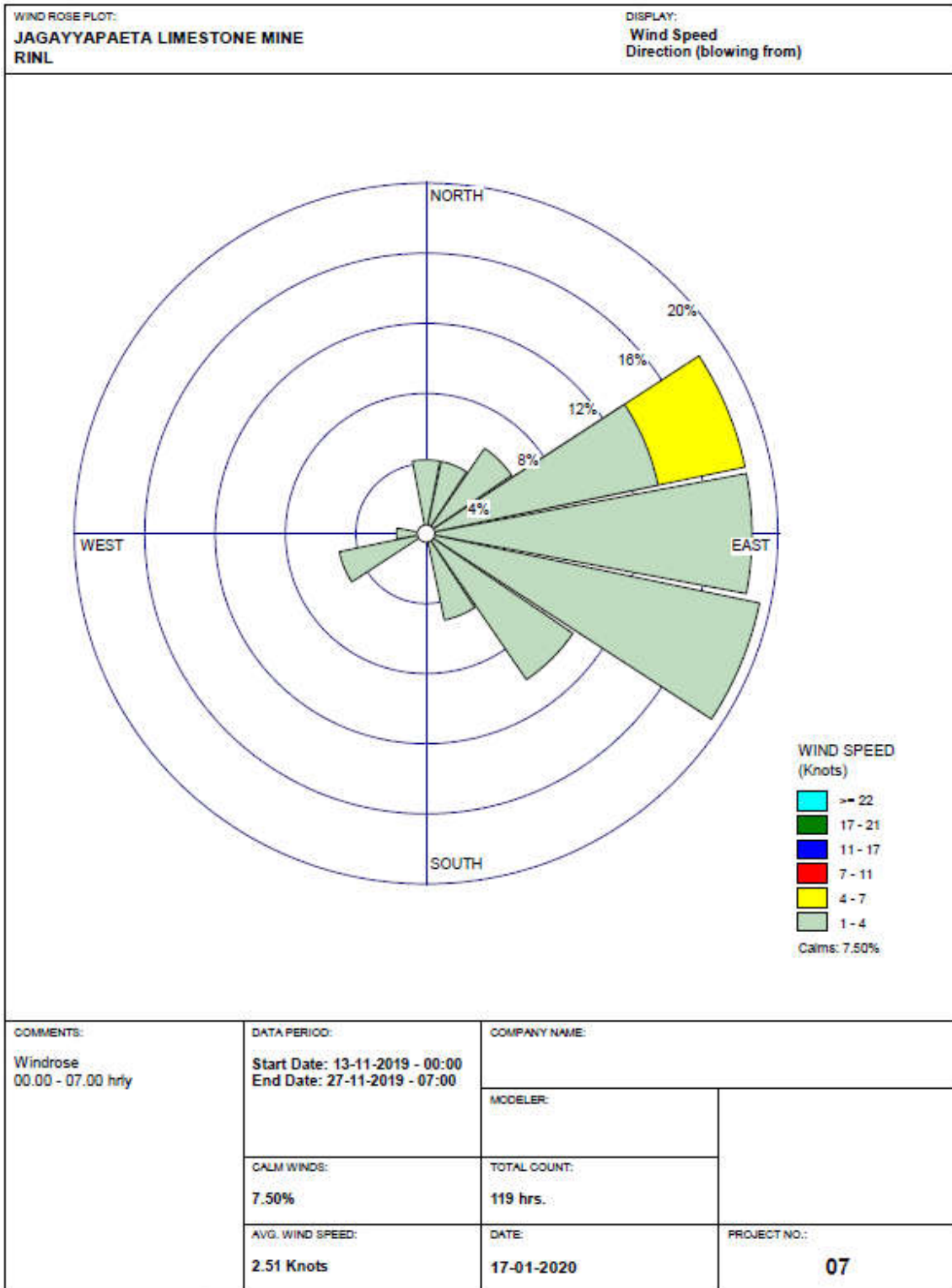
Fig – 2 .Graphical interpretation of Minimum and Maximum values of Relative Humidity during study period.



WIND PATTERN – November’ 2019

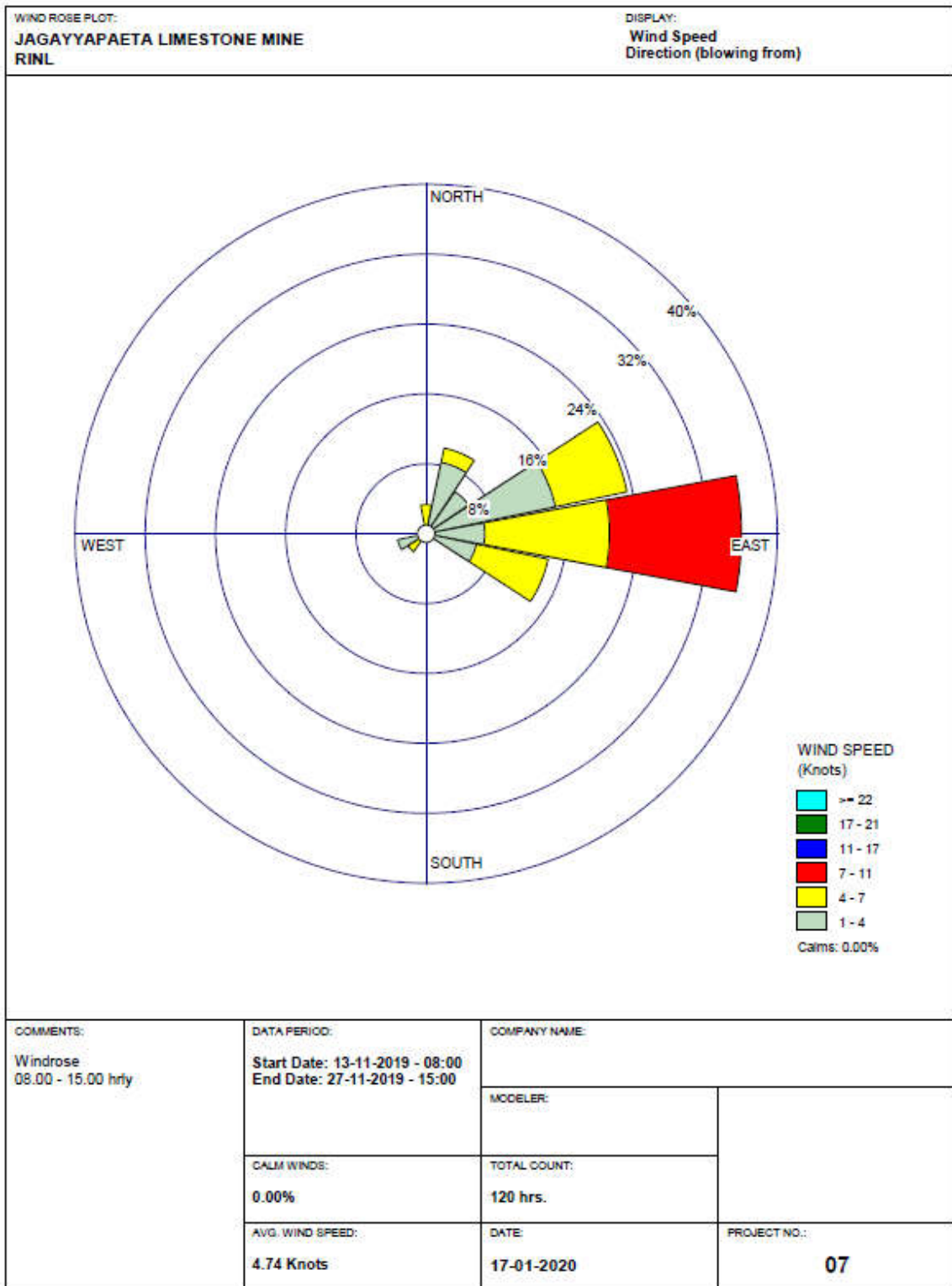
Duration	Predominant Wind directions	Wind rose Enclosed as
00:00 – 07.00 hrs	ESE	Fig – 3
08.00 – 15.00 hrs	E	Fig – 4
16.00 – 23.00 hrs	ENE	Fig – 5
00.00 – 23.00 hrs	ENE	Fig – 6

Fig- 3. Wind rose diagram for 00.00 – 07.00 hrs (8hrly)



WRPLOT View - Lakes Environmental Software

Fig –4. Wind rose diagram for 08.00 – 15.00 hrs (8hrly)



WRPLOT View - Lakes Environmental Software

Fig – 5. Wind rose diagram for 16.00 – 23.00 hrs (8hrly)

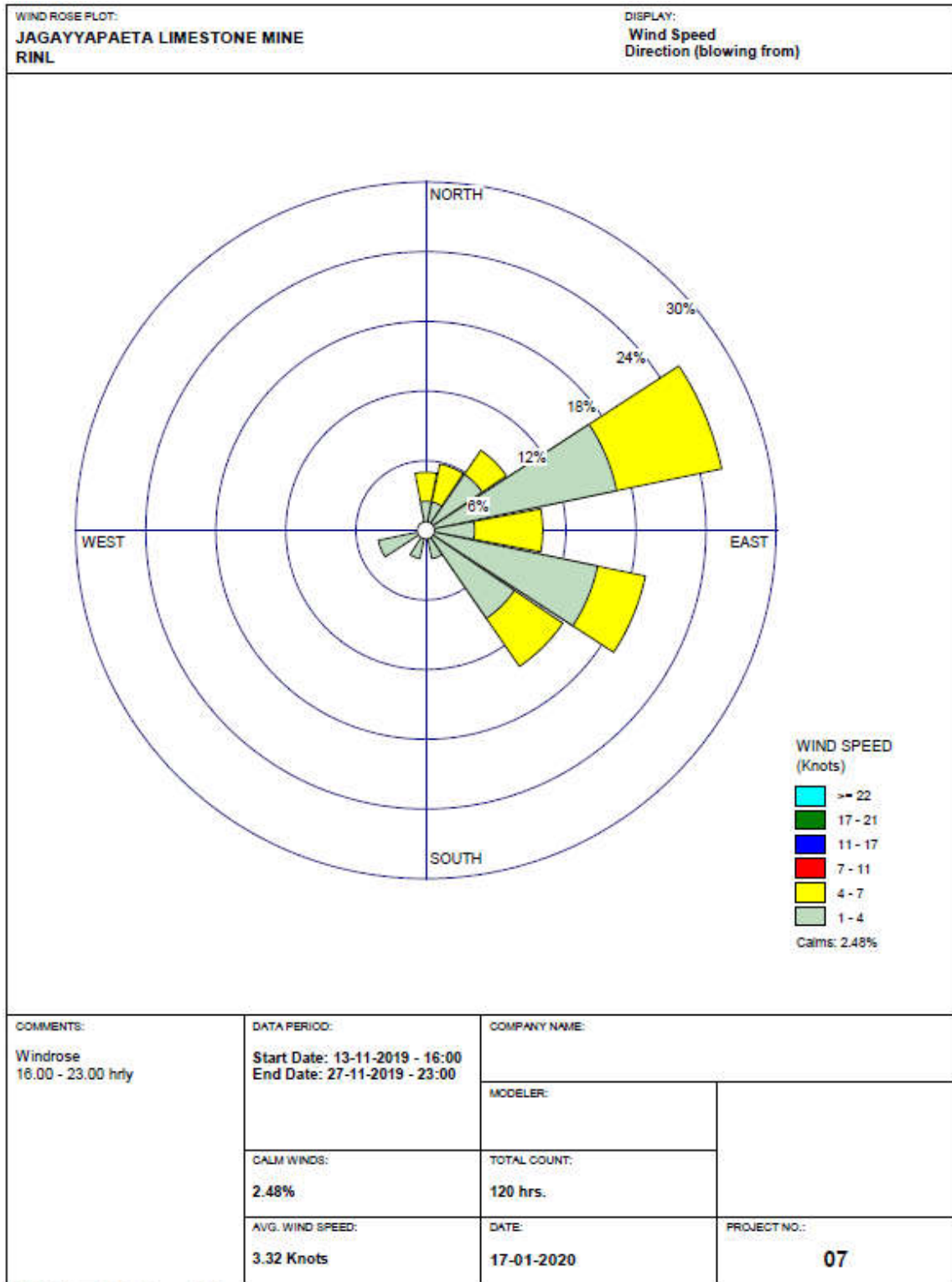
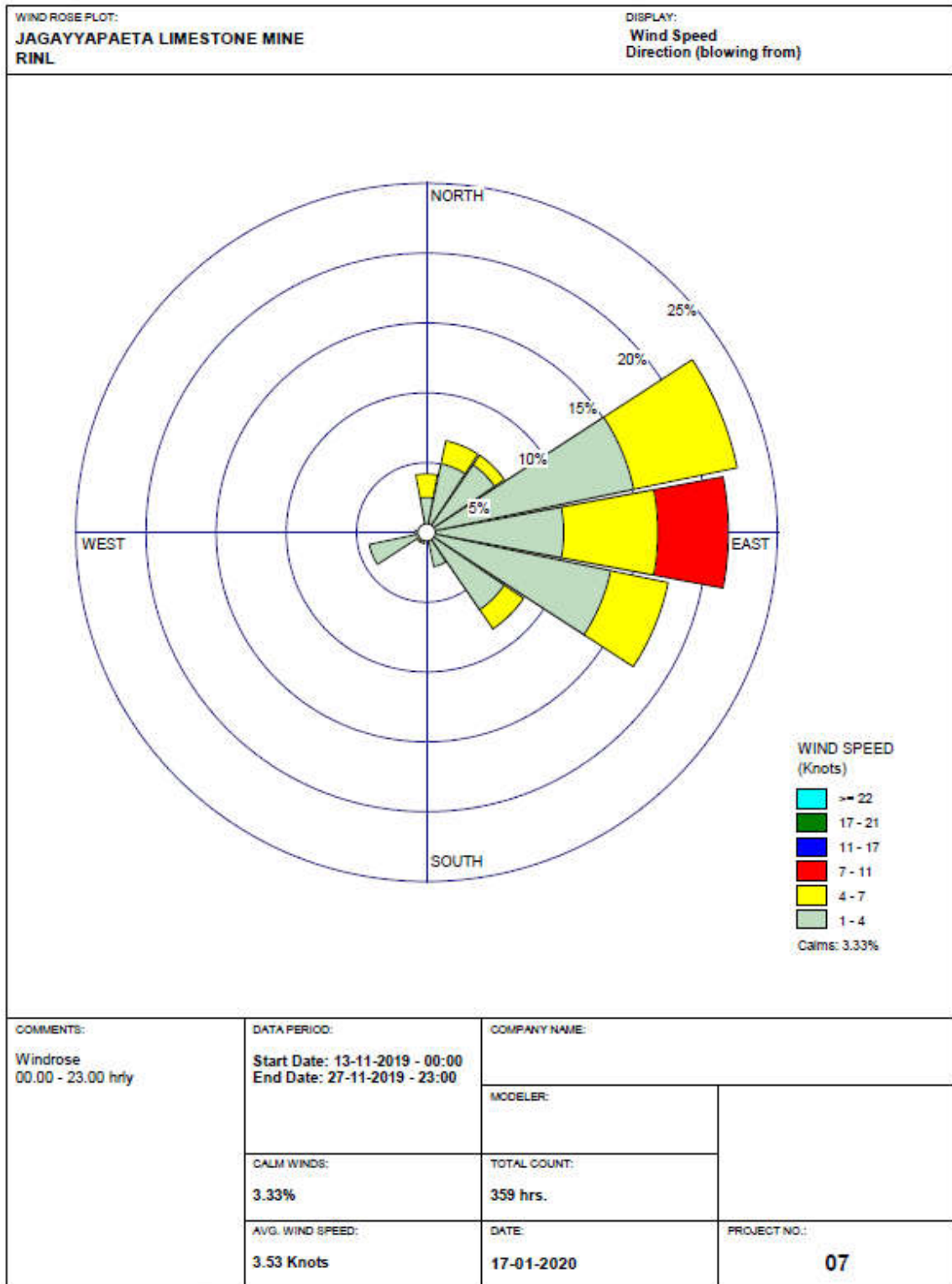


Fig –6. Wind rose diagram for 00.00 – 23.00 hrs (24hrly)



WRPLOT View - Lakes Environmental Software

WIND PERCENTAGE FREQUENCY

	Directions / Wind Classes (Knots)	01-04	04-07	07-11	11-17	17 - 21	>= 22	Total (%)
1	348.75 - 11.25	2.50696	1.67131	0	0	0	0	4.16667
2	11.25 - 33.75	5.01393	1.67131	0	0	0	0	6.66667
3	33.75 - 56.25	5.84958	0.83565	0	0	0	0	6.66667
4	56.25 - 78.75	15.0418	7.52089	0	0	0	0	22.5
5	78.75 - 101.25	9.7493	6.68524	5.01393	0	0	0	21.3889
6	101.25 - 123.75	13.3705	4.17827	0	0	0	0	17.5
7	123.75 - 146.25	6.68524	1.67131	0	0	0	0	8.33333
8	146.25 - 168.75	2.50696	0	0	0	0	0	2.5
9	168.75 - 191.25	0	0	0	0	0	0	0
10	191.25 - 213.75	0.83565	0	0	0	0	0	0.83333
11	213.75 - 236.25	0	0.83565	0	0	0	0	0.83333
12	236.25 - 258.75	4.17827	0	0	0	0	0	4.16667
13	258.75 - 281.25	0.83565	0	0	0	0	0	0.83333
14	281.25 - 303.75	0	0	0	0	0	0	0
15	303.75 - 326.25	0	0	0	0	0	0	0
16	326.25 - 348.75	0	0	0	0	0	0	0
	Sub-Total	66.3889	25	5	0	0	0	96.3889
	Calms							3.33333
	Missing/Incomplete							0.27778
	Total							100

4.2 AMBIENT AIR QUALITY MONITORING

The ambient air quality was assessed through a network of 05 AAQM stations (3 stations in core zone and 2 stations in buffer zone.)

The locations of ambient air quality stations are given below:

Station code	Location	Environmental setting
A1	Mine Site Office	Industrial
A2	Ore Handling Plant	Industrial
A3	Loading Point	Industrial
A4	VSP Township	Residential
A5	Budawada Village	Residential

Monitoring reports are enclosed as Annexure – I

4.3 DUST FALL MEASUREMENT

Dust fall monitoring was conducted at 05 stations (3 stations in core zone and 2 stations in buffer zone.) Details of locations mentioned hereunder:

Station code	Location	Environmental setting
DF1	Mine Site Office	Industrial
DF2	Ore Handling Plant	Industrial
DF3	Loading Point	Industrial
DF4	VSP Township	Residential
DF5	Budawada Village	Residential

Monitoring reports are enclosed as Annexure – II

4.4 NOISE LEVEL MONITORING

Noise levels were monitoring at seven locations mentioned hereunder:

Station code	Location	Environmental setting
N1	Mining Area	Industrial
N2	Administrative office	Industrial
N3	Ore Handling Plant	Industrial
N4	Loading Point	Industrial
N5	VSP Township	Residential
N6	Near Hydraulic Excavator	Industrial
N7	Near DTH Drill	Industrial

Monitoring reports are enclosed as Annexure – III

4.5 WATER QUALITY

Water samples were collected at the following points.

Station code	Location	Environmental setting
W1	Paleru River Upstream	Surface water
W2	Paleru River Down Stream	Surface Water
W3	Mine sump water	Surface Water
W4	Bore well (VSP Township)	Ground water
W5	Budawada well water	Ground water

The methodology for sample collection and preservation techniques was followed as per the Standard Operating Procedures (SOP) mentioned in table hereunder:

Standard Operating Procedures (SOP) For Water Sampling

Parameter	Sample Collection	Sample Size	Storage/ Preservation
pH	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Electrical Conductivity	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Total suspended solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
Total Dissolved Solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
BOD	Grab sampling Plastic /glass container	500 ml	Refrigeration, 48 hrs
Hardness	Grab sampling Plastic /glass container	100 ml	Add HNO ₃ to pH<2, refrigeration; 6 months
Chlorides	Grab sampling Plastic /glass container	50 ml	Not required; 28 days
Sulphates	Grab sampling Plastic /glass container	100 ml	Refrigeration; 28 days
Nitrates	Plastic containers	100 ml	Refrigeration; 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/ glass containers	100 ml	Refrigeration; 14 days
Ammonia	Plastic/ glass containers	100 ml	Add H ₂ SO ₄ to pH>2, refrigeration, 28 days
Heavy Metals (Ar, Cd, Mn, Cu, Fe, Zn, Pb etc.)	Plastic/ Glass rinse with 1+1 HNO ₃	500 ml	Filter, add HNO ₃ to pH>2; Grab sample; 6 months

Source: Standard Methods for the Examination of Water and Wastewater, Published By APHA, 23rd Edition, 2017

The analytical techniques used for water analysis is given in the table hereunder:

Analytical Techniques For Water Analysis

S.No	Parameter	Method
1.	pH	APHA, 4500-H+B, 23rd Ed., 2017
2.	Colour	APHA, 2120-C/2120-B, 23rd Ed., 2017
3.	Odour	APHA, 2150, 23rd Ed., 2017
4.	Temperature	APHA, 2550-A+B, 23rd Ed., 2017
5.	Oil & Grease	APHA, 5520-D, 23rd Ed., 2017
6.	Total Suspended Solids	APHA, 2540-D, 23rd Ed., 2017
7.	Total Dissolved Solids	APHA, 2540-C, 23rd Ed., 2017
8.	Total Residual Chlorine	APHA, 4500-Cl B, 23rd Ed., 2017
9.	Biochemical Oxygen Demand	APHA, 5210-B, 23rd Ed., 2017 4500-OC, 23rd Ed., 2017
10.	Chemical Oxygen Demand	APHA, 5220-B, 23rd Ed., 2017
11.	Free Ammonia	IS 3025
12.	Ammonical Nitrogen	APHA, 4500-NH ₃ B, 23rd Ed., 2017
13.	Total Kjeldhal Nitrogen	APHA, 4500-Norg B, 23rd Ed., 2017
14.	Zinc	APHA, 3111-B, 23rd Ed., 2017
15.	Lead	APHA, 3111-B, 23rd Ed., 2017
16.	Cadmium	APHA, 3111-B, 23rd Ed., 2017
17.	Mercury	APHA, 3112-B, 23rd Ed., 2017
18.	Arsenic	APHA, 3114-B, 23rd Ed., 2017
19.	Copper	APHA, 3111-B, 23rd Ed., 2017
20.	Nickel	APHA, 3111-B, 23rd Ed., 2017
21.	Cyanide	APHA, 4500-CNB, 23rd Ed., 2017
22.	Fluoride	APHA, 4500-FD, 23rd Ed., 2017 (SPANDS Methods)
23.	Phosphates	APHA, 4500-PD, 23rd Ed., 2017
24.	Sulphates	APHA, 4500-SO ₄ ²⁻ E, 23rd Ed., 2017
25.	Sulphide	APHA, 4500-S ²⁻ , 23rd Ed., 2017
26.	Manganese	APHA, 3111-B, 23rd Ed., 2017
27.	Iron	APHA, 3111-B, 23rd Ed., 2017
28.	Phenolic Compounds	APHA, 5530-B, 23rd Ed., 2017

Analysis results of the water samples collected from the above locations are enclosed as **Annexure – IV.**

ANNEXURE – I
(Ambient Air Monitoring Reports)



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Ref: SVELC/RIL-JLM/19-12/01

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : AMBIENT AIR QUALITY

SOURCE OF COLLECTION : VSP TOWNSHIP

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

Date of Monitoring	Week	SPM ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)
13.11.2019	I	148	9.8	13.2	0.29
14.11.2019	I	158	10.3	12.9	0.31
24.11.2019	II	144	9.5	12.5	0.28
25.11.2019	II	138	9.7	13.6	0.26
Maximum		158	10.3	13.6	0.31
Minimum		138	9.5	12.5	0.26
Average		147	9.8	13.0	0.28
CPCB Standards		-	80	80	4



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Ref: SVELC/RIL-JLM/19-12/02

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **AMBIENT AIR QUALITY**


SOURCE OF COLLECTION : **ORE HANDLING AREA**

DURATRION OF SAMPLING : **24 Hrs**

ATMOSPHERE CONDITION : **Clear Sky**


TEST REPORT

Date of Monitoring	Week	SPM ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)
15.11.2019	I	268	12.8	15.2	0.41
16.11.2019	I	252	11.3	14.6	0.38
22.11.2019	II	236	12.2	14.3	0.52
23.11.2019	II	246	11.9	15.0	0.44
Maximum		268	12.8	15.2	0.52
Minimum		236	11.3	14.3	0.38
Average		250	12.0	14.7	0.43
CPCB Standards		-	80	80	4



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Ref: SVELC/RIL-JLM/19-12/03

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : AMBIENT AIR QUALITY

SOURCE OF COLLECTION : MINE SITE OFFICE

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

Date of Monitoring	Week	SPM ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)
15.11.2019	I	198	75.8	40.3	10.2	13.6	0.32
16.11.2019	I	184	78.9	38.6	11.2	14.2	0.35
22.11.2019	II	190	74.6	36.2	10.9	13.2	0.29
23.11.2019	II	174	80.2	37.2	11.8	13.5	0.37
Maximum		198	80.2	40.3	11.8	14.2	0.37
Minimum		174	74.6	36.2	10.2	13.2	0.29
Average		186	77.3	38.0	11.0	13.6	0.33
CPCB Standards		-	100	60	80	80	4



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Ref: SVELC/RIL-JLM/19-12/04

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : AMBIENT AIR QUALITY

SOURCE OF COLLECTION : LOADING AREA

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

Date of Monitoring	Week	SPM ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)
15.11.2019	I	232	81.5	41.5	12.4	15.6	0.65
16.11.2019	I	214	83.6	45.6	11.9	16.4	0.54
22.11.2019	II	208	84.9	44.7	12.6	15.9	0.59
23.11.2019	II	226	87.2	41.9	11.3	15.2	0.62
Maximum		232	87.2	45.6	12.6	16.4	0.65
Minimum		208	81.5	41.5	11.3	15.2	0.54
Average		220	84.3	43.4	12.0	15.7	0.60
CPCB Standards		-	100	60	80	80	4



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Ref: SVELC/RIL-JLM/19-12/05

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : AMBIENT AIR QUALITY

SOURCE OF COLLECTION : BUDAWADA VILLAGE

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

Date of Monitoring	Week	SPM ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)
13.11.2019	I	136	65.5	26.8	9.2	11.6	0.18
14.11.2019	I	128	62.4	24.5	8.9	11.2	0.22
24.11.2019	II	122	59.8	22.6	9.7	12.4	0.20
25.11.2019	II	144	54.2	23.5	10.2	11.8	0.17
Maximum		144	65.5	26.8	10.2	12.4	0.22
Minimum		122	54.2	22.6	8.9	11.2	0.17
Average		132	60.4	24.3	9.5	11.7	0.19
CPCB Standards		-	100	60	80	80	4



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ANNEXURE – II
(Dustfall Monitoring Reports)



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Ref: SVELC/RIL-JLM/19-12/06

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : DUSTFALL

SOURCE OF COLLECTION : VSP TOWNSHIP

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

S.No	Parameters	Unit	Result
1	Insoluble Particles	Tons/Km ² /Month	2.96
2	Soluble Particles	Tons/Km ² /Month	2.45
3	Total Particles	Tons/Km ² /Month	5.41

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Ref: SVELC/RIL-JLM/19-12/07

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **DUSTFALL**

SOURCE OF COLLECTION : **ORE HANDLING AREA**

ATMOSPHERE CONDITION : **Clear Sky**

TEST REPORT

S.No	Parameters	Unit	Result
1	Insoluble Particles	Tons/Km ² /Month	3.34
2	Soluble Particles	Tons/Km ² /Month	4.88
3	Total Particles	Tons/Km ² /Month	8.22

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Ref: SVELC/RIL-JLM/19-12/08

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : DUSTFALL

SOURCE OF COLLECTION : MINE SITE OFFICE

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

S.No	Parameters	Unit	Result
1	Insoluble Particles	Tons/Km ² /Month	2.46
2	Soluble Particles	Tons/Km ² /Month	3.96
3	Total Particles	Tons/Km ² /Month	6.42

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Ref: SVELC/RIL-JLM/19-12/09

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **DUSTFALL**

SOURCE OF COLLECTION : **LOADING AREA**

ATMOSPHERE CONDITION : **Clear Sky**

TEST REPORT

S.No	Parameters	Unit	Result
1	Insoluble Particles	Tons/Km ² /Month	3.18
2	Soluble Particles	Tons/Km ² /Month	4.27
3	Total Particles	Tons/Km ² /Month	7.46

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Ref: SVELC/RIL-JLM/19-12/010

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : DUSTFALL

SOURCE OF COLLECTION : BUDAWADA VILLAGE

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

S.No	Parameters	Unit	Result
1	Insoluble Particles	Tons/Km ² /Month	2.39
2	Soluble Particles	Tons/Km ² /Month	1.66
3	Total Particles	Tons/Km ² /Month	4.05

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ANNEXURE – III
(Noise Monitoring Reports)



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Ref: SVELC/RIL-JLM/19-12/11

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **NOISE LEVEL MONITORING**

DATE OF COLLECTION : 14-11-2019 to 17-11-2019

TEST REPORT

Period	Time	Source of collection				
		Mining Area	Admin office	Ore Handling Plant	Loading Point	VSP Township
Day	6.00	50.9	44.5	59.8	61.2	42.0
	7.00	51.5	48.5	65.5	64.2	41.5
	8.00	58.9	55.8	72.8	63.0	40.0
	9.00	61.5	61.5	77.6	68.7	45.6
	10.00	65.8	62.5	75.8	68.5	51.0
	11.00	71.4	63.4	79.8	69.5	52.6
	12.00	70.2	69.5	78.6	71.4	55.0
	13.00	72.5	62.1	74.6	70.2	52.6
	14.00	71.6	60.8	72.8	73.2	53.0
	15.00	70.8	62.5	78.8	69.8	58.9
	16.00	70.5	64.5	76.5	71.0	60.2
	17.00	68.9	55.2	74.8	70.2	62.7
	18.00	65.5	56.9	76.5	68.5	63.5
	19.00	66.4	57.8	72.1	62.5	65.7
	20.00	68.5	59.1	70.6	64.3	51.4
21.00	69.5	52.6	69.8	63.2	48.5	
Night	22.00	52.8	42.6	68.5	61.5	42.5
	23.00	52.6	45.7	67.4	60.5	43.2
	24.00	53.4	42.1	64.5	58.0	41.6
	1.00	50.4	41.4	58.5	54.0	40.6
	2.00	49.7	40.8	57.6	52.0	42.5
	3.00	47.8	42.1	49.5	55.3	43.6
	4.00	48.7	41.5	44.6	45.0	42.5
	5.00	49.6	44.6	48.6	48.7	45.6
Leq Day		68.9	62.1	75.7	69.1	58.6
Leq Night		51.6	43.5	63.8	57.5	43.5

CPCB Standards for Noise levels	Day Time	Night Time
		75

Note :Day time shall mean from 6.00 am to 10.00 pm
Night time shall mean from 10.00 p.m. to 6.00 a.m.



AUTHORIZED SIGNATORY

B. RAVI PRASAD



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Ref: SVELC/RIL-JLM/19-12/12

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **NOISE LEVEL MONITORING**

DATE OF COLLECTION : 14-11-2019 to 17-11-2019

TEST REPORT

Period	Time	Source of collection	
		Near Hydraulic Excavator	Near DTH Drill
Day	6.00	52.5	48.5
	7.00	56.2	46.5
	8.00	57.8	55.8
	9.00	62.5	61.5
	10.00	65.5	65.8
	11.00	67.8	67.8
	12.00	69.8	69.5
	13.00	70.2	68.7
	14.00	68.5	65.4
	15.00	67.2	64.2
	16.00	66.5	63.4
	17.00	60.2	55.8
	18.00	59.8	57.6
	19.00	57.0	58.4
20.00	56.4	57.4	
21.00	54.5	56.5	
Night	22.00	57.5	54.2
	23.00	54.5	52.0
	24.00	52.6	49.8
	1.00	54.6	47.5
	2.00	48.7	45.2
	3.00	47.5	42.4
	4.00	46.5	43.2
	5.00	45.2	41.7
Leq Day		65.4	64.1
Leq Night		53.3	49.7

CPCB Standards for Noise levels	Day Time	Night Time
	75	70

Note :Day time shall mean from 6.00 am to 10.00 pm
Night time shall mean from 10.00 p.m. to 6.00 a.m.



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B. RAVI PRASAD

ANNEXURE – IV
(Water Analysis Reports)



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Ref: SVELC/RIL-JLM/19-12/13

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : PALERU RIVER UPSTREAM

DATE OF COLLECTION : 14-11-2019

TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	0.76	5 - 25
4	pH	-	8.14	5.5 to 9.0
5	Total Dissolved Solids	mg/l	588	500 – 2000
6	Total suspended solids	mg/l	06	100
7	Fluorides as F	mg/l	1.28	2.0
8	Nitrates as NO ₃ ⁻	mg/l	0.99	10
9	Iron as Fe	mg/l	0.07	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	<0.0005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	0.08	5.0
15	Sulphide as S	mg/l	< 0.01	2.0
16	Cadmium as Cd	mg/l	<0.01	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr ⁺⁶	mg/l	< 0.05	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	< 0.01	50
25	Free ammonia as NH ₃	mg/l	< 0.1	5
26	Chemical oxygen demand -COD	mg/l	<10.0	250
27	Biochemical oxygen demand –BOD	mg/l	<3.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23rd Edition, 2017


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Ref: SVELC/RIL-JLM/19-12/14

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : PALERU RIVER DOWN STREEM

DATE OF COLLECTION : 14-11-2019

TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	7.49	5 - 25
4	pH	-	8.03	5.5 to 9.0
5	Total Dissolved Solids	mg/l	634	500 – 2000
6	Total suspended solids	mg/l	7.0	100
7	Fluorides as F	mg/l	1.30	2.0
8	Nitrates as NO ₃ ⁻	mg/l	1.305	10
9	Iron as Fe	mg/l	0.12	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	<0.0005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	0.15	5.0
15	Sulphide as S	mg/l	< 0.01	2.0
16	Cadmium as Cd	mg/l	<0.01	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr ⁺⁶	mg/l	< 0.05	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	< 0.01	50
25	Free ammonia as NH ₃	mg/l	< 0.1	5
26	Chemical oxygen demand -COD	mg/l	10	250
27	Biochemical oxygen demand –BOD	mg/l	<3.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23rd Edition, 2017


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Ref: SVELC/RIL-JLM/19-12/15

Date: 10-12-2019

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : WATER

SOURCE OF COLLECTION : MINES SUMP WATER

DATE OF COLLECTION : 14-11-2019

TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	1.70	5 - 25
4	pH	-	7.64	5.5 to 9.0
5	Total Dissolved Solids	mg/l	170	500 – 2000
6	Total suspended solids	mg/l	11	100
7	Fluorides as F	mg/l	0.18	2.0
8	Nitrates as NO ₃ ⁻	mg/l	< 0.01	10
9	Iron as Fe	mg/l	0.025	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	<0.0005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	<0.01	5.0
15	Sulphide as S	mg/l	< 0.01	2.0
16	Cadmium as Cd	mg/l	<0.01	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr ⁺⁶	mg/l	< 0.05	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	< 0.01	50
25	Free ammonia as NH ₃	mg/l	< 0.1	5
26	Chemical oxygen demand -COD	mg/l	20	250
27	Biochemical oxygen demand -BOD	mg/l	<3.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23rd Edition, 2017


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Ref: SVELC/RIL-JLM/19-12/16

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **WATER SAMPLE**

SOURCE OF COLLECTION : **TAP WATER (VSP TOWNSHIP)**

DATE OF COLLECTION : **14-11-2019**

TEST REPORT

S.No	Parameter	Unit	Result	IS 10500:2012 Specifications
1.	Colour	Hazen	< 1.0	5.0
2.	Odour	-	Agreeable	Agreeable
3.	Temperature	^o C	27	-
4.	Taste	-	Agreeable	Agreeable
5.	Turbidity	NTU	1.30	1.0
6.	pH	-	7.94	6.5 – 8.5
7.	Total Dissolved Solids	mg/l	436	500
8.	Total Alkalinity as CaCO ₃	mg/l	279	200
9.	Total Hardness as CaCO ₃	mg/l	313	200
10.	Calcium as Ca	mg/l	45.2	75
11.	Magnesium as Mg	mg/l	48.6	30
12.	Chlorides as Cl ⁻	mg/l	41.3	250
13.	Fluorides as F	mg/l	0.20	1.0
14.	Nitrates as NO ₃ ⁻	mg/l	5.57	45
15.	Sulphates as SO ₄ ²⁻	mg/l	7.60	200
16.	Iron as Fe	mg/l	0.18	0.3
17.	Free Residual Chlorine	mg/l	< 0.1	0.2
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	<0.0005	0.001
19.	Copper as Cu	mg/l	< 0.01	0.05
20.	Manganese as Mn	mg/l	< 0.01	0.1
21.	Zinc as Zn	mg/l	0.42	5.0
22.	Aluminum as Al	mg/l	< 0.01	0.03
23.	Boron as B	mg/l	< 0.1	0.5
24.	Sulphide as H ₂ S	mg/l	< 0.01	0.05
25.	Anionic Detergents (as MBAS)	mg/l	< 0.01	0.2
26.	Barium as Ba	mg/l	0.61	0.7
27.	Chloramines (as Cl ₂)	mg/l	<1.0	4.0
28.	Ammonia as total ammonia-N	mg/l	< 0.01	0.5
29.	Mineral Oil	mg/l	< 0.01	0.5
30.	Selenium as Se	mg/l	< 0.005	0.01
31.	Silver as Ag	mg/l	< 0.01	0.1
32.	Cadmium as Cd	mg/l	<0.001	0.003
33.	Cyanide as CN	mg/l	<0.01	0.05
34.	Lead as Pb	mg/l	<0.01	0.01
35.	Mercury as Hg	mg/l	<0.001	0.001
36.	Molybdenum as Mo	mg/l	<0.01	0.07



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37.	Nickel as Ni	mg/l	<0.01	0.02
38.	Total Arsenic as As	mg/l	<0.01	0.01
39.	Total Chromium as Cr	mg/l	<0.01	0.05
40.	Polychlorinated biphenyls	mg/l	<0.0001	0.0005
41.	Polynuclear aromatic Hydrocarbons as PAH	mg/l	<0.0001	0.0001
MICROBIOLOGY:				
42.	<i>E. coliforms</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml
43.	<i>Total coliforms</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml
44.	<i>Faecal coliforms</i>	CFU/100mL	Not detected	-
PESTICIDES:				
45.	Alpha HCH	µg/l	BDL	0.01
46.	Beta HCH	µg/l	BDL	0.04
47.	Butachlor	µg/l	BDL	125
48.	Chlorpyrifos	µg/l	BDL	30
49.	Delta HCH	µg/l	BDL	0.04
50.	2,4- Dichlorophenoxyacetic Acid	µg/l	BDL	30
51.	DDT (o,p and p,p-Isomers of DDT, DDE and DDD)	µg/l	BDL	1.0
52.	Endosulfan (alpha, beta and Sulphate)	µg/l	BDL	0.4
53.	Ethion	µg/l	BDL	3.0
54.	Gamma-HCH (Lindane)	µg/l	BDL	2.0
55.	Isoproturon	µg/l	BDL	9.0
56.	Malathion	µg/l	BDL	190
57.	Methyl Parathion	µg/l	BDL	0.3
58.	Alachlor	µg/l	BDL	20
59.	Atrazine	µg/l	BDL	2.0
60.	Aldrin/ Dieldrin	µg/l	BDL	0.03
61.	Monocrotophos	µg/l	BDL	1.0
62.	Phorate	µg/l	BDL	2.0
TRIHALOMETHANE				
63.	Bromoform	mg/l	<0.05	0.1
64.	Dibromochloromethane	mg/l	<0.05	0.1
65.	Bromodichloromethane	mg/l	<0.05	0.06
66.	chloroform	mg/l	<0.05	0.2

Note: All the above parameters are tested as per APHA methods, 23rd Edition, 2017

BDL- Below detectable limit, Detectable limit- <0.02 µg/l



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Ref: SVELC/RIL-JLM/19-12/17

Date: 10-12-2019

NAME AND ADDRESS : **M/s. JAGGAYYAPETA LIMESTONE MINE,**
Visakhapatnam Steel Plant,
Jaggayapeta-521175.
Krishna District ,A.P.

SAMPLE PARTICULARS : **GROUND WATER**

SOURCE OF COLLECTION : **BUDAWADA BORE WELL WATER**

DATE OF COLLECTION : **14-11-2019**

TEST REPORT

S.No	Parameter	Unit	Result	IS 10500:2012 Specifications
1.	Colour	Hazen	< 1.0	5.0
2.	Odour	-	Agreeable	Agreeable
3.	Temperature	^o C	27.3	-
4.	Taste	-	Agreeable	Agreeable
5.	Turbidity	NTU	0.32	1.0
6.	pH	-	7.16	6.5 – 8.5
7.	Total Dissolved Solids	mg/l	1600	500
8.	Total Alkalinity as CaCO ₃	mg/l	248	200
9.	Total Hardness as CaCO ₃	mg/l	700	200
10.	Calcium as Ca	mg/l	221	75
11.	Magnesium as Mg	mg/l	35.9	30
12.	Chlorides as Cl ⁻	mg/l	484	250
13.	Fluorides as F	mg/l	1.31	1.0
14.	Nitrates as NO ₃ ⁻	mg/l	11.9	45
15.	Sulphates as SO ₄ ²⁻	mg/l	228	200
16.	Iron as Fe	mg/l	2.65	0.3
17.	Free Residual Chlorine	mg/l	< 0.1	0.2
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	<0.0005	0.001
19.	Copper as Cu	mg/l	< 0.01	0.05
20.	Manganese as Mn	mg/l	< 0.01	0.1
21.	Zinc as Zn	mg/l	1.05	5.0
22.	Aluminum as Al	mg/l	< 0.01	0.03
23.	Boron as B	mg/l	< 0.1	0.5
24.	Sulphide as H ₂ S	mg/l	< 0.01	0.05
25.	Anionic Detergents (as MBAS)	mg/l	< 0.01	0.2
26.	Barium as Ba	mg/l	0.52	0.7
27.	Chloramines (as Cl ₂)	mg/l	<1.0	4.0
28.	Ammonia as total ammonia-N	mg/l	< 0.01	0.5
29.	Mineral Oil	mg/l	< 0.01	0.5
30.	Selenium as Se	mg/l	< 0.005	0.01
31.	Silver as Ag	mg/l	< 0.01	0.1
32.	Cadmium as Cd	mg/l	<0.001	0.003
33.	Cyanide as CN	mg/l	<0.01	0.05
34.	Lead as Pb	mg/l	<0.01	0.01
35.	Mercury as Hg	mg/l	<0.001	0.001
36.	Molybdenum as Mo	mg/l	<0.01	0.07



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39.	Total Chromium as Cr	mg/l	<0.01	0.05
40.	Polychlorinated biphenyls	mg/l	<0.0001	0.0005
41.	Polynuclear aromatic Hydrocarbons as PAH	mg/l	<0.0001	0.0001
MICROBIOLOGY:				
42.	<i>E. coliforms</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml
43.	<i>Total coliforms</i>	CFU/100mL	18	Shall not be detected in 100 ml
44.	<i>Faecal coliforms</i>	CFU/100mL	Not detected	-
PESTICIDES:				
45.	Alpha HCH	µg/l	BDL	0.01
46.	Beta HCH	µg/l	BDL	0.04
47.	Butachlor	µg/l	BDL	125
48.	Chlorpyrifos	µg/l	BDL	30
49.	Delta HCH	µg/l	BDL	0.04
50.	2,4- Dichlorophenoxyacetic Acid	µg/l	BDL	30
51.	DDT (o,p and p,p-Isomers of DDT, DDE and DDD)	µg/l	BDL	1.0
52.	Endosulfan (alpha, beta and Sulphate)	µg/l	BDL	0.4
53.	Ethion	µg/l	BDL	3.0
54.	Gamma-HCH (Lindane)	µg/l	BDL	2.0
55.	Isoproturon	µg/l	BDL	9.0
56.	Malathion	µg/l	BDL	190
57.	Methyl Parathion	µg/l	BDL	0.3
58.	Alachlor	µg/l	BDL	20
59.	Atrazine	µg/l	BDL	2.0
60.	Aldrin/ Dieldrin	µg/l	BDL	0.03
61.	Monocrotophos	µg/l	BDL	1.0
62.	Phorate	µg/l	BDL	2.0
TRIHALOMETHANE				
63.	Bromoform	mg/l	<0.05	0.1
64.	Dibromochloromethane	mg/l	<0.05	0.1
65.	Bromodichloromethane	mg/l	<0.05	0.06
66.	chloroform	mg/l	<0.05	0.2

Note: All the above parameters are tested as per APHA methods, 23rd Edition, 2017

BDL- Below detectable limit, Detectable limit- <0.02 µg/l

Y. J. K.

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