

MONITORING OF ENVIRONMENTAL PARAMETERS

(INTERIM REPORT FOR POST MONSOON SEASON -2019)

FOR

SARIPALLI SAND MINE

of

M/s. Rashtriya Ispat Nigam Limited.

(GOVERNMENT OF INDIA ENTERPRISE)

VISAKHAPATNAM STEEL PLANT

Saripalli (V), Nellimarla (M), Vizianagaram (Dist)

Andhra Pradesh.

Prepared By

M/s. SV ENVIRO LABS & CONSULTANTS

(MOEF Recognized, NABL & NABET Accredited And
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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 Saripalli Sand Mine.

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

1.1 LOCATION OF THE PROJECT

The Project site is located at Saripalli Sand Mine of M/s. Rashtriya Ispat Nigam Limited located at Saripalli Village, Nellimarla Mandal, Vizianagaram District, 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 03 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 3 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 four 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 Surface water and well 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 three locations . | Ambient Air samples collected at three locations at Mining Area - 16 th , 17 th , 25 th and 26 th November'2019 Kudipi Village - 16 th , 17 th , 25 th and 26 th November'2019 Saripalli Village - 16 th , 17 th , 25 th and 26 th November'2019 for SPM, PM10, PM2.5, SO2, NOx & CO. |
| 2. | Meteorological parameters | Collection of micrometeorological data at project site for 15 days continuously | Collected for the period of 16.11.2019 to 30.11.2019. |
| 3. | Dustfall rate | Collection of dustfall at three locations . | Dust fall samples were collected at three locations for the period of 16.11.2019 to 30.11.2019. <ul style="list-style-type: none"> • Mining Area • Kudipi Village • Saripalli Village |

| | | | |
|----|------------------------|---|---|
| 4. | Water Quality | Collection of Surface water and Well Water | Champavathi river upstream and downstream, Kudipi and Sarepalli well water samples have been collected on 17-11-2019. |
| 5. | Noise Level Monitoring | Monitoring of noise levels at four locations at work zones. | Monitoring of noise levels at four locations at work zones. <ul style="list-style-type: none"> • Mining Area • Kudipi Village • Loading Plant • Saripalli Village |

4.1.1 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 16th November to 30th 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 | 17 | 50 | - |
| Maximum | 31 | 93 | - |
| Mean | 24 | 71 | - |
| Total | - | - | Nil |

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

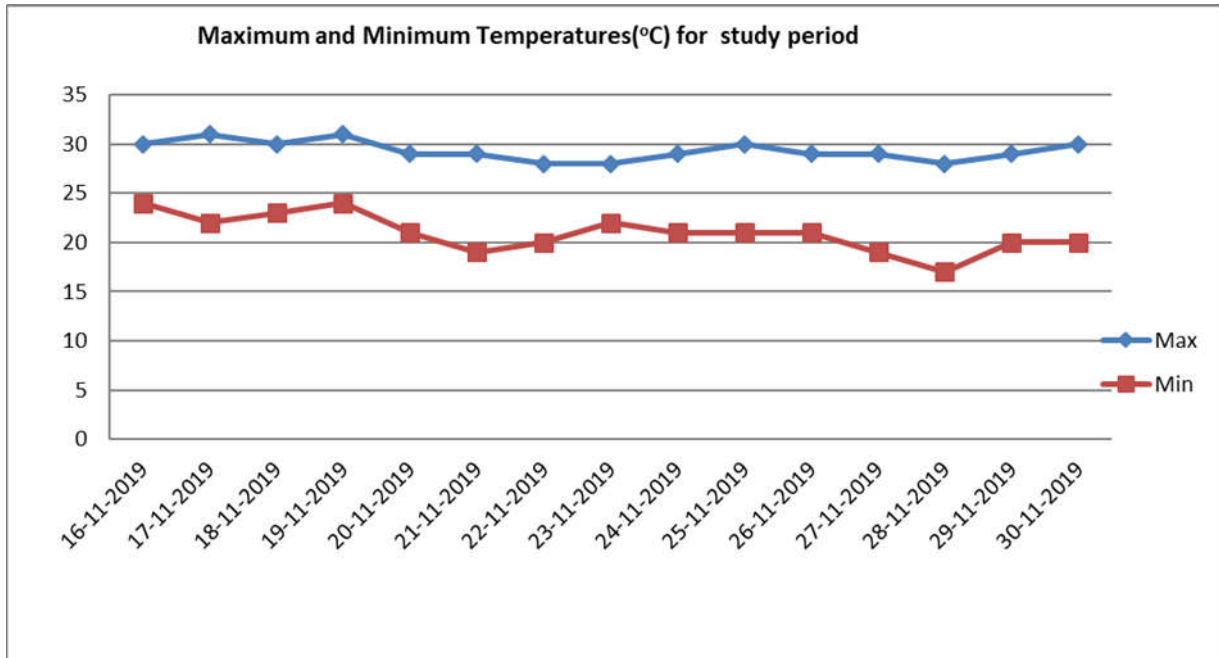
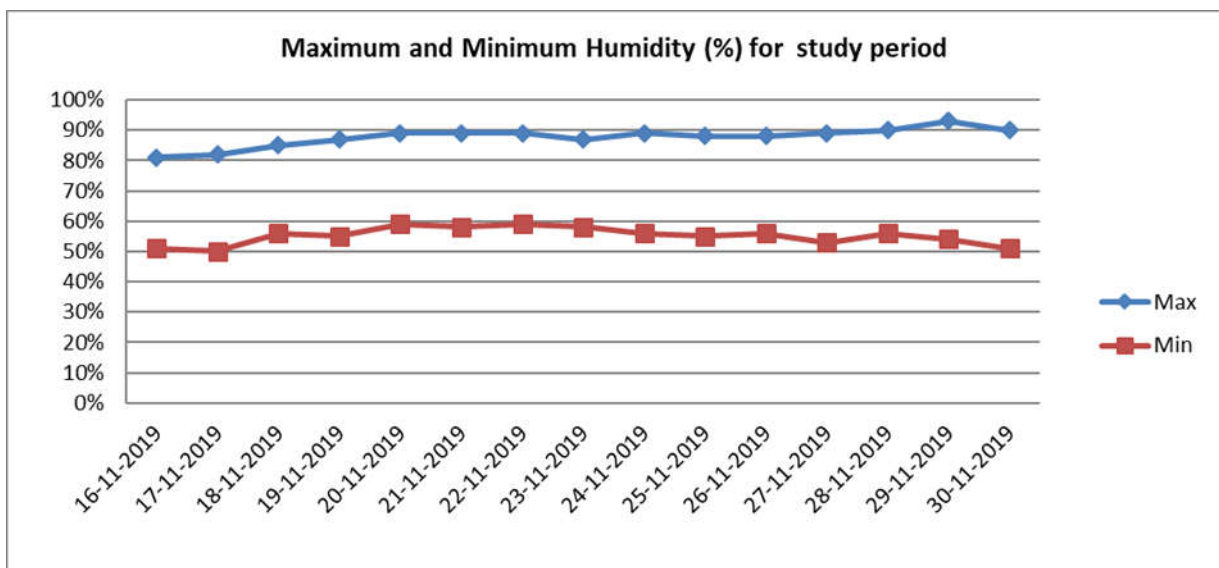


Fig – 2 .Graphical interpretation of Minimum and Maximum values of Relative Humidity during study period.



WIND PATTERN – November’ 2019

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

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

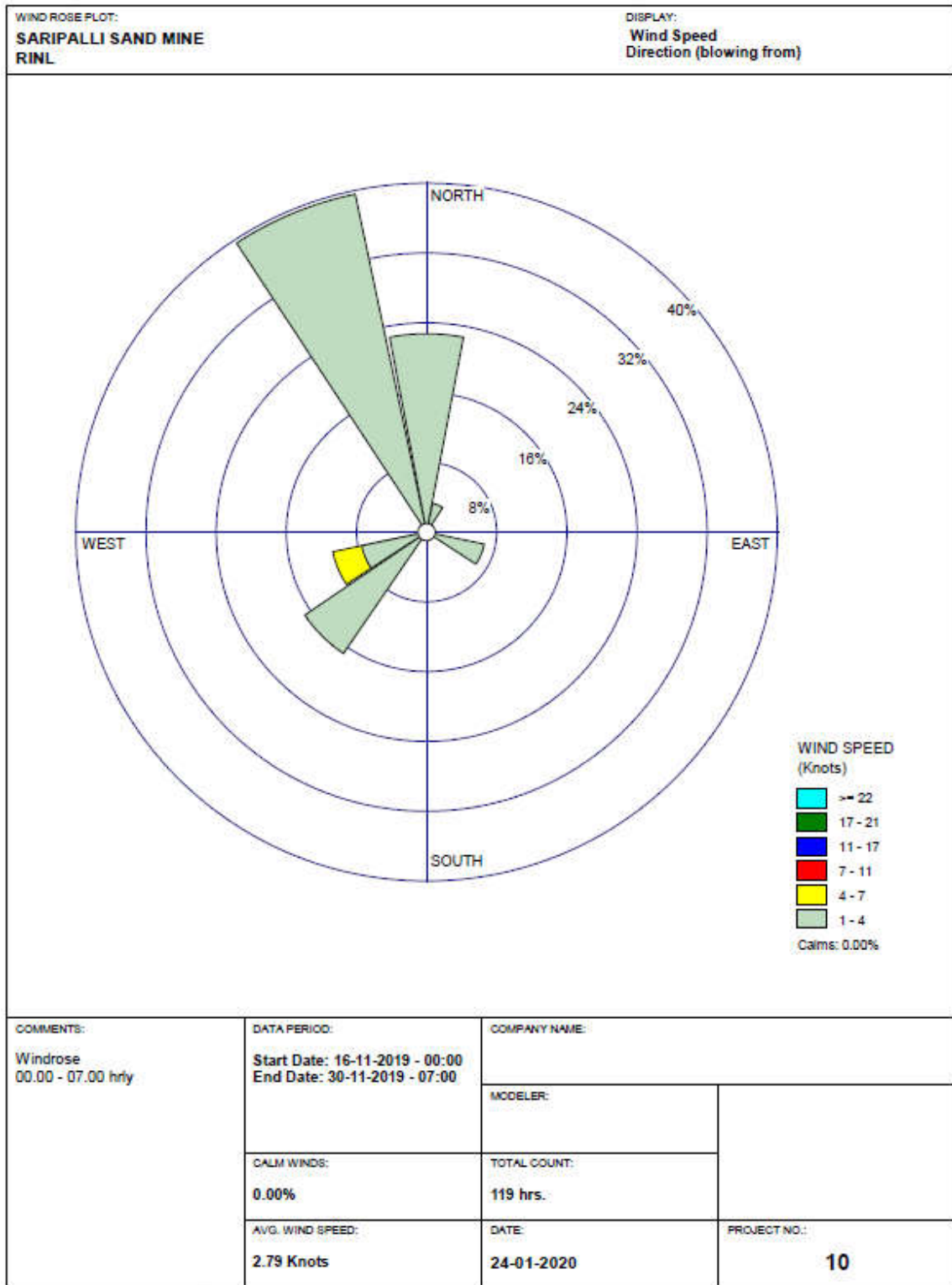
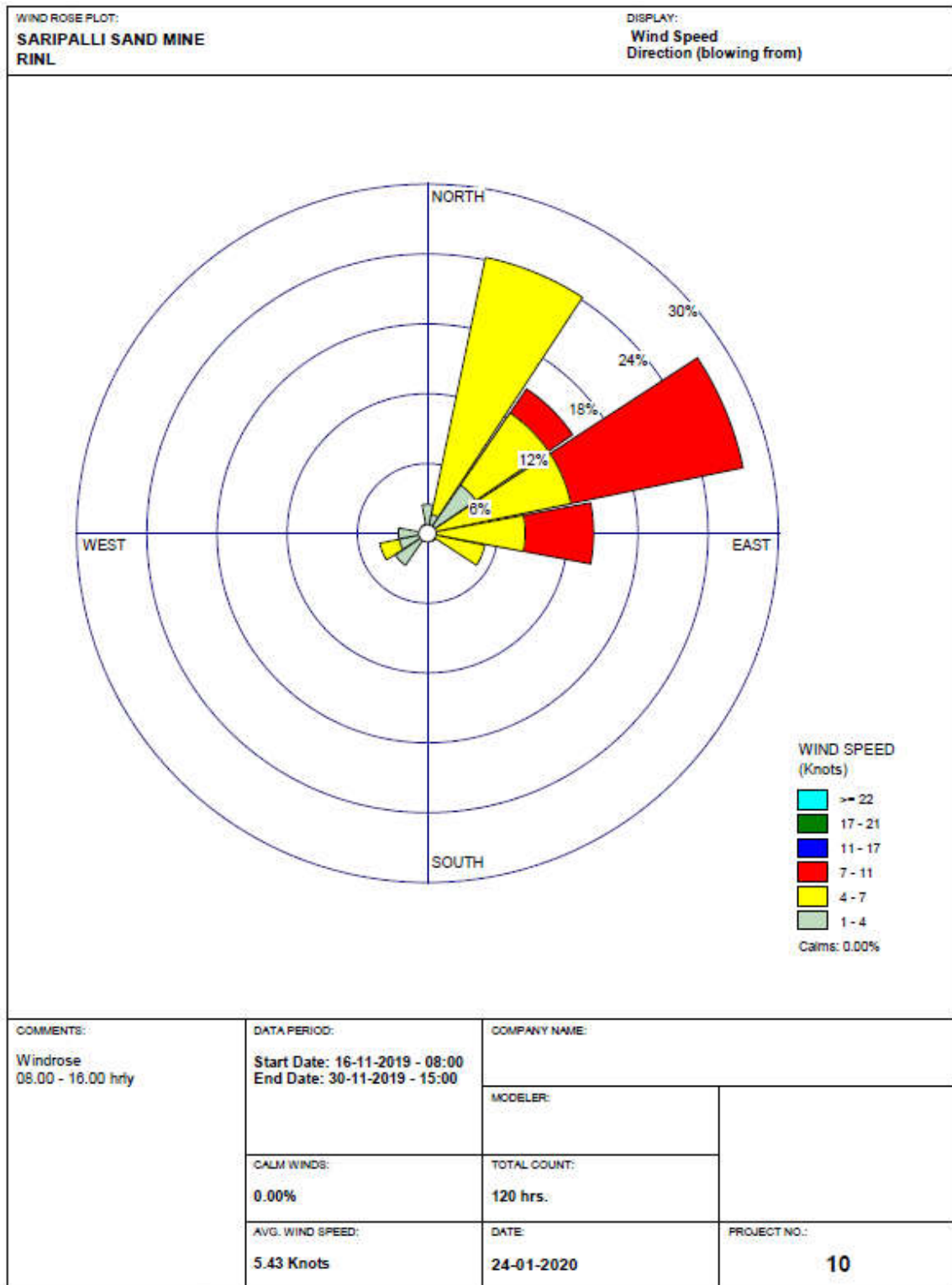
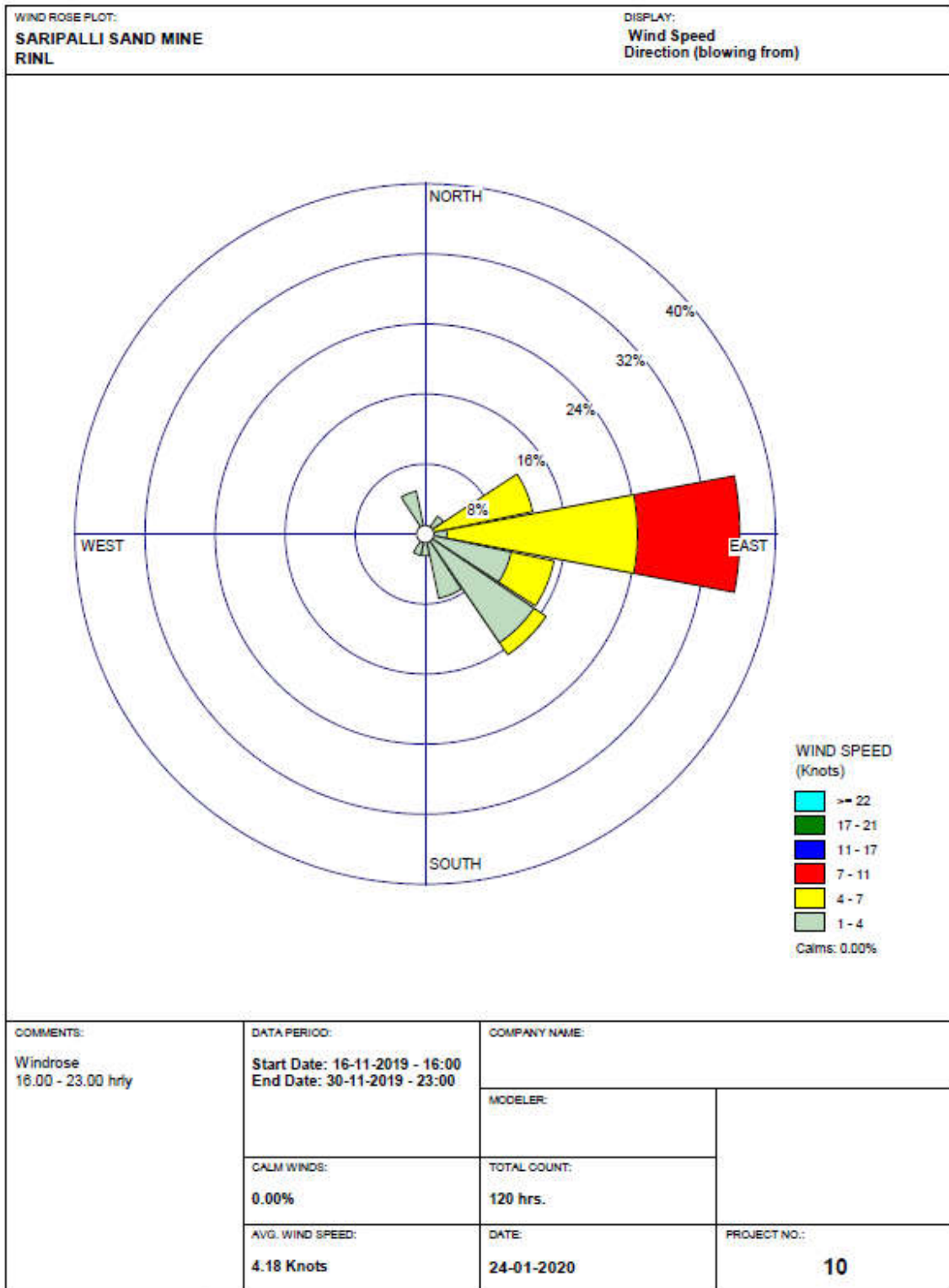


Fig –4. Wind rose diagram for 08.00 – 15.00 hrs (8hrly)



WRPLOT View - Lakes Environmental Software

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



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 | 8.35655 | 0 | 0 | 0 | 0 | 0 | 8.33333 |
| 2 | 11.25 - 33.75 | 1.67131 | 7.52089 | 0 | 0 | 0 | 0 | 9.16667 |
| 3 | 33.75 - 56.25 | 2.50696 | 2.50696 | 0.83565 | 0 | 0 | 0 | 5.83333 |
| 4 | 56.25 - 78.75 | 0 | 8.35655 | 5.01393 | 0 | 0 | 0 | 13.3333 |
| 5 | 78.75 - 101.25 | 0.83565 | 10.0279 | 5.84958 | 0 | 0 | 0 | 16.6667 |
| 6 | 101.25 - 123.75 | 5.57103 | 3.34262 | 0 | 0 | 0 | 0 | 8.88889 |
| 7 | 123.75 - 146.25 | 5.01393 | 0.83565 | 0 | 0 | 0 | 0 | 5.83333 |
| 8 | 146.25 - 168.75 | 2.50696 | 0 | 0 | 0 | 0 | 0 | 2.5 |
| 9 | 168.75 - 191.25 | 0.83565 | 0 | 0 | 0 | 0 | 0 | 0.83333 |
| 10 | 191.25 - 213.75 | 0.83565 | 0 | 0 | 0 | 0 | 0 | 0.83333 |
| 11 | 213.75 - 236.25 | 6.68524 | 0 | 0 | 0 | 0 | 0 | 6.66667 |
| 12 | 236.25 - 258.75 | 3.34262 | 1.67131 | 0 | 0 | 0 | 0 | 5 |
| 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 | 15.0418 | 0 | 0 | 0 | 0 | 0 | 15 |
| | Sub-Total | 53.8889 | 34.1667 | 11.6667 | 0 | 0 | 0 | 99.7222 |
| | Calms | | | | | | | 0 |
| | Missing/Incomplete | | | | | | | 0.27778 |
| | Total | | | | | | | 100 |

4.2 AMBIENT AIR QUALITY MONITORING

The ambient air quality was assessed through a network of 03 AAQM stations.

The locations of ambient air quality stations are given below:

| Station code | Location | Environmental setting |
|--------------|-------------------|-----------------------|
| A1 | Mining Area | Industrial |
| A2 | Kudipi Village | Residential |
| A3 | Saripalli Village | Residential |

Monitoring reports are enclosed as Annexure – I

4.3 DUST FALL MEASUREMENT

Dust fall monitoring was conducted at 03 stations. Details of locations mentioned hereunder:

| Station code | Location | Environmental setting |
|--------------|-------------------|-----------------------|
| DF1 | Mining Area | Industrial |
| DF2 | Kudipi Village | Industrial |
| DF3 | Saripalli Village | Industrial |

Monitoring reports are enclosed as Annexure – II

4.4 NOISE LEVEL MONITORING

Noise levels were monitoring at four locations mentioned hereunder:

| Station code | Location | Environmental setting |
|--------------|-------------------|-----------------------|
| N1 | Mining Area | Industrial |
| N2 | Kudipi Village | Residential |
| N3 | Loading Point | Industrial |
| N4 | Saripalli Village | 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 | Champavathi River Upstream | Surface water |
| W2 | Champavathi Downstream | Surface water |
| W3 | Kudipi Village Well Water | Ground water |
| W4 | Sarepalli Village 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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info@svenvirolabs.com, svenviro_labs@yahoo.co.in

Branch Office : 2-53, Mahipala Street, Yanam - 533464.

Recognized by Govt.of India-MoEF & CC, New Delhi ,Accredited by: QCI-NABET for EIA



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

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **AMBIENT AIR QUALITY**

SOURCE OF COLLECTION : KUDIPI VILLAGE

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky

TEST REPORT

| Date of Monitoring | Week | SPM ($\mu\text{g}/\text{m}^3$) | PM10 ($\mu\text{g}/\text{m}^3$) | PM2.5 ($\mu\text{g}/\text{m}^3$) | SO2 ($\mu\text{g}/\text{m}^3$) | NO2 ($\mu\text{g}/\text{m}^3$) | CO (mg/m^3) |
|-----------------------|------|----------------------------------|-----------------------------------|------------------------------------|----------------------------------|----------------------------------|-------------------------------|
| 16.11.2019 | I | 158 | 69.8 | 31.5 | 9.7 | 11.8 | 0.22 |
| 17.11.2019 | I | 169 | 68.5 | 30.6 | 9.6 | 12.2 | 0.19 |
| 25.11.2019 | II | 154 | 65.4 | 29.8 | 10.2 | 12.8 | 0.20 |
| 26.11.2019 | II | 148 | 63.4 | 27.8 | 10.5 | 12.4 | 0.25 |
| Maximum | | 169 | 69.8 | 31.5 | 10.5 | 12.8 | 0.25 |
| Minimum | | 148 | 63.4 | 27.8 | 9.6 | 11.8 | 0.19 |
| Average | | 157 | 66.7 | 29.8 | 10.0 | 12.3 | 0.21 |
| CPCB Standards | | - | 100 | 60 | 80 | 80 | 4 |



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

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **AMBIENT AIR QUALITY**

SOURCE OF COLLECTION : SARIPALLI VILLAGE

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky


TEST REPORT

| Date of Monitoring | Week | SPM ($\mu\text{g}/\text{m}^3$) | PM10 ($\mu\text{g}/\text{m}^3$) | PM2.5 ($\mu\text{g}/\text{m}^3$) | SO2 ($\mu\text{g}/\text{m}^3$) | NO2 ($\mu\text{g}/\text{m}^3$) | CO (mg/m^3) |
|-----------------------|------|----------------------------------|-----------------------------------|------------------------------------|----------------------------------|----------------------------------|-------------------------------|
| 16.11.2019 | I | 142 | 66.5 | 28.4 | 9.2 | 12.6 | 0.22 |
| 17.11.2019 | I | 132 | 65.5 | 26.5 | 8.9 | 11.9 | 0.26 |
| 25.11.2019 | II | 148 | 63.2 | 24.3 | 9.1 | 13.2 | 0.28 |
| 26.11.2019 | II | 151 | 61.4 | 23.2 | 9.0 | 12.6 | 0.21 |
| Maximum | | 151 | 66.5 | 28.4 | 9.2 | 13.2 | 0.28 |
| Minimum | | 132 | 61.4 | 23.2 | 8.9 | 12.5 | 0.21 |
| Average | | 142 | 64.0 | 25.6 | 9.0 | 12.7 | 0.24 |
| CPCB Standards | | - | 100 | 60 | 80 | 80 | 4 |



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

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **AMBIENT AIR QUALITY**

SOURCE OF COLLECTION : MINING AREA

DURATRION OF SAMPLING : 24 Hrs

ATMOSPHERE CONDITION : Clear Sky


TEST REPORT

| Date of Monitoring | Week | SPM ($\mu\text{g}/\text{m}^3$) | PM10 ($\mu\text{g}/\text{m}^3$) | PM2.5 ($\mu\text{g}/\text{m}^3$) | SO2 ($\mu\text{g}/\text{m}^3$) | NO2 ($\mu\text{g}/\text{m}^3$) | CO (mg/m^3) |
|-----------------------|------|----------------------------------|-----------------------------------|------------------------------------|----------------------------------|----------------------------------|-------------------------------|
| 16.11.2019 | I | 168 | 70.5 | 29.8 | 9.8 | 13.4 | 0.29 |
| 17.11.2019 | I | 164 | 68.4 | 27.4 | 9.4 | 12.8 | 0.27 |
| 25.11.2019 | II | 160 | 69.5 | 28.2 | 9.5 | 13.5 | 0.25 |
| 26.11.2019 | II | 159 | 67.3 | 26.8 | 9.2 | 13.2 | 0.28 |
| Maximum | | 168 | 70.5 | 29.8 | 9.8 | 13.5 | 0.29 |
| Minimum | | 159 | 67.3 | 26.8 | 9.2 | 12.8 | 0.25 |
| Average | | 162 | 68.9 | 28.0 | 9.4 | 13.2 | 0.27 |
| CPCB Standards | | - | 100 | 60 | 80 | 80 | 4 |



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ANNEXURE – II
(Dustfall Monitoring Reports)



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

Date: 10-12-2019

NAME AND ADDRESS : **M/s. SARIPALLI SAND MINE,**
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **DUSTFALL**

SOURCE OF COLLECTION : **KUDIPI VILLAGE**

ATMOSPHERE CONDITION : **Clear Sky**

TEST REPORT

| S.No | Parameters | Unit | Result |
|------|---------------------|-----------------------------|--------|
| 1 | Insoluble Particles | Tons/Km ² /Month | 3.38 |
| 2 | Soluble Particles | Tons/Km ² /Month | 1.86 |
| 3 | Total Particles | Tons/Km ² /Month | 5.24 |

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

Date: 10-12-2019

NAME AND ADDRESS : **M/s. SARIPALLI SAND MINE,**
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **DUSTFALL**

SOURCE OF COLLECTION : **SARIPALLI VILLAGE**

ATMOSPHERE CONDITION : **Clear Sky**

TEST REPORT

| S.No | Parameters | Unit | Result |
|------|---------------------|-----------------------------|--------|
| 1 | Insoluble Particles | Tons/Km ² /Month | 3.15 |
| 2 | Soluble Particles | Tons/Km ² /Month | 1.62 |
| 3 | Total Particles | Tons/Km ² /Month | 4.76 |

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

Date: 10-12-2019

NAME AND ADDRESS : **M/s. SARIPALLI SAND MINE,**
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : **DUSTFALL**

SOURCE OF COLLECTION : **MINING AREA**

ATMOSPHERE CONDITION : **Clear Sky**

TEST REPORT

| S.No | Parameters | Unit | Result |
|------|---------------------|-----------------------------|--------|
| 1 | Insoluble Particles | Tons/Km ² /Month | 4.65 |
| 2 | Soluble Particles | Tons/Km ² /Month | 2.91 |
| 3 | Total Particles | Tons/Km ² /Month | 7.56 |

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ANNEXURE – III
(Noise Monitoring Reports)



SV ENVIRO LABS & CONSULTANTS

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

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : NOISE LEVEL MONITORING

DATE OF COLLECTION : 16-11-2019 to 18-11-2019

TEST REPORT

| Period | Time | Source of collection | | | |
|------------------|-------|----------------------|----------------|---------------|-------------------|
| | | Mining Area | Kudipi village | Loading Point | Saripalli village |
| Day | 6.00 | 47.0 | 42.0 | 44.2 | 41.5 |
| | 7.00 | 46.5 | 45.5 | 43.6 | 47.2 |
| | 8.00 | 51.8 | 48.9 | 47.8 | 44.5 |
| | 9.00 | 50.8 | 53.2 | 49.2 | 43.2 |
| | 10.00 | 52.8 | 54.2 | 52.0 | 48.5 |
| | 11.00 | 54.6 | 49.8 | 53.4 | 49.6 |
| | 12.00 | 51.5 | 47.5 | 52.5 | 51.2 |
| | 13.00 | 52.5 | 46.5 | 56.8 | 53.4 |
| | 14.00 | 53.2 | 44.0 | 57.4 | 55.2 |
| | 15.00 | 54.5 | 43.2 | 61.4 | 54.2 |
| | 16.00 | 56.0 | 49.8 | 63.2 | 55.8 |
| | 17.00 | 58.5 | 51.0 | 64.9 | 57.4 |
| | 18.00 | 56.5 | 50.2 | 65.4 | 56.4 |
| | 19.00 | 52.3 | 53.2 | 64.3 | 52.4 |
| 20.00 | 51.4 | 52.4 | 62.4 | 53.8 | |
| 21.00 | 52.5 | 47.5 | 63.4 | 51.4 | |
| Night | 22.00 | 50.4 | 46.4 | 54.6 | 49.8 |
| | 23.00 | 48.5 | 44.3 | 52.0 | 47.6 |
| | 24.00 | 47.2 | 42.1 | 48.6 | 45.2 |
| | 1.00 | 45.5 | 41.5 | 44.6 | 43.4 |
| | 2.00 | 44.0 | 38.6 | 42.6 | 41.4 |
| | 3.00 | 43.6 | 36.5 | 38.6 | 39.5 |
| | 4.00 | 42.7 | 35.8 | 34.5 | 36.2 |
| 5.00 | 44.6 | 37.8 | 36.2 | 35.4 | |
| Leq Day | | 53.9 | 50.3 | 60.9 | 53.3 |
| Leq Night | | 47.1 | 42.4 | 49.1 | 45.3 |

| 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.



AUTHORIZED SIGNATORY
B. RAVI PRASAD

ANNEXURE – IV
(Water Analysis Reports)



SV ENVIRO LABS & CONSULTANTS

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

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : CHAMPAVATI RIVER UPSTREAM

DATE OF COLLECTION : 17-11-2019

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 | < 1.0 | 5 - 25 |
| 4 | pH | - | 8.14 | 5.5 to 9.0 |
| 5 | Total Dissolved Solids | mg/l | 345 | 500 – 2000 |
| 6 | Total suspended solids | mg/l | 05 | 100 |
| 7 | Fluorides as F | mg/l | 0.25 | 2.0 |
| 8 | Nitrates as NO ₃ ⁻ | mg/l | < 0.01 | 10 |
| 9 | Iron as Fe | mg/l | <0.01 | 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 | 0.02 | 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-SSM/19-12/09

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village,Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : CHAMPAVATI RIVER DOWN STREAM

DATE OF COLLECTION : 17-11-2019

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 | < 1.0 | 5 - 25 |
| 4 | pH | - | 8.09 | 5.5 to 9.0 |
| 5 | Total Dissolved Solids | mg/l | 350 | 500 – 2000 |
| 6 | Total suspended solids | mg/l | 09 | 100 |
| 7 | Fluorides as F | mg/l | 0.25 | 2.0 |
| 8 | Nitrates as NO ₃ ⁻ | mg/l | <0.01 | 10 |
| 9 | Iron as Fe | mg/l | <0.01 | 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 | 0.07 | 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-SSM/19-12/10

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village, Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : GROUND WATER

SOURCE OF COLLECTION : KUDIPI VILLAGE WELL WATER

DATE OF COLLECTION : 17-11-2019

TEST REPORT

| S.No | Parameter | Unit | Result | IS 10500:2012 Specifications |
|------|--|----------------|-----------|------------------------------|
| 1. | Colour | Hazen | < 1.0 | 5.0 |
| 2. | Odour | - | Agreeable | Agreeable |
| 3. | Temperature | ⁰ C | 28.0 | - |
| 4. | Taste | - | Agreeable | Agreeable |
| 5. | Turbidity | NTU | 8.44 | 1.0 |
| 6. | pH | - | 6.89 | 6.5 – 8.5 |
| 7. | Total Dissolved Solids | mg/l | 738 | 500 |
| 8. | Total Alkalinity as CaCO ₃ | mg/l | 310 | 200 |
| 9. | Total Hardness as CaCO ₃ | mg/l | 478 | 200 |
| 10. | Calcium as Ca | mg/l | 121 | 75 |
| 11. | Magnesium as Mg | mg/l | 42.7 | 30 |
| 12. | Chlorides as Cl ⁻ | mg/l | 130 | 250 |
| 13. | Fluorides as F | mg/l | 1.15 | 1.0 |
| 14. | Nitrates as NO ₃ ⁻ | mg/l | 52.3 | 45 |
| 15. | Sulphates as SO ₄ ²⁻ | mg/l | 58.7 | 200 |
| 16. | Iron as Fe | mg/l | 0.04 | 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 | 0.79 | 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 | < 0.1 | 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 | <0.01 | 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 |
| 37. | Nickel as Ni | mg/l | <0.01 | 0.02 |



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| | | | | |
|-----------------------|---|-----------|--------------|---------------------------------|
| 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 | 10 | 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-SSM/19-12/11

Date: 10-12-2019

NAME AND ADDRESS : M/s. SARIPALLI SAND MINE,
Visakhapatnam Steel Plant,
Saripalli Village, Nellimarla Mandal,
Vizianagaram District ,A.P.

SAMPLE PARTICULARS : GROUND WATER

SOURCE OF COLLECTION : SAREPALLI WELL WATER

DATE OF COLLECTION : 17-11-2019

TEST REPORT

| S.No | Parameter | Unit | Result | IS 10500:2012 Specifications |
|------|--|----------------|-----------|------------------------------|
| 1. | Colour | Hazen | < 1.0 | 5.0 |
| 2. | Odour | - | Agreeable | Agreeable |
| 3. | Temperature | ⁰ C | 27.5 | - |
| 4. | Taste | - | Agreeable | Agreeable |
| 5. | Turbidity | NTU | 0.62 | 1.0 |
| 6. | pH | - | 6.91 | 6.5 – 8.5 |
| 7. | Total Dissolved Solids | mg/l | 1335 | 500 |
| 8. | Total Alkalinity as CaCO ₃ | mg/l | 544 | 200 |
| 9. | Total Hardness as CaCO ₃ | mg/l | 592 | 200 |
| 10. | Calcium as Ca | mg/l | 129 | 75 |
| 11. | Magnesium as Mg | mg/l | 65.1 | 30 |
| 12. | Chlorides as Cl ⁻ | mg/l | 258 | 250 |
| 13. | Fluorides as F | mg/l | 0.91 | 1.0 |
| 14. | Nitrates as NO ₃ ⁻ | mg/l | 51 | 45 |
| 15. | Sulphates as SO ₄ ²⁻ | mg/l | 81.8 | 200 |
| 16. | Iron as Fe | mg/l | <0.01 | 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 | 0.35 | 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 | < 0.1 | 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 | <0.01 | 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 |
| 37. | Nickel as Ni | mg/l | <0.01 | 0.02 |



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| | | | | |
|-----------------------|---|-----------|--------------|---------------------------------|
| 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

CHECKED BY



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