



## राष्ट्रीय इस्पात निगम लिमिटेड

(भारत सरकार का उपक्रम)

**Rashtriya Ispat Nigam Limited**

(A Government of India Undertaking)

CIN No. U27109AP1982GOI003404



Ref.No: GMM/6-55/2019/

Dt: 19.08.2019

(1) Ministry of  
Environment, Forest and  
Climate Change  
Govt. of India,  
Indira Paryavaran Bhavan,  
Jorbagh Road,  
New Delhi - 110 003  
INDIA

(2) Additional Principal  
Chief Conservator of  
Forests (C),  
Ministry of Environment,  
Forest and Climate Change,  
Regional Office (SE Zone),  
1st & 2nd floor  
HEPC Building No. - 34  
Cathedral Garden Road,  
Nungambakkam,  
Chennai-600 034.

(3) The Chairman  
Andhra Pradesh Pollution Control  
Board (APPCB)  
D.No. 33-26-14 D/2, Near Sunrise  
Hospital,  
Pushpa Hotel Centre,  
Chalamalavari Street, Kasturibaipet,  
VIJAYAWADA - 520 010

माननीय महोदय **Dear Sir,**

विषय :- राष्ट्रीय इस्पात निगम लिमिटेड की गर्भम मैंगनीज खदान, गर्भम के सन्दर्भ में पर्यावरण मंजूरी के अनुसार अर्ध वार्षिक अनुपालन के प्रस्तुतीकरण के बाबत -

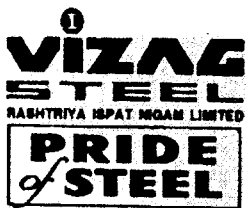
**Sub:- Submission of Half Yearly Compliance on Environmental Clearance (EC) of Garbham Manganese Mine, Garbham of Rashtriya Ispat Nigam Ltd, Visakhapatnam Steel Plant.**

सन्दर्भ/Ref: पर्यावरण मंजूरी आदेश क्र. E.C. Order No. : J-11015/375/2005-IA.II(M), Dt. 04.10.2006.

इस प्रपत्र के साथ राष्ट्रीय इस्पात निगम लिमिटेड की गर्भम मैंगनीज खदान, गर्भम के सन्दर्भ में अ) पर्यावरण मंजूरी के अनुसार अर्ध वार्षिक अनुपालन के तहत जनवरी 2019 से जून 2019 तक पर्यावरण मंजूरी पर स्थितिवार अनुपालन रिपोर्ट, ब) ग्रीष्म ऋतू 2019 की पर्यावरण रिपोर्ट तथा स) वर्ष 2018-19 के लिए पर्यावरण व्यक्तत्व प्रपत्र V संलग्न है।

Enclosed please find a) Condition wise compliance report on Environmental Clearance (EC) pertaining to **Garbham Manganese Mine, Garbham, Rashtriya Ispat Nigam Ltd., Visakhapatnam Steel Plant, for the Period January 2019 – June 2019, b) Seasonal monitoring report for the period summer 2019 and c) Environmental statement in Form-V for the year 2018-19.**

जैसा कि हम अतिरिक्त क्षमता के लिए MoEFCC नई दिल्ली में आवेदन कर रहे हैं, कृपया नयी पर्यावरण मंजूरी प्राप्त करने हेतु अनापत्ति प्रमाण पत्र प्रदान करने का कष्ट करें।



A NAVRATNA COMPANY

Please send your reply to :

O/o GM(Mines) & HOD  
Room No.384, Main Admn Building.

Phones : +91 891 -2275841  
Tel/Fax : +91 891 -  
E-mail : [mineshq@vizagsteel.com](mailto:mineshq@vizagsteel.com)  
Grams : 'UBEAM'

विशाखपट्टणम इस्पात संयंत्र, विशाखपट्टणम-530031

Visakhapatnam Steel Plant, Visakhapatnam - 530 031

Regd. Office : Visakhapatnam Steel Project, Administrative Building, Visakhapatnam - 530 031, INDIA.

पंजीकृत कार्यालय : विशाखपट्टणम इस्पात परियोजना, प्रशासनिक भवन, विशाखपट्टणम-530031, भारत



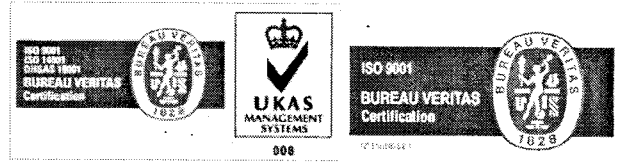
राष्ट्रीय इस्पात निगम लिमिटेड

(भारत सरकार का उपक्रम)

Rashtriya Ispat Nigam Limited

(A Government of India Undertaking)

CIN No. U27109AP1982GOI003404



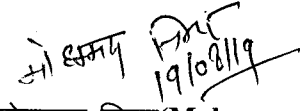
Now that we are applying to MoEFCC, New Delhi for obtaining EC for enhanced capacity, it is requested to issue the necessary NOC for applying for fresh EC.

यह आपके सादर अभिलेख के लिए प्रस्तुत है।

This is for your kind record.

धन्यवाद Thanking you,

भवदीय/ Yours faithfully,  
कृते/For विशाखापट्टणम इस्पात संयंत्र  
Visakhapatnam Steel Plant

  
मोहम्मद निमर (Mohammad Nimar)  
प्रबंधक/ Manager (Mines)

संलग्न/Encl:

उपरोक्तानुसार / As above.



Please send your reply to :

O/o GM(Mines) & HOD  
Room No.384, Main Admn Building.

विशाखपट्टणम इस्पात संयंत्र, विशाखपट्टणम-530031

Visakhapatnam Steel Plant, Visakhapatnam - 530 031

Regd. Office : Visakhapatnam Steel Project, Administrative Building, Visakhapatnam - 530 031, INDIA.

पंजीकृत कार्यालय : विशाखपट्टणम इस्पात परियोजना, प्रशासनिक भवन, विशाखपट्टणम-530031, भारत

Phones : +91 891 -2275841

TelFax : +91 891 -

E-mail : mineshq@vizagsteel.com

Grams : 'UBEAM'

Mobile :

**COMPLIANCE REPORT OF CONSIDITIONS STIPULATED IN ENVIROMNETAL**

**Clearance By MOEF dtd. 04.10.2006**

**A). SPECIFIC CONDITIONS:**

- i. All the conditions stipulated by the State Pollution Control Board in their Consent to establish shall be effectively implemented.

**Ans. Being complied.**

- ii. Top soil shall be stacked properly with proper slope with adequate safeguard and shall be backfilled for reclamation and rehabilitation of mined out area.

**Ans. Only dump mining is carried out. Since that no fresh ground is broken, top soil is not generated. The mineral is not excavated to the fullest depth. Hence, back filling is not yet started. However, whenever top soil is excavated, it shall be stacked and re-used for growth of vegetation.**

- iii. Garland drains shall be constructed to arrest silt and sediment flows from soil, and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted particularly after monsoon and maintained properly

Garland drain (size, gradient and length) shall be constructed for both mine pit and for waste dump and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the comers of the garland drains and destilted at regular intervals.

**Ans. The garland drains of length 1.4 kms. encompassing the dump mining section and Overburden dumps area are being maintained on North-East and on Eastern side of the working lease. The floor of the garland drain is gently sloped. They are de-silted and properly maintained from time to time. The drains avoid flow of silt from overburden dumps.**

**Old water logged pit and nalah pit have large and sufficient sump capacity. The waters are allowed to settle without being disturbed. A small capacity pump is installed in the water logged pit to quench mine roads and green belt regularly.**

- iv. Controlled blasting shall not be undertaken.

**Ans. No blasting is being done.**

- v. Plantation shall be raised in an area of 10 ha including a green belt of adequate width by planting the native species around the ML area, roads, OB dump sites etc. in consultation with the local DFO / Agriculture Department. The density of the trees shall be around 2000 plants per ha.

*DM*

Ans. Total mining lease area is 264.545 Hectares Out of the above area, 245.99 Hectares is not acquired (no surface rights) and hence not disturbed by mining activity. The remaining 18.55 Hectares is being used for mining and for other allied activities, in which 11.33 Ha of green belt is developed by planting 3700 Nos. of trees and saplings. As and when the dump mining is complete. The area shall be progressively brought under afforestation.

In the Mining Lease area, there are 46,162 plants/trees. Hence, the density of trees is around 4117 plants per Hectares.

- vi. The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

Ans. Water is conserved by coursing rain water to main winter logged pit (irrigation pond). The state Government irrigation department has installed a pump for irrigating lands of adjacent villages. The water is used for irrigating around 192 Acres of Patta lands which belong to outsiders.

- vii. Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director, Central Ground Water Board.

Ans. Regular seasonal monitoring, four times a year is being done. THE reports are submitted regularly.

- viii. Prior permission from the competent authority shall be obtained for drawal of ground water, if any.

Ans. Permission shall be obtained.

- ix. Vehicular emission shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles shall be covered with a tarpaulin and shall not be overloaded.

Ans. Vehicular emissions were tested and found within limits. The vehicles used for transportation of ore beyond mining lease are covered with tarpaulin.

- xi. Sewage treatment plant shall be installed for the colony, ETP shall also be provided for workshop and wastewater generated from mining operations.

Ans. Mining colony is not existing, hence not applicable. Also all the Mining operations are dry processes.

Xii A Final Mine Closure Plan, along with details of Corpus Fund, shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

Ans. Bank guarantee is deposited to Indian Bureau of Mines towards progressive mine closure plan for a total amount of Rs. 1,38,66,000/- (Rupees One crores thirty eight lakhs sixty six thousand only) as stated as per rule 27 of MCDR, 2017. The bank guarantees are valid up to 07.10.2022.

*Mohammad Nisar*  
*19.08.19*  
**MOHAMMAD NISAR**  
MANAGER (MINES)  
RINL/VSP/GARBHAM Manganese Mine

## **B. General conditions:**

- i) No. change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment & forests.

**Ans. Not changed.**

- ii) No change in the calendar plan including excavation, quantum of mineral iron ore and waste shall be made.

**Ans. Not changed.**

- iii) Conservation measures for protection of flora and fauna in the core & buffer zone shall be drawn up in consultation with the local forest and wildlife department.

**Ans. Being conserved.**

- iv) Four ambient air quality-monitoring stations shall be established in the core zone as well as in the buffer zone for RPM, SPM, NO<sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.

**Ans. Seasonal monitoring regularly conducted by NABL accredited laboratory. The quarterly reports are submitted regularly.**

- v) Data on ambient air quality (RPM, SPM, SO<sub>2</sub>, NO<sub>x</sub>) should be regularly submitted to the Ministry including its Regional office located at Bangalore and the State Pollution Control Board / Central Pollution Control Board once in six months.

**Ans. Being submitted.**

- vi) Fugitive dust emissions from all the sources shall be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained.

**Ans. Emissions and air borne dust controlled**

- vii) Measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc., shall be provided with ear plugs / muffs.

**Ans. Being controlled.**

- viii) Industrial, waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup>

May, 1993 and 31<sup>st</sup> December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.

-2-

**Ans. No industrial wastewater is generated**

- ix) Personnel working industry areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.

**Ans. PPE's are provided and worn. Also training is imparted at GVTC.**

- x) Occupational health surveillance program of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

**Ans. Periodical medical examination is conducted at 5 yrs. Interval regularly. Last PME was conducted during was conducted during Aug-2017.**

- xi) A separate environmental management cell with suitable qualified personnel shall be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

**Ans. It is setup**

- xii) The project authorities shall inform to the Regional Office located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

**Ans. Informed**

- xiii) The funds earmarked for environmental protection measures shall be kept in separate account and should not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry and its Regional Office located at Bangalore.

**Ans. Not diverted.**

- xiv) The project authorities shall inform to the Regional Office located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

**Ans. Not applicable**

- xv) The Regional Office of this Ministry located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities should extent full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

**Ans. Not applicable**

xvi) A copy of clearance letter will be marked to the concerned Panchayat / local NGO, of any, from whom suggestion / representation has been received while processing the proposal.

-3-

**Ans. Copies sent to village Panchayats and local NGO.**

xvii) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District industry Centre and Collector's office / Tehsildar's Office for 30 days.

**Ans. Not applicable.**

xviii) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <http://envfor.nic.in> and a copy of the same shall be forwarded to the Regional Office of this ministry located Bangalore.

**Ans. Advertisements were made in Telugu in the Eenadu and in English in the Hindu.**

Handwritten signature: *Mohammad Nimar*  
Date: *19.02.14*  
MOHAMMAD NIMAR  
MANAGER (MINES)  
RINL/VSP/GARBHAM Manganese Mine



## F O R M - V

{See Rule – 14 of Environment (Protection) Rules 1986}

### ENVIRONMENTAL DATA REPORT FOR THE FINANCIAL YEAR (2018-19) ENDING 31<sup>ST</sup> MARCH 2019

#### PART – A

**i) Name and address of the Owner/Occupier of the industry:**

- a) Name of the Owner : Rashtriya Ispat Nigam Limited  
Visakhapatnam Steel Plant  
VISAKHAPATNAM – 530 031, A.P.
- b) Nominated Owner : **Shri Ajit Kumar Saxena,**  
Director (Operations)  
Visakhapatnam Steel Plant  
VISAKHAPATNAM – 530 031, A.P.
- c) Operation or process : Operation

**ii) Industry Category Primary-(SIC code)**

- Secondary – (SIC Code) : 1400  
Mining & Quarrying of  
Nonmetallic Minerals (No Fuels)

**iii) Production Category – units**

- : Manganese Ore – 50 TPD

**iv) Year of establishment**

- : 01.10.1992  
(Date of Opening of Mine)

**v) Date of last environmental statement submitted**

- : 19/08/2018

#### PART – B

**Water & Raw Material Consumption:**

**i) Water Consumption**

- a) Process : 5 KLD
- b) Cooling : Nil
- c) Domestic : 0.5 KLD

Name of the Products	Process water consumption per unit of the product	
	During previous financial year (2017-18)	During the current financial year (2018-19)
Manganese Ore	0.12 KLD	0.12 KLD

*AME*

**ii) Raw Material Consumption**

Name of Raw Materials*	Name of Products	Consumption of raw material unit of output	
		During previous financial year (2017-18)	During the current financial year (2018-19)
Not Applicable	Not Applicable	Not Applicable	Not Applicable

\* Industry may use codes if disclosing details of raw material would be violate contractual obligations, otherwise all industries have to name the raw materials used.

**PART – C**

**Pollution discharge to environment/unit of output**

(Parameters as specified in the consent issued)

Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants discharged (mass/volume)	Percentage of variation from prescribed standards with reasons
a) Water b) Air	Seasonal monitoring is being carried out and reports are regularly submitting. All the parameters of samples are within the prescribed limits. Season wise monitoring report submitted copies are enclosed with this form.		

**C.a. Effluent analysis data after treatment:**

(As per the parameters specified in the water consent order)

Parameter	Standards prescribed in the water consent	Measured peak values during 2018-19	Percentage of variation from prescribed standards with reasons
Domestic effluents	0.5 KLD	0.5 KLD	within the prescribed limits
Industrial effluents	Nil		

**C.b. Pollution stacks emission data:**

(as per the parameters specified in the Air Consent order):

Parameter	Standards prescribed in the water consent	Average concentration NM3			% Variation from prescribed limits with reasons		
		Stack			Stack		
		I	II	III	I	II	III
Not Applicable							

*Handwritten signature/initials*

**C.c. Air Quality Data (Ambient Air):**

(As per the parameters specified in the Air Consent order)

Consent Order No. 9059-VZN/APPCB/ZOVSP/CFO/2016 dated 26.09.2016 valid up to 31.12.2021

Parameter	Standards prescribed in the Air Consent	Avg. concentration ug/m3 during 2018-19	% variation from prescribed limits with reasons
Particulate Matter (PM10)	100 ug/m3	Seasonal monitoring is being carried out and reports are regularly submitted. All the parameters of samples are within the prescribed limits. Copies of Seasonal monitoring reports are enclosed.	
Particulate Matter (PM2.5)	60 ug/m3		
SO2	80 ug/m3		
NoX	80 ug/m3		

**PART – D****Hazardous Wastes:**

(As specified under hazardous wastes (Management &amp; Handling) Rules, 1989)

Hazardous Wastes	Total Quantity (Kg)	
	During Previous financial year (2017-18)	During the Current financial year (2018-19)
From Process		
a) Tyres	10 No	5 No
b) Detoxified Containers & container liners of Hazardous waste (Barrels/Drums)		
i). Oil drums (Lubricant Oil)	4 No	7 No
ii). Grease containers.	01 No	01 No
c) Used Led Acid Batteries	05 No	10 No
d) Waste/Used Mineral oil synthetic oil	Nil	Nil
e) Non Ferrous Metal scrap	Nil	Nil
From Pollution Control facilities	-	-

**PART – E**

**Solid Wastes:**

Solid Wastes	Total Quantity (Kg)	
	During previous financial year (2017-18)	During the current financial year (2018-19)
a. From Process	Nil	Nil
b. From Pollution Control facilities		
c. Quantity recycled or reutilized within the unit		

**PART – F**

**Please specify the characteristics (in terms of concentration and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes:**

**Disposal Practices:**

- Dust suppression measure is carried out by providing sprinklers and rain guns on haul roads.

**PART – G**

**Impact of pollution control measures taken on conservation of natural resources and consequently on the cost of production:**

**Pollution Control Measures:**

- No drilling and blasting operations are carried out.
- Dust suppression is carried out by providing sprinklers and rain guns on haul roads.
- Cumulative 4,400 saplings are planted within mining lease till the end of financial year. The survival rate is 90%.

**PART – H**

**Additional measures / investment proposal for environmental protection including abatement of pollution:**

- N.A.

**PART – I**

**Miscellaneous:**

**Any other particulars in respect of environmental protection and abatement of pollution:**



- Garland drains are constructed near the mine boundary on Northeastern and on eastern side of the tenement. The drains avoid flow of silt from overburden dumps.

*HEALTHY FILE*  
*19/02/19*

**(Mohammad Nimar)**  
**Manager (Mines)**

**MOHAMMAD NIMAR**  
**MANAGER (MINES)**  
**FINL/VSP/GARBHAM Manganese Mine**

# ENVIRONMENTAL MONITORING REPORT

*for*

## GARBHAM MANGANESE MINE

*of*

## RASHTRIYA ISPAT NIGAM LIMITED

(Government of India Enterprise)

Visakhapatnam Steel Plant

Garbham (V), Merakamudidam (M),

Vizianagaram (Dist.), A.P

**SUMMER SEASON-2019**

Prepared by

---



B. S. ENVI-TECH (P) LTD

Secunderabad

# **TABLE OF CONTENTS**

## TABLE OF CONTENT

S. No	Title of chapter	Page No.
1.0	Introduction	1
2.0	Scope of Environmental Monitoring	
2.1	Meteorology	4
2.2	Air Environment	11
2.3	Water Environment	11
2.4	Dust Fall Measurement	12
2.5	Noise Level Monitoring	12

## LIST OF FIGURES

Fig No.	Title	Page No.
Fig-2.1	Wind Rose Diagram 1-8,9-16 & 17-24	5
Fig-2.2	Wind Rose Diagram 1-24	6

## LIST OF TABLES

Table No.	Title	Page No.
Table-2.1	Duration of Time : 01:00 – 08:00 Hrs	7
Table-2.2	Duration of Time : 09:00 – 16:00 Hrs	8
Table-2.3	Duration of Time : 17:00 – 24:00 Hrs	9
Table-2.4	Duration of Time : 01:00 – 24:00 Hrs	10
Table-2.5	Ambient Air Quality Locations	4
Table-2.6	Water Sampling Locations	11
Table-2.7	Dust Fall Monitoring	12
Table-2.8	Noise Level Monitoring	12

## ANNEXURES

Annexure-1	Data of Ambient Air Quality
Annexure-2	Data of Water Quality
Annexure-3	Dust Fall Monitoring
Annexure-4	Noise Level Monitoring



# **INTRODUCTION**

## **1.0 INTRODUCTION**

Visakhapatnam Steel Plant (VSP), the first coast based Steel Plant of India is located, 16 KM South West of city of Destiny i.e. Visakhapatnam. Bestowed with modern technologies, VSP has an installed capacity of 3 million Tonnes per annum of Liquid Steel and 2.656 million Tonnes of saleable steel. At VSP there is emphasis on total automation, seamless integration and efficient up gradation, which result in wide range of long and structural products to meet stringent demands of discerning customers within India and abroad. VSP products meet exacting International Quality Standards such as JIS, DIN, BIS, BS etc.

VSP has become the first integrated Steel Plant in the country to be certified to all the three international standards for quality (ISO-9001), for Environment Management (ISO-14001) & for Occupational Health & Safety (OHSAS-18001). The certificate covers quality systems of all Operational, Maintenance and Service units besides Purchase systems, Training and Marketing functions spreading over 4 Regional Marketing Offices, 24 branch offices and stock yards located all over the country.

VSP by successfully installing & operating efficiently Rs. 460 crores worth of Pollution Control and Environment Control Equipments and converting the barren landscape by planting more than 3 million plants has made the Steel Plant, Steel Township and surrounding areas into a heaven of lush greenery. This has made Steel Township a greener, cleaner and cooler place, which can boast of 3 to 4° C lesser temperature even in the peak summer compared to Visakhapatnam City.

Resultant the obvious importance, Visakhapatnam Steel Plant (RINL) has awarded environmental monitoring work to Messurs. B. S. Envi-Tech Pvt. Ltd., 12-13-1270/71/73, Amity Ville, 4th Floor, Beside Spencer Super Market, St. Ann's Road, Tarnaka, Secunderabad for monitoring and preparation of requisite reports for the Summer Season – 2019 that includes data generation of environmental data on Air, Water, Dust fall and Noise for “Manganese Mine- Garbham” , Visakhapatnam Steel Plant, Garbham Village, Vizianagaram District, A.P.

## SUMMARY

India is the world's third-largest producer of crude steel (up from eighth in 2003) and is expected to become the second-largest producer by 2016. The growth in the Indian steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective labour. Consequently, the steel sector has been a major contributor to India's manufacturing output.

The Indian steel industry is very modern with state-of-the-art steel mills. It has always strived for continuous modernization and up-gradation of older plants and higher energy efficiency levels.

### Road ahead

India is expected to become the world's second largest producer of crude steel in the next 10 years, moving up from the third position, as its capacity is projected to increase to about 300 MT by 2025. Huge scope for growth is offered by India's comparatively low per capita steel consumption and the expected rise in consumption due to increased infrastructure construction and the thriving automobile and railways sectors.

### Domestic Scenario

- The Indian steel industry has entered into a new development stage from 2007-08, riding high on the resurgent economy and rising demand for steel.
- Rapid rise in production has resulted in India becoming the 3rd largest producer of crude steel in 2015 and the country continues to be the largest producer of sponge iron or DRI in the world.
- As per the report of the Working Group on Steel for the 12th Five Year Plan, there exist many factors which carry the potential of raising the per capita steel consumption in the country. These include among others, an estimated infrastructure investment of nearly a trillion dollars, a projected growth of manufacturing from current 8% to 11-12%, increase in urban population to 600 million by 2030 from the

current level of 400 million, emergence of the rural market for steel currently consuming around 10 kg per annum buoyed by projects like Bharat Nirman, Pradhan Mantri Gram Sadak Yojana, Rajiv Gandhi Awaas Yojana among others.

- At the time of its release, the National Steel Policy 2005 had envisaged steel production to reach 110 million tonnes (mt) by 2019-20. However, based on the assessment of the current ongoing projects, both in greenfield and brownfield, the Working Group on Steel for the 12 th Five Year Plan has projected that domestic crude steel capacity in the county is likely to be 140 mt by 2016-17 and has the potential to reach 149 mt if all requirements are adequately met.
- The National Steel Policy 2005 is currently being reviewed keeping in mind the rapid developments in the domestic steel industry (both on the supply and demand sides) as well as the stable growth of the Indian economy since the release of the Policy in 2005.

Since the scope of Indian Industry has been widening in a progressive manner in capital and energy, environmental quality, the intensive areas. In view of the energy and environmental scenario of the future and the impact of industry on environmental quality, it has been propounded that certain regulations of environment need to be followed for the development as well as environmental management of Indian industries. Such regulations ensure that the environmental quality does not affect by the industrial activities. Moreover, improvement in the economy of the industries would be possible with the latest technologies in process and energy, effectively along with the Occupational Health and Safety.

M/s. Garbham Manganese Mine has retained M/s B. S. Envi -Tech Pvt. Ltd., to carry out monitoring of environmental parameters of the reports includes, Ambient Air Dust fall, Water, Noise and Meteorological Data are included in the report. Accordingly, the study was carried out for the **Summer Season-2019 i.e. May-2019** on the basis of samples collected in and around the

Manganese Mine as per the statutory requirement of Indian Bureau of Mines [IBM] during **Summer Season-2019**.

## **2.0 SCOPE OF ENVIRONMENTAL MONITORING**

The scope of the environmental monitoring includes collection of Meteorology Data, air and water samples in and around the Garbham Manganese Mine during Summer Season-2019 as per the guidelines of IBM for assessing the existing quality and their conformance with stipulated standards.

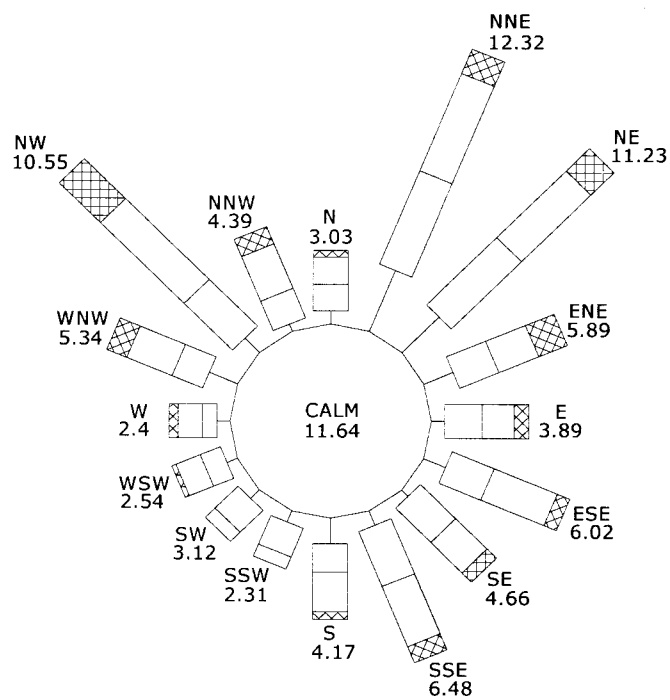
### **2.1 METEOROLOGY**

The data collected on wind speed and wind direction was used for computation of wind percentage frequencies in all the sixteen directions for wind speed in the range of 1.6-5.0, 5.01-10.0, 10.01-15.0 and > 15.01 km ph. Wind speed of 0.0-1.0 kmph was considered as calm condition. The percentage frequencies computed were used for plotting wind rose diagrams. The wind rose diagrams are depicted in **Figure- 2.1 & 2.2**. **Table 2.1 to 2.4** shows the wind percentage frequency data during the study period.

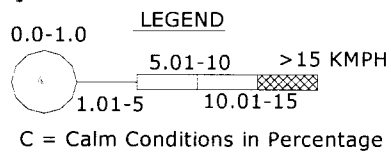
**FIG - 2.1  
WINDROSE DIAGRAM**

CLIENT : VISAKHAPATNAM STEEL PLANT  
PROJECT : GARBHAM MANGANESE MINE  
LOCATION : Garbham Village, Merakamudidam Mandal, Vijayanagram District, Andhra Pradesh.

PERIOD : SUMMER-2019



DURATION : 01- 24 HRS.



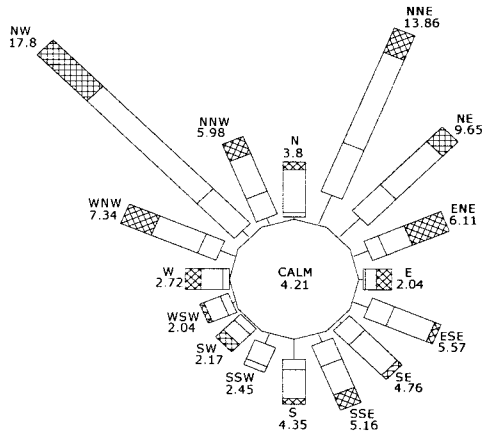
NOTE : All readings are in percentage occurrence of wind



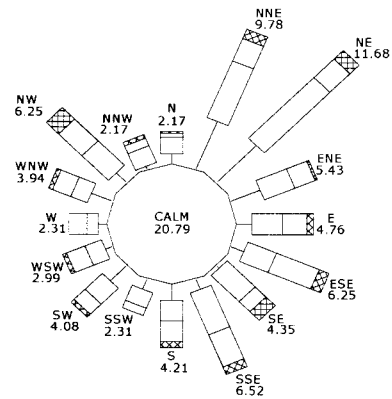
**FIG - 2.2  
WINDROSE DIAGRAM**

CLIENT : VISAKHAPATNAM STEEL PLANT  
PROJECT : GARBHAM MANGANESE MINE  
LOCATION : Garbham Village, Merakamudidam Mandal, Vijayanagram District, Andhra Pradesh.

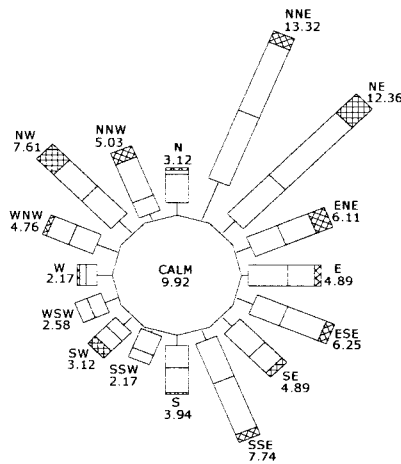
PERIOD : SUMMER-2019



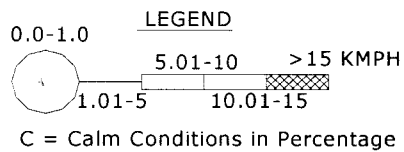
DURATION : 01- 08 HRS.



DURATION : 09- 16 HRS.



DURATION : 17- 24 HRS.



NOTE : All readings are in percentage occurrence of wind



**Table-2.1**  
**Wind Percentage Frequency**

**CLIENT : Visakhapatnam Steel Plant**  
**PROJECT : Garbham Manganese Mine**  
**LOCATION : Garbham (V), Merakamudidam (M), Vizianagaram (Dist.), A.P.**  
**SEASON : Summer Season-2019**

**Duration of Time : 01:00 - 08:00 Hrs**

Direction	Wind Speed (KMPH)				Total
	1.6-5	5-10	10-15	>15	
N	0.14	0.27	2.85	0.54	3.8
NNE	2.04	3.53	6.52	1.77	13.86
NE	1.77	2.45	4.08	1.36	9.65
ENE	0.95	0.95	1.77	2.45	6.11
E	0.27	0.14	0.68	0.95	2.04
ESE	0.95	1.49	2.72	0.41	5.57
SE	0.14	1.36	2.85	0.41	4.76
SSE	0.54	1.49	2.04	1.09	5.16
S	1.36	0.68	1.9	0.41	4.35
SSW	0.68	1.36	0.41	0	2.45
SW	0	0.54	0.95	0.68	2.17
WSW	0.14	0.54	1.09	0.27	2.04
W	0	0.41	1.36	0.95	2.72
WNW	0.95	1.22	3.12	2.04	7.34
NW	0.54	3.26	9.65	4.35	17.8
NNW	0.41	1.63	2.72	1.22	5.98
<b>CALM</b>					4.21
<b>TOTAL</b>					100



**Table -2.2**

**Wind Percentage Frequency**

**CLIENT : Visakhapatnam Steel Plant**

**PROJECT : Garbham Manganese Mine**

**LOCATION : Garbham (V), Merakamudidam (M), Vizianagaram (Dist.), A.P.**

**SEASON : Summer Season-2019**

**Duration of Time : 09:00 - 16:00 Hrs**

Direction	Wind Speed (KMPH)				Total
	1.6-5.0	5-10	10-15	>15	
N	0.68	1.09	0.27	0.14	2.17
NNE	3.4	4.08	1.63	0.68	9.78
NE	3.4	5.71	1.77	0.82	11.68
ENE	1.9	2.04	1.36	0.14	5.43
E	0.95	1.9	1.49	0.41	4.76
ESE	0.82	1.9	2.85	0.68	6.25
SE	0.14	2.45	0.95	0.82	4.35
SSE	0.68	2.99	2.31	0.54	6.52
S	1.09	1.36	1.36	0.41	4.21
SSW	0.68	1.09	0.54	0	2.31
SW	1.36	1.49	0.95	0.27	4.08
WSW	0.41	1.09	1.22	0.27	2.99
W	0.54	0.68	1.09	0	2.31
WNW	1.36	1.09	1.22	0.27	3.94
NW	0.82	2.31	2.04	1.09	6.25
NNW	0.14	1.22	0.54	0.27	2.17
<b>CALM</b>					20.79
<b>TOTAL</b>					100

**Table - 2.3**

**Wind Percentage Frequency**

**CLIENT : Visakhapatnam Steel Plant**

**PROJECT : Garbham Manganese Mine**

**LOCATION : Garbham (V), Merakamudidam (M), Vizianagaram (Dist.), A.P.**

**SEASON : Summer Season-2019**

**Duration of Time: 17:00 - 24:00 Hrs**

Direction	Wind Speed (KMPH)				Total
	1.6-5.0	5-10	10-15	>15	
N	0.82	1.9	0.27	0.14	3.12
NNE	2.72	4.89	4.89	0.82	13.32
NE	1.09	3.67	5.84	1.77	12.36
ENE	0.95	2.04	2.04	1.09	6.11
E	0.41	2.45	1.63	0.41	4.89
ESE	1.09	2.04	2.58	0.54	6.25
SE	0.82	2.17	1.49	0.41	4.89
SSE	0.68	2.85	3.67	0.54	7.74
S	0.68	1.49	1.63	0.14	3.94
SSW	0.14	1.36	0.68	0	2.17
SW	0.68	0.82	0.95	0.68	3.12
WSW	0.82	0.95	0.82	0	2.58
W	0.95	0.68	0.41	0.14	2.17
WNW	1.36	1.63	1.49	0.27	4.76
NW	1.09	2.58	2.45	1.49	7.61
NNW	0.41	1.09	2.72	0.82	5.03
<b>CALM</b>					9.92
<b>TOTAL</b>					100

**Table - 2.4**  
**Wind Percentage Frequency**

**CLIENT : Visakhapatnam Steel Plant**  
**PROJECT : Garbham Manganese Mine**  
**LOCATION : Garbham (V), Merakamudidam (M), Vizianagaram (Dist.), A.P.**  
**SEASON : Summer Season-2019**

**Duration of Time: 01:00 - 24:00 Hrs**

Direction	Wind Speed (KMPH)				Total
	1.6-5.0	5-10	10-15	>15	
N	0.54	1.09	1.13	0.27	3.03
NNE	2.72	4.17	4.35	1.09	12.32
NE	2.08	3.94	3.89	1.31	11.23
ENE	1.27	1.68	1.72	1.22	5.89
E	0.54	1.49	1.27	0.59	3.89
ESE	0.95	1.81	2.72	0.54	6.02
SE	0.36	1.99	1.77	0.54	4.66
SSE	0.63	2.45	2.67	0.72	6.48
S	1.04	1.18	1.63	0.32	4.17
SSW	0.5	1.27	0.54	0	2.31
SW	0.68	0.95	0.95	0.54	3.12
WSW	0.45	0.86	1.04	0.18	2.54
W	0.5	0.59	0.95	0.36	2.4
WNW	1.22	1.31	1.95	0.86	5.34
NW	0.82	2.72	4.71	2.31	10.55
NNW	0.32	1.31	1.99	0.77	4.39
<b>CALM</b>					11.64
<b>TOTAL</b>					100

## 2.2 AIR ENVIRONMENT

Ambient air quality was monitored at the following three locations for significant parameters like SPM, PM<sub>10</sub>, PM<sub>2.5</sub> SO<sub>2</sub>, NO<sub>2</sub> & CO adopting the methods prescribed by Central Pollution Control Board (CPCB) & Indian Standard (IS) 5182. The locations of ambient air quality monitoring stations are given below **Table 2.5**.

**TABLE-2.5**  
**AMBIENT AIR QUALITY LOCATIONS**

Station Code	Locations
<b>CORE ZONE</b>	
A-1	Mines Area
A-2	Administrative Office
<b>BUFFER ZONE</b>	
A-3	Garbham Village

### 2.2.1 Duration & Frequency of Sampling

The ambient air sampling at each location was carried as following guidelines of Indian Bureau of Mines.

No of Shifts : 2 shifts per day (Shift – A & Shift – B) each of 8hr duration

No of Days : 2 days per week

No of Weeks: 2 weeks per season

Pre-calibrated Respirable Dust Sampler & Fine Dust Samplers have been used for the monitoring of AAQ status. The Test reports are given as **Annexure – I**.

## 2.3 WATER ENVIRONMENT

Four water samples were collected from the following various sources located in and around the mine. The locations of water quality monitoring stations in and around the mines are given in **Table 2.6**.

**TABLE - 2.6**  
**WATER SAMPLING LOCATIONS**

CODE.	LOCATIONS
<b>Mine Pit Water</b>	
W-1	Mine Discharge water
<b>Bore well Water</b>	
W-2	Borewell Raw water
W-3	Drinking water
W-4	Garbham village

Water sampling at each location was collected to assess the quality. The water samples collected were assessed for Physico-Chemical and bacteriological quality. The Test reports are given as **Annexure - II**.

#### 2.4 DUST FALL MEASUREMENT

Dust fall measurement was carried at three locations in and around the mine. The analysis results of the sample are given in **Annexure-III**.

**TABLE - 2.7**  
**DUST FALL MONITORING**

S.No	LOCATIONS
DF1	Mining Area
DF2	Admin. Office
DF3	Garbham Village

#### 2.5 NOISE LEVEL MONITORING

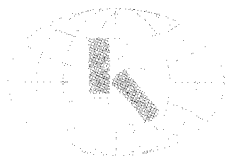
Four locations were collected from the following various sources located in and around the mine. The locations of Noise level Monitoring stations in and around the mines are given in **Table 2.8**.

**TABLE - 2.8**  
**NOISE LEVEL MONITORING**

S.No	LOCATIONS
N1	Mining Area
N2	Admin. Office
N3	Near Hydraulic Excavator
N4	Loading Point

The Test reports are given as **Annexure - IV**.

# **ANNEXURES**

**ENVIRONMENTAL CONSULTANTS & ANALYTICAL LABORATORY**4<sup>th</sup> Floor, 'AMITY VILLE', 12-13-1270/71/73, St. Ann's Road,

Tarnaka, Secunderabad - 500 017, Telangana, INDIA

Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063

Email : info@bsenvitech.com Website : www.bsenvitech.com

**Annexure-I****AMBIENT AIR QUALITY MONITORING**

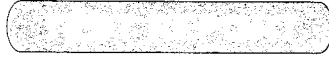
**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Monitoring location** : Mine Area (A-1)

Date of Monitoring	Week	SPM ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
21.05.2019	I	454	46	283	10.9	12.4	<1
		423	34	262	10.2	11.7	<1
22.05.2019	I	436	42	257	12.3	13.6	<1
		415	35	242	10.5	11.9	<1
28.05.2019	II	442	39	259	12.6	13.2	<1
		421	36	245	10.1	11.4	<1
29.05.2019	II	448	48	276	12.4	13.7	<1
		433	40	231	10.3	11.8	<1
<b>MAXIMUM</b>		<b>454</b>	<b>48</b>	<b>283</b>	<b>12.6</b>	<b>13.7</b>	<1
<b>MINIMUM</b>		<b>415</b>	<b>34</b>	<b>231</b>	<b>10.1</b>	<b>11.4</b>	<1
<b>AVERAGE</b>		<b>434.1</b>	<b>40.2</b>	<b>256.9</b>	<b>11.2</b>	<b>12.5</b>	<1
<b>8 hourly Standard as per IBM</b>		<b>700</b> [ $\mu\text{g}/\text{m}^3$ ]	-	<b>350</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>5000</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>6000</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>40</b> [ $\text{mg}/\text{m}^3$ ]
<b>NAAQ Standards for Industrial, Residential, Rural and Other Areas (24 hourly standard)</b>		-	<b>60</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>100</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>2</b> [ $\text{mg}/\text{m}^3$ ] (8 hourly)

  
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**ENVIRONMENTAL CONSULTANTS & ANALYTICAL LABORATORY**

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Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
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**Annexure-I****AMBIENT AIR QUALITY MONITORING**

**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Monitoring Location** : Administrative Office (A-2)

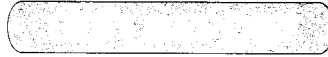
Date of Monitoring	Week	SPM ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
21.05.2019	I	256	40	79	10.5	11.9	<1
		231	32	65	10.1	11.3	<1
22.05.2019	I	248	36	75	11.3	12.6	<1
		227	29	58	9.7	10.8	<1
28.05.2019	II	252	33	66	11.8	12.9	<1
		223	24	49	10.2	11.5	<1
29.05.2019	II	239	33	68	11.4	12.3	<1
		218	26	57	9.9	10.6	<1
<b>MAXIMUM</b>		<b>256</b>	<b>40</b>	<b>79</b>	<b>11.8</b>	<b>12.9</b>	<1
<b>MINIMUM</b>		<b>218</b>	<b>24</b>	<b>49</b>	<b>9.7</b>	<b>10.6</b>	<1
<b>AVERAGE</b>		<b>236.8</b>	<b>31.7</b>	<b>64.5</b>	<b>10.6</b>	<b>11.7</b>	<1
<b>8 hourly Standard as per IBM</b>		<b>700</b> [ $\mu\text{g}/\text{m}^3$ ]	-	-	-	-	-
<b>NAAQ Standards for Industrial, Residential, Rural and Other Areas (24 hourly standard)</b>		-	<b>60</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>100</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>2</b> [ $\text{mg}/\text{m}^3$ ] (8 hourly)

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**Annexure-I****AMBIENT AIR QUALITY MONITORING**

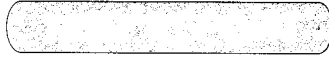
**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Monitoring Location** : Garbham Village (A-3)

Date of Monitoring	Week	SPM ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
21.05.2019	I	238	40	79	10.0	10.7	<1
		223	33	65	9.3	10.4	<1
22.05.2019	I	245	38	76	10.1	11.3	<1
		234	29	58	9.5	10.6	<1
28.05.2019	II	240	32	64	10.8	12.6	<1
		217	24	51	9.4	10.5	<1
29.05.2019	II	236	43	78	11.2	12.2	<1
		219	37	66	10.3	11.1	<1
<b>MAXIMUM</b>		<b>245</b>	<b>43</b>	<b>79</b>	<b>11.2</b>	<b>12.6</b>	<1
<b>MINIMUM</b>		<b>217</b>	<b>24</b>	<b>51</b>	<b>9.3</b>	<b>10.4</b>	<1
<b>AVERAGE</b>		<b>231.4</b>	<b>34.3</b>	<b>66.7</b>	<b>10.1</b>	<b>11.2</b>	<1
<b>8 hourly Standard as per IBM</b>		<b>700</b> [ $\mu\text{g}/\text{m}^3$ ]	-	-	-	-	-
<b>NAAQ Standards for Industrial, Residential, Rural and Other Areas (24 hourly standard)</b>		-	<b>60</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>100</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>80</b> [ $\mu\text{g}/\text{m}^3$ ]	<b>2</b> [ $\text{mg}/\text{m}^3$ ] (8 hourly)

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**Annexure-II**

**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Location** : Mine Pit water  
**Date of Collection** : 28th May-2019

S.No.	Parameters	Results	Standards as per GSR 422 (E)	Units
<b>PHYSICAL EXAMINATIONS</b>				
01.	Colour	<5	Colourless	Hazen
02.	Odour	Agreeable	Odorless	-
03.	Turbidity	8	----	NTU
04.	Total Dissolved Solids	418	2100 Max.	mg/l
05.	Total Suspended Solids	49	100 Max.	mg/l
<b>CHEMICAL EXAMINATIONS</b>				
06.	pH	7.59	5.5 to 9.0	-
07.	Oil & Grease	<1	10 Max.	mg/l
08.	Total residual Chlorine	<0.1	1.0 Max.	mg/l
09.	Ammonical Nitrogen as N	0.9	50 Max.	mg/l
10.	Biochemical Oxygen demand	8	30 Max.	mg/l
11.	Chemical Oxygen demand	32	250 Max	mg/l
12.	Arsenic as As	<0.01	0.2 Max.	mg/l
13.	Mercury as Hg	<0.001	0.01 Max.	mg/l
14.	Lead as Pb	<0.01	0.1 Max.	mg/l
15.	Cadmium as Cd	<0.003	2.0 Max.	mg/l
16.	Hexavalent Chromium as Cr <sup>+6</sup>	<0.05	----	mg/l
17.	Total Chromium as Cr	<0.02	2.0 Max.	mg/l
18.	Copper as Cu	<0.02	3.0 Max.	mg/l
19.	Zinc as Zn	0.09	5.0 Max.	mg/l
20.	Selenium as Se	<0.01	0.05 Max.	mg/l
21.	Nickel as Ni	<0.02	3.0 Max.	mg/l
22.	Fluoride as F	0.49	2.0 Ma.	mg/l
23.	Sulphide as S	<0.02	2.0 Max.	mg/l
24.	Phenolic Compounds s C <sub>6</sub> H <sub>5</sub> OH	<0.001	1.0 Max.	mg/l
25.	Manganse as Mn	<0.02	2.0 Max.	mg/l
26.	Iron as Fe	0.30	3.0 Max.	mg/l
27.	Vanadium as V	<0.02	0.2 Max.	mg/l
28.	Nitrate as N	2.1	10 Max.	mg/l

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4<sup>th</sup> Floor, 'AMITY VILLE', 12-13-1270/71/73, St. Ann's Road,  
Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
Email : info@bsenvitech.com Website : www.bsenvitech.com

### Water Quality Monitoring

### Annexure-II

**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Location** : Mines office Bore well water  
**Date of Collection** : 28th May-2019

S.No.	Parameters	Results	STANDARD AS PER IS 10500-2012		Units
			ACCEPTABLE LIMITS	PERMISSIBLE LIMITS	
<b>PHYSICAL EXAMINATIONS</b>					
01.	Colour	<5	5	15	Hazen
02.	Odour	Agreeable	Agreeable	Agreeable	-
03.	Turbidity	<1	1	5	NTU
04.	Total Dissolved Solids	510	500	2000	mg/l
05.	Electrical Conductivity	786	-	-	-
<b>CHEMICAL EXAMINATIONS</b>					
06.	pH	7.54	6.5 to 8.5	No Relaxation	-
07.	Residual Free Chlorine	<0.1	0.2	1	mg/l
08.	Alkalinity Total as CaCO <sub>3</sub>	150	200	600	mg/l
09.	Total Hardness as CaCO <sub>3</sub>	295	200	600	mg/l
10.	Calcium as Ca	86	75	200	mg/l
11.	Magnesium as Mg	19	30	100	mg/l
12.	Iron Total as Fe	0.08	1.0	No Relaxation	mg/l
14.	Manganese as Mn	<0.02	0.1 Max.	0.3 Max.	mg/l
15.	Nitrate as NO <sub>3</sub>	13	45 Max.	No Relaxation	mg/l
16.	Chloride as Cl	126	250 Max.	1000 Max.	mg/l
17.	Fluoride as F	0.58	1.0 Max.	1.5 Max.	mg/l
18.	Sulphate as SO <sub>4</sub>	45	200 Max.	400 Max.	mg/l
19.	Phenolic Compounds	<0.001	0.001 Max.	0.002 Max.	mg/l
20.	Cyanide as CN	<0.02	0.05 Max.	No Relaxation	mg/l
21.	Mineral Oil	Absent	0.5 Max.	No Relaxation	c
<b>METALS</b>					
22.	Total Chromium (as Cr)	<0.02	0.05 Max.	No Relaxation	mg/l
23.	Arsenic as As	<0.01	0.01 Max.	No Relaxation	mg/l
24.	Lead as Pb	<0.01	0.01 Max.	No Relaxation	mg/l
25.	Copper as Cu	<0.02	0.05 Max.	1.5 Max.	mg/l
26.	Cadmium as Cd	<0.003	0.003 Max.	No Relaxation	mg/l
27.	Boron as B	<0.10	0.5 Max.	2.4 Max.	mg/l
28.	Zinc as Zn	<0.02	5 Max.	15 Max.	mg/l
29.	Mercury as Hg	<0.001	0.001 Max.	No Relaxation	mg/l
30.	Selenium as Se	<0.01	0.01 Max.	No Relaxation	mg/l
31.	Nickel as Ni	<0.02	0.02 Max.	No Relaxation	mg/l
32.	Chemical Oxygen Demand	8	-	-	mg/l

  
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Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
Email : info@bsenvitech.com Website : www.bsenvitech.com

**Annexure-II**

**CLIENT** : **VISAKHAPATNAM STEEL PLANT**  
**PROJECT** : **GARBHAM MANGANESE MINE**  
**LOCATION** : **GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.**  
**SEASON** : **SUMMER SEASON-2019.**  
**Location** : **Drinking water**  
**Date of Collection** : **28th May-2019**

S.No.	Parameters	Results	STANDARD AS PER IS 10500 - 2012		Units
			ACCEPTABLE LIMITS	PERMISSIBLE LIMITS	
<b>PHYSICAL EXAMINATIONS</b>					
01.	Colour	<5	5	15	Hazen
02.	Odour	Agreeable	Agreeable	Agreeable	-
03.	Turbidity	<1	1	5	NTU
04.	Total Dissolved Solids	530	500	2000	mg/l
05.	Electrical Conductivity	815	-	-	-
<b>CHEMICAL EXAMINATIONS</b>					
06.	pH	7.48	6.5 to 8.5	No Relaxation	-
07.	Residual Free Chlorine	<0.1	0.2	1	mg/l
08.	Alkalinity Total as CaCO <sub>3</sub>	135	200	600	mg/l
09.	Total Hardness as CaCO <sub>3</sub>	325	200	600	mg/l
10.	Calcium as Ca	94	75	200	mg/l
11.	Magnesium as Mg	22	30	100	mg/l
12.	Iron Total as Fe	0.08	1.0	No Relaxation	mg/l
14.	Manganese as Mn	<0.02	0.1 Max.	0.3 Max.	mg/l
15.	Nitrate as NO <sub>3</sub>	20	45 Max.	No Relaxation	mg/l
16.	Chloride as Cl	133	250 Max.	1000 Max.	mg/l
17.	Fluoride as F	0.70	1.0 Max.	1.5 Max.	mg/l
18.	Sulphate as SO <sub>4</sub>	60	200 Max.	400 Max.	mg/l
19.	Phenolic Compounds	<0.001	0.001 Max.	0.002 Max.	mg/l
20.	Cyanide as CN	<0.02	0.05 Max.	No Relaxation	mg/l
21.	Mineral Oil	Absent	0.5 Max.	No Relaxation	c
<b>METALS</b>					
22.	Chromium (as Cr)	<0.02	0.05 Max.	No Relaxation	mg/l
23.	Arsenic as As	<0.01	0.01 Max.	No Relaxation	mg/l
24.	Lead as Pb	<0.01	0.01 Max.	No Relaxation	mg/l
25.	Copper as Cu	<0.02	0.05 Max.	1.5 Max.	mg/l
26.	Cadmium as Cd	<0.003	0.003 Max.	No Relaxation	mg/l
27.	Boron as B	<0.10	0.5 Max.	2.4 Max.	mg/l
28.	Zinc as Zn	<0.02	5 Max.	15 Max.	mg/l
29.	Mercury as Hg	<0.001	0.001 Max.	No Relaxation	mg/l
30.	Selenium as Se	<0.01	0.01 Max.	No Relaxation	mg/l
31.	Nickel as Ni	<0.02	0.02 Max.	No Relaxation	mg/l
32.	Chemical Oxygen Demand	<4			mg/l

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Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
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**Annexure-II**

**CLIENT** : **VISAKHAPATNAM STEEL PLANT**  
**PROJECT** : **GARBHAM MANGANESE MINE**  
**LOCATION** : **GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.**  
**SEASON** : **SUMMER SEASON-2019.**  
**Location** : **Garbham Village Tap Water (Panchayat).**  
**Date of Collection** : **28th May-2019**

S.No.	Parameters	Results	STANDARD AS PER IS 10500 - 2012		Units
			ACCEPTABLE LIMITS	PERMISSIBLE LIMITS	
<b>PHYSICAL EXAMINATIONS</b>					
01.	Colour	<5	5	15	Hazen
02.	Odour	Agreeable	Agreeable	Agreeable	-
03.	Turbidity	<1	1	5	NTU
04.	Total Dissolved Solids	525	500	2000	mg/l
05.	Electrical Conductivity	808	-	-	-
<b>CHEMICAL EXAMINATIONS</b>					
06.	pH	7.42	6.5 to 8.5	No Relaxation	-
07.	Residual Free Chlorine	<0.1	0.2	1	mg/l
08.	Alkalinity Total as CaCO <sub>3</sub>	125	200	600	mg/l
09.	Total Hardness as CaCO <sub>3</sub>	310	200	600	mg/l
10.	Calcium as Ca	90	75	200	mg/l
11.	Magnesium as Mg	21	30	100	mg/l
12.	Iron Total as Fe	0.11	1.0	No Relaxation	mg/l
14.	Manganese as Mn	<0.02	0.1 Max.	0.3 Max.	mg/l
15.	Nitrate as NO <sub>3</sub>	22	45 Max.	No Relaxation	mg/l
16.	Chloride as Cl	138	250 Max.	1000 Max.	mg/l
17.	Fluoride as F	0.70	1.0 Max.	1.5 Max.	mg/l
18.	Sulphate as SO <sub>4</sub>	60	200 Max.	400 Max.	mg/l
19.	Phenolic Compounds	<0.001	0.001 Max.	0.002 Max.	mg/l
20.	Cyanide as CN	<0.02	0.05 Max.	No Relaxation	mg/l
21.	Mineral Oil	Absent	0.5 Max.	No Relaxation	c
<b>METALS</b>					
22.	Chromium (as Cr)	<0.02	0.05 Max.	No Relaxation	mg/l
23.	Arsenic as As	<0.01	0.01 Max.	No Relaxation	mg/l
24.	Lead as Pb	<0.01	0.01 Max.	No Relaxation	mg/l
25.	Copper as Cu	<0.02	0.05 Max.	1.5 Max.	mg/l
26.	Cadmium as Cd	<0.003	0.003 Max.	No Relaxation	mg/l
27.	Boron as B	<0.10	0.5 Max.	2.4 Max.	mg/l
28.	Zinc as Zn	<0.02	5 Max.	15 Max.	mg/l
29.	Mercury as Hg	<0.001	0.001 Max.	No Relaxation	mg/l
30.	Selenium as Se	<0.01	0.01 Max.	No Relaxation	mg/l
31.	Nickel as Ni	<0.02	0.02 Max.	No Relaxation	mg/l
32.	Chemical Oxygen Demand	<4			mg/l

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Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
Email : info@bsenvitech.com Website : www.bsenvitech.com

**Annexure-II**

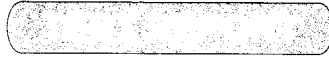
**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**Location** : Garbham Bore well Water  
**Date of Collection** : 28th May-2019

S. No.	Parameters	Result	Standards as per GSR 422 (E)	Units
<b>PHYSICAL EXAMINATIONS</b>				
01.	Colour	<5	Colourless	Hazen
02.	Odour	Agreeable	Odorless	-
03.	Turbidity	1	----	NTU
04.	Total Dissolved Solids	555	2100 Max.	mg/l
05.	Total Suspended Solids	<10	100 Max.	mg/l
<b>CHEMICAL EXAMINATIONS</b>				
06.	pH	7.50	5.5 to 9.0	-
07.	Oil & Grease	<1	10 Max.	mg/l
08.	Total residual Chlorine	<0.1	1.0 Max.	mg/l
09.	Ammonical Nitrogen as N	<0.2	50 Max.	mg/l
10.	Biochemical Oxygen demand	<2	30 Max.	mg/l
11.	Chemical Oxygen demand	8	250 Max.	mg/l
12.	Arsenic as As	<0.01	0.2 Max.	mg/l
13.	Mercury as Hg	<0.001	0.01 Max.	mg/l
14.	Lead as Pb	<0.01	0.1 Max.	mg/l
15.	Cadmium as Cd	<0.003	2.0 Max.	mg/l
16.	Hexavalent Chromium as Cr <sup>+6</sup>	<0.05	----	mg/l
17.	Total Chromium as Cr	<0.02	2.0 Max.	mg/l
18.	Copper as Cu	<0.02	3.0 Max.	mg/l
19.	Zinc as Zn	0.07	5.0 Max.	mg/l
20.	Selenium as Se	<0.01	0.05 Max.	mg/l
21.	Nickel as Ni	<0.02	3.0 Max.	mg/l
22.	Fluoride as F	0.60	2.0 Ma.	mg/l
23.	Sulphide as S	<0.02	2.0 Max.	mg/l
24.	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	<0.001	1.0 Max.	mg/l
25.	Manganese as Mn	<0.02	2.0 Max.	mg/l
26.	Iron as Fe	0.14	3.0 Max.	mg/l
27.	Vanadium as V	<0.02	0.2 Max.	mg/l
28.	Nitrate as N	3.1	10 Max.	mg/l

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Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
Email : info@bsenvitech.com Website : www.bsenvitech.com

**Annexure-III****DUST FALL REPORTS**

**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.

**Code: Mines area****pH Value: 7.18**

S.No	Parameters	Quantity Measured (mg)	Calculated Deposition (T/Km <sup>2</sup> /Month)
1	Total Un dissolved Matter	213	2.67
2	Total Dissolved Matter	204	1.82
3	Total Solids	417	4.49
4	Ash	28	0.36

*Note: T indicates Metric Tonnes***Code: Admin. Office****pH Value: 7.10**

S.No	Parameters	Quantity Measured (mg)	Calculated Deposition (T/Km <sup>2</sup> /Month)
1	Total Un dissolved Matter	207	2.51
2	Total Dissolved Matter	298	3.15
3	Total Solids	505	5.66
4	Ash	24	0.39

*Note: T indicates Metric Tonnes***Code: Garbham Village****pH Value: 7.13**

S.No	Parameters	Quantity Measured (mg)	Calculated Deposition (T/Km <sup>2</sup> /Month)
1	Total Un dissolved Matter	197	1.77
2	Total Dissolved Matter	204	2.25
3	Total Solids	401	4.02
4	Ash	22	0.34

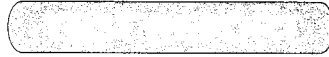
*Note: T indicates Metric Tonnes*

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4<sup>th</sup> Floor, 'AMITY VILLE', 12-13-1270/71/73, St. Ann's Road,  
Tarnaka, Secunderabad - 500 017, Telangana, INDIA  
Ph. : +91 40 49723062 / 27016806 Fax : +91 40 49783063  
Email : info@bsenvitech.com Website : www.bsenvitech.com



### Annexure-IV

**CLIENT** : VISAKHAPATNAM STEEL PLANT  
**PROJECT** : GARBHAM MANGANESE MINE  
**LOCATION** : GARBHAM (V) MERAKAMUDIDAM (M),  
VIZIANAGARAM (DIST.), A.P.  
**SEASON** : SUMMER SEASON-2019.  
**DATE OF MONITORING** : 29th May-2019

### NOISE LEVEL MONITORING

Location	Mining Area	Admin. Office	Near Hydraulic Excavator	Loading Point
<b>Day Time</b>				
06:00	53.5	44.6	60.3	58.1
07:00	55.6	52.3	59.4	56.6
08:00	57.9	64.6	63.5	63.2
09:00	56.4	59.1	67.9	60.5
10:00	57.8	56.5	73.4	57.6
11:00	61.9	61.3	71.6	62.6
12:00	63.8	53.2	72.3	64.5
13:00	65.1	53.7	73.1	63.2
14:00	63.2	63.6	71.6	64.2
15:00	67.3	62.9	70.8	64.3
16:00	68.9	57.5	70.5	60.8
17:00	62.3	54.3	72.3	62.6
18:00	64.2	52.6	73.7	60.1
19:00	58.6	54.5	66.1	58.6
20:00	68.7	54.3	68.2	59.1
21:00	60.2	51.8	70.6	60.7
<b>Night Time</b>				
22:00	49.3	45.7	63.1	58.9
23:00	47.8	45.6	62.9	58.8
24:00	45.6	42.3	63.7	57.6
01:00	47.6	46.7	62.3	56.8
02:00	44.6	43.2	63.1	55.3
03:00	50.2	43.6	63.2	56.4
04:00	49.5	45.8	62.6	53.1
05:00	47.2	43.9	64.5	54.2
<b>Day Equivalent (Ld)</b>	<b>63.8</b>	<b>58.8</b>	<b>70.6</b>	<b>61.7</b>
<b>Night Equivalent (Ld)</b>	<b>48.1</b>	<b>44.8</b>	<b>63.2</b>	<b>56.8</b>
<b>CPCB standards for Noise levels</b>			<b>Day Time</b>	<b>Night Time</b>
<b>Standards For Industrial Area</b>			<b>75</b>	<b>70</b>
<b>Noise Standards For Residential Area</b>			<b>50</b>	<b>45</b>

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