Pre-feasibility Report

Efficiency Enhancement in Production capacity of Existing Sponge Iron Units from 1.2 TPA to 1.65 TPA

M/s Minera Steel & Power Pvt. Ltd.

(formerly known as M/s KMMI Steels Pvt. Ltd.)

Corporate Office : # 811/2, NH63, Hospet Road, Alipur, Bellary -583105

Works Yarabanahalli Village, Sandur Taluk, Bellary Dist

January 2016

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Chapter - 1

Project Highlights

Name of the Industry	:	**Minera Steel & Power Pvt. Ltd** (formerly known as KMMI Steels pvt. Ltd.) .
Corporate Office :	:	#811/2, NH63, Hospet Road, Alipur, Bellary -583105
Works		Yarabanahalli Village, Sandur Taluk, Bellary Dist
Plant Location	:	Within existing premises of plant at Yarabanahalli village, Sandur Taluk, Bellary Dist
Contact person	:	Sri Nanda Kumar Kadloor, Director & CEO
Tel No.	:	918392 237701 918392 237801
Mobile No.	:	09449078466/ 09900025520 / 9480823405
Fax No.	:	918392 237799
E mail		nkkadloor@mineragroup.com / admn@mineragroup.com/ info@mineragroup.com
Present Proposal	:	Efficiency Enhancement in Production Capacity of Sponge Iron Plants from 1.2 LTPA to 1.65 LTPA (within the other existing facilities of Integrated Steel Plant) **without any modification** in the existing plant and machinery, but only change in the raw material mix.
Land Area	:	Within the existing land of 137.65 Acres
Raw Material Requirement	:	Iron Ore Pellets(From Captive Production) 2,34,300 TPA (In lieu of existing Iron Ore Lumps 2,22,000 TPA) : Imported Coal (Source:South Africa) 1,40,250 TPA Dolomite 4,950 TPA

Water Requirement for Sponge Iron units	:	Existing – 400 KLD. Proposed - 400 KLD Additional requirement - Nil Source: Tungabhadra River RBHLC /Ground water
Power Requirement for Sponge Iron units	:	Existing – 6.6 MU Proposed – 7.92 MU Additional requirement – 1.32 MU Source : Existing Captive generation
Project Cost	:	Total investment of Rs. 332.89 Crore already made in the entire manufacturing activities No additional investment is proposed for enhancement.

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Chapter – 2

Background Information

KMMI Steel Private Limited (KSPL) was incorporated on 05/02/2006 with the Registrar of Companies, Karnataka. Environment Clearance for Establishment of Mini Steel Plant with the following plant facilities at village Yerabanahalli, Taluk Sandur, District Bellary, Karnataka was granted to KMMI Steel Private Limited (KSPL) by Government of India (GOI), Ministry of Environment & Forest, vide Lt. No. J-11011/1166/2007-IAII (I) dated 22.09.2008.

Sl. No.	Plant Facilities	Capacity
1	Sponge Iron Plant	1.2 LTPA
2	Mini Steel Plant	1.5LTPA
3	Pelletisation Plant	6.0LTPA
4	Captive Power Plant	25 MW (8 MW –WHRB & 17 MW -FBC)

Subsequently the name of the Company has been changed to KMMI Steel Private Ltd., to **Minera Steel & Power Private Limited.** Fresh Certificate of Incorporation Consequent upon Change of Name has been issued under Section 21 of the Companies Act 1956 by Registrar of Companies, Karnataka vide SRNB04931218 dated 11.02.2011. Ministry of Environment & Forest, GOI was requested by the company to transfer EC from KMMI Steel Private Ltd. to Minera Steel & Power Private Limited.

Ministry of Environment, Forest and Climate Change GOI after considering the facts, transferred the Environmental Clearance letter dated 22.09.2008 from KMMI Steel Private Ltd. to Minera Steel & Power Ltd., vide letter even No. dated 22.07.2015.

Particulars of the Company

Name of the Unit	:	**Minera Steel & Power Private Limited** (formerly known as KMMI Steel Private Ltd)
Date of Incorporation	:	15.02.2006
Corporate Office	:	# 811/2, NH 63, Hospet Road, Alipur, Bellary -583105

Plant Location	:	Yerabanahally village, Sandur Taluk, Bellary Dist.. Pin:583115
Managing Director		Mr. Tanveer Ahmed
Contact Person	:	Mr. Nandakumar Kadloor, Director & CEO
E-mail	:	nkkadloor@mineragroup.com
Tel No.	:	09449078466 / 9900025520/91-8392237701, 91-8392237801
Fax No.	:	91-8392237799

The proponent after obtaining CFE and CFO from Karnataka State Pollution Control Board has commissioned the following units and the units are in operation.

Sl. No.	Plant Facilities	Capacity
1	Sponge Iron Plant	1.2 LTPA (4x100 TPD)
2	Mini Steel Plant	0.75 LTPA (IF Route)
3	Pelletisation Plant	6.0LTPA
4	Captive Power Plant	18 MW i.e WHRB 10 MW –FBC

Presently 4x100 TPD capacity Sponge Iron Plants are in operation using Iron ore as primary raw material. Earlier it was considered to use Iron ore with Fe content › 65% in sponge Iron units. As per Supreme Court Order Iron Ore is to be procured through e-action now and the quality of Iron Ore is poor with low Fe content. As such the industry is facing lot of problem in producing quality Sponge Iron.

M/s Minera Steel and Power Private Limited has commissioned 6.0LTPA capacity Pellet plant in the month of August 2014 and producing good quality pellets. The company proposes to enhance the efficiency of the production capacity of its Sponge Iron Plant from 1,20,000 TPA to 1,65,000 TPA without any modification in the plant and machinery, but only by changing the raw material mix. Instead of using the conventional iron ore, the company now proposes to feed iron ore **pellets**. With Iron ore as raw material Sponge Iron units work for periods of 270-300 days in a year. By using pellets the same units will be capable of working up to 330 days in a year.

The compliance reports for all the existing manufacturing facilities are being submitted to the Regional Office, MoEF&CC, Bangalore and Karnataka State Pollution Control Board, Bangalore regularly.

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Chapter - 3

Proposed expansion of Sponge Iron Plant

The company proposes to increase the production capacity of its Sponge Iron Plant from 1,20,000 TPA to 1,65,000 TPA without any modification in the plant and machinery, but only by changing the raw material mix. Instead of using the conventional sized iron ore we now propose to feed iron ore pellets and mix of indigenous and imported coal. Earlier, Sponge Iron plants could work for periods of 270-300 days in a year. Nowadays, by using pellets the plants are capable of working upto 330 days in a year.

Need for the proposed expansion of Sponge Iron project

The company is having existing Iron Ore Pelletizing facilities of capacity of 6.0 lakh TPA. This is the backward integration for utilization of iron ore fines as pellets in sponge iron kilns. Pellet is today an important feed material for Sponge Iron making.

The agglomeration technologies viz. pelletization is an added advantage to Sponge Iron plant so that concentrates can be used as feed material. Recycling of cheaper raw material (fines) by beneficiation and pelletization process as feed material result in better Return on Investment as compared to using iron ore as feed material. With superior reducibility behavior of pellets compared to lump ore, the efficiency of Sponge Iron production improves.

With the present availability of pellets as in house production, the Company is in a position to use the pellet in Sponge Iron kiln instead of iron ore.

Advantages of using pellet in Sponge Iron Kiln:

- Sponge Iron Kiln can produce more than 35-40% than its rated capacity with the use of pellet as raw material **without any change in the design.**
  With the high, uniform mechanical strength and high abrasive strength of the pellet resulting in more yield, the production of sponge iron can be increased.
- Specific consumption of coal will come down.
- Campaign life will increase due to less accretion.

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- As there is less accretion and less fused lump formation, the refractory repairing cost will reduce.
- Metallization is better compared to lump ore.
- There is very little generation of fines in the finished product as against production with lump ore.
- There is less generation of solid waste.
- Maintenance cost will come down, as there will be no need for crushing and screening of iron ore lumps.
- Due to minimum handling of pellet, ground losses are low as compared to iron ore.
- As productivity will improve, cost of production of Sponge Iron will come down.
- Due to use of pellets, the fugitive emission is lower.
- Due to lower dust emissions and fugitive emissions etc, there is less stress on environment.

The proposed feed materials for revised capacity of sponge iron plant will be iron ore pellet, coal and dolomite.

Most of the coal based sponge iron plants in India uses iron ore lumps. The requirement is generally 1.6 to 1.8 t/ t of sponge iron. Use of pellets with better physical and metallurgical properties for sponge iron production, reduces the accretion formation in the kiln. Further, the production from the kiln is expected to increase by more than 30- 40%.

Project's Importance to the Country/ Region

Utilization of low grade ore and fines has to play an important role. In India partly due to the sponge iron sector; the overall percentage of lumps usage in steel making (47%) is higher than most other countries. As hard ore reserves is depleting day by day, lump generation suitable for blast furnace operation is coming down resulting in production of large amount of surplus fines. Alternative iron making processes for production of steel may lead to changing pattern of use material inputs and feed stock causing significant shift in respective share of lumps and agglomerated iron ore (pellets) and will also enable the use of ores which could not be utilized earlier. As fines forms considerable part of iron ore resources, value addition to the iron ore fines through various activities such as beneficiation, Pelletization is the need of the hour for use in Sponge Iron.

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Basis for increase in production capacity from 1.20 lakh TPA to 1.65 lakh TPA

1 RAW MATERIAL BASIS

Sl. No.	Particulars	Specific Consumption		
		Current	**Proposed**	**Increase/**
	Raw Material Consumption	Iron Ore – 1.85	Pellet - 1.42	
		Coal - 1.00 Dolomite - 0.04 Total Feed : 2.89	Coal -0/85 (Imported) Dolomite- 0.03 Total Feed : 2.30	(-)0.59
	Reduction in Coal consumption from 1.0 T/T to 0.85 T/T			(-)0.15 MT
A)	Increase in capacity due to reduction in coal use with better ore quality: 0.15MT			
	Proportionate increase in ore feed : Coal decrease x Density of Coal / Density of Iron Ore 0.15 15x 0.8/.2 = 5.45% 5.45 (increase in iron ore) x 0.70 (yield) =			**3.8%**
B)	Decrease in consumption of iron ore = 1.42/1.85 =			**8 %**
	Overall Increase in capacity = A + B = 4 + 8 =			**12%**
	Revised Capacity of DRI = 400 TPD x 1.12 x 330 days = 1,47,840 TPA			

2 GROSS FEED BASIS

Raw Material Burden	**Burden as per Iron Ore**	**Burden as per Pellet**	
	2.89	2.30	(-) 0.59
Difference in burden = 0.59/2.89 =			21 %
Revised Capacity of DRI = 400 TPD x 1.21 x 330 days = 1,59,720 TPA			

With efficient operation of the plants we propose to keep the capacity at 1,65,000TPA

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Brief Description of the Sponge Iron Project

The company is operating the Sponge Iron plant of 1,20,000 TPA capacity with 4 Nos. of 100 TPD Rotary Kilns in its premises situated at village Yerabanahalli, Taluk Sandur, District Bellary, Karnataka along with other steel manufacturing facilities:

Sponge iron manufacturing involves direct reduction, basically a chemical process occurring at high temperature in which oxygen is removed from the iron ore converting the ore, practically entirely to metallic iron.

Generally, in the solid reductant process, reduction of iron oxide is carried out in a refractory lined kiln with slope down from the feed to the discharge end. Iron oxide charge along with solid reductant and flux are fed to the kiln in controlled proportions. The charge material travels down the kiln counter current to the reducing gases and discharges into a water-cooled rotating drum cooler through a gas tight transfer chute. The cooled material is discharged on the screen that separates the product into different fractions each of which may pass through a magnetic separation stage to recover the magnetic fractions (DR) from the unused reductant and waste materials.

The process usually employs coal as the solid reductant. Gasification of the coal and reduction of the iron oxide take place simultaneously in the kiln once the reaction temperature has been reached. Heat for the process, particularly the endothermic gasification reaction, is supplied by combustion of free board carbon monoxide and coal volatiles evolving from the bed.

Temperature within the reduction zone of the kiln is generally controlled in the range of 1050°C. For temperature and process control there are a number of air tubes distributed along the length of the kiln through which controlled amount of shell-mounted fans for maintaining reducing condition and longitudinal temperature profile admit air.

The kiln is fired from the discharge end with liquid fuel during start-up. Injection of fine coal is adopted through the discharge end burner during normal operation.

The rotary kiln, which is driven by a variable speed, controlled drive to maintain regulated speed. Determined quantity of sized and pre-heated iron ore with coarse fraction of coal and sized limestone would be fed from the charging end. During the rotation of the kiln, due to its inclination the raw materials gradually move counter current to the flow of kiln off the gases. Fine coal would be injected from the discharge end of the kiln. Pre-heating of ore-coal composite shall be done in a separate kiln and the preheated material shall be charged in the reduction kiln. Pre-heating will be done by the gas from the reduction kiln.

The output product discharged from the reduction kiln would be cooled to room temperature in a rotary cooler by means of indirect water spray. The final product would be separated by magnetic separator. Metallic iron would be screened to get the fractions of + 2 mm and below 2 mm. The kiln gas shall be cleaned and shall be used for generation of power.

Environmental Clearances / Consents of the existing project of Minera Steel & Power Pvt. Ltd

Environmental Clearance for the establishment of Establishment of Mini Steel Plant at village Yerabanahalli, Taluk Sandur, District Bellary, Karnataka was granted to KMMI Steel Private Limited (KSPL) by Ministry of Environment & Forest, GOI, vide Lt. No. J-11011/1166/2007-IAII(I) dated 22.09.2008.

Subsequently the name of the Company has been changed to KMMI Steel Private Ltd., to **Minera Steel & Power Private Limited.** Fresh Certificate of Incorporation Consequent upon Change of Name has been issued under Section 21 of the Companies Act 1956 by Registrar of Companies, Karnataka vide SRNB04931218 dated 11.02.2011. Ministry of Environment & Forest, GOI, was requested by the company to transfer EC from KMMI Steel Private Ltd. to Minera Steel & Power Private Limited. Ministry of Environment, Forest and Climate Change, GOI, after considering the facts, transferred the Environmental Clearance letter dated 22.09.2008 from KMMI Steel Private Ltd. to Minera Steel & Power Ltd., vide letter even No. dated 22.07.2015.

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Consent for Establishment (CFE) was obtained from Karnataka State Pollution Control Board vide order dated 05.03.2009. Consent for Operation (CFO) was also obtained before operation of the units. CFO is being renewed every year. Current CFO is valid up to 30.06.2016.

The compliance reports for all the existing manufacturing facilities are being submitted to the Regional Office, MoEF, Bangalore and Karnataka State Pollution Control Board, Bangalore regularly.

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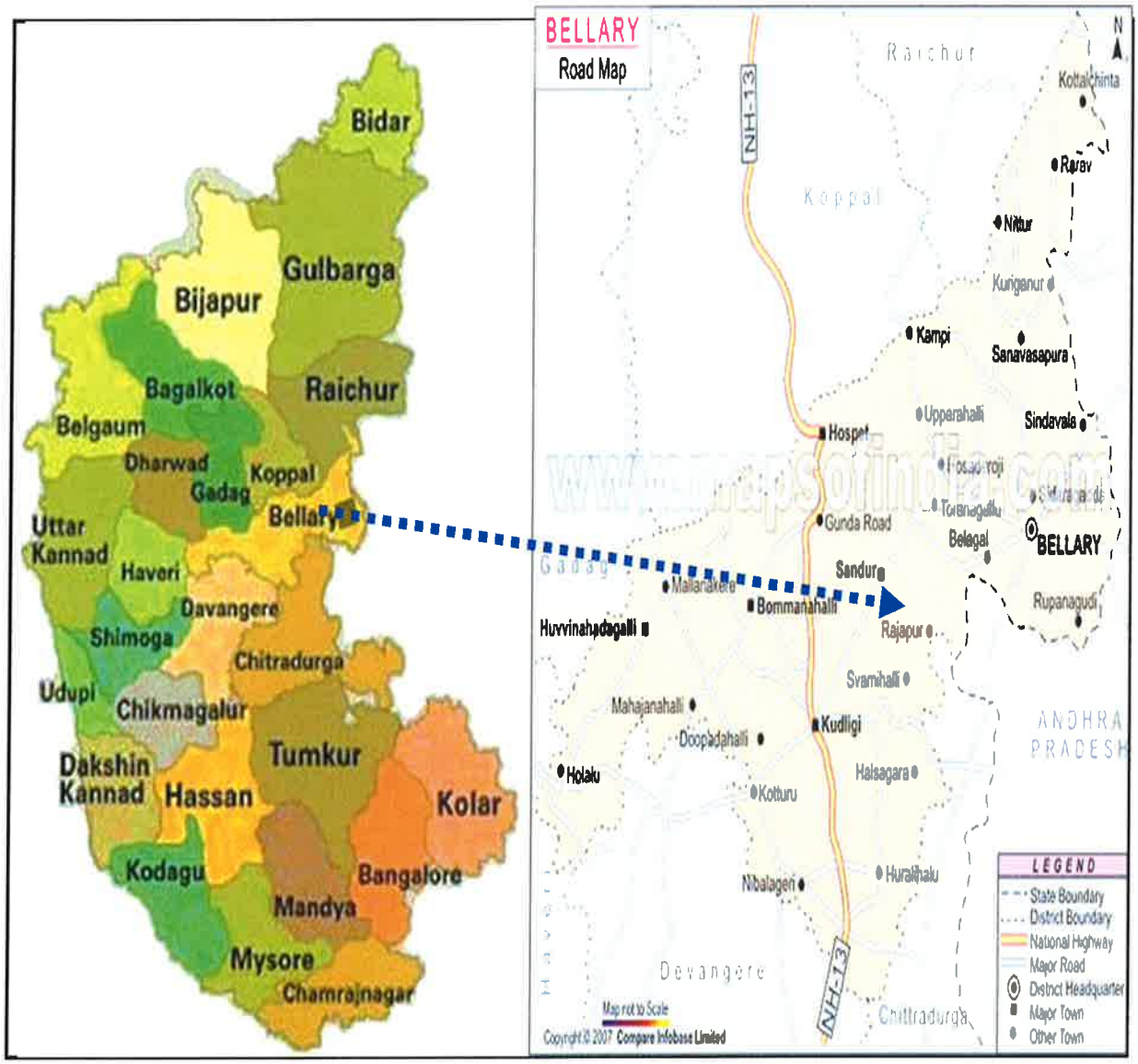
Location of Project:

The project site is located in Sy. No.114, 124, 9 & 131 of Yerabanahalli village, Sandur Taluk, Bellary District, Karnataka

Location of the Project Site on Bellary District map, with reference to State Map of Karnataka



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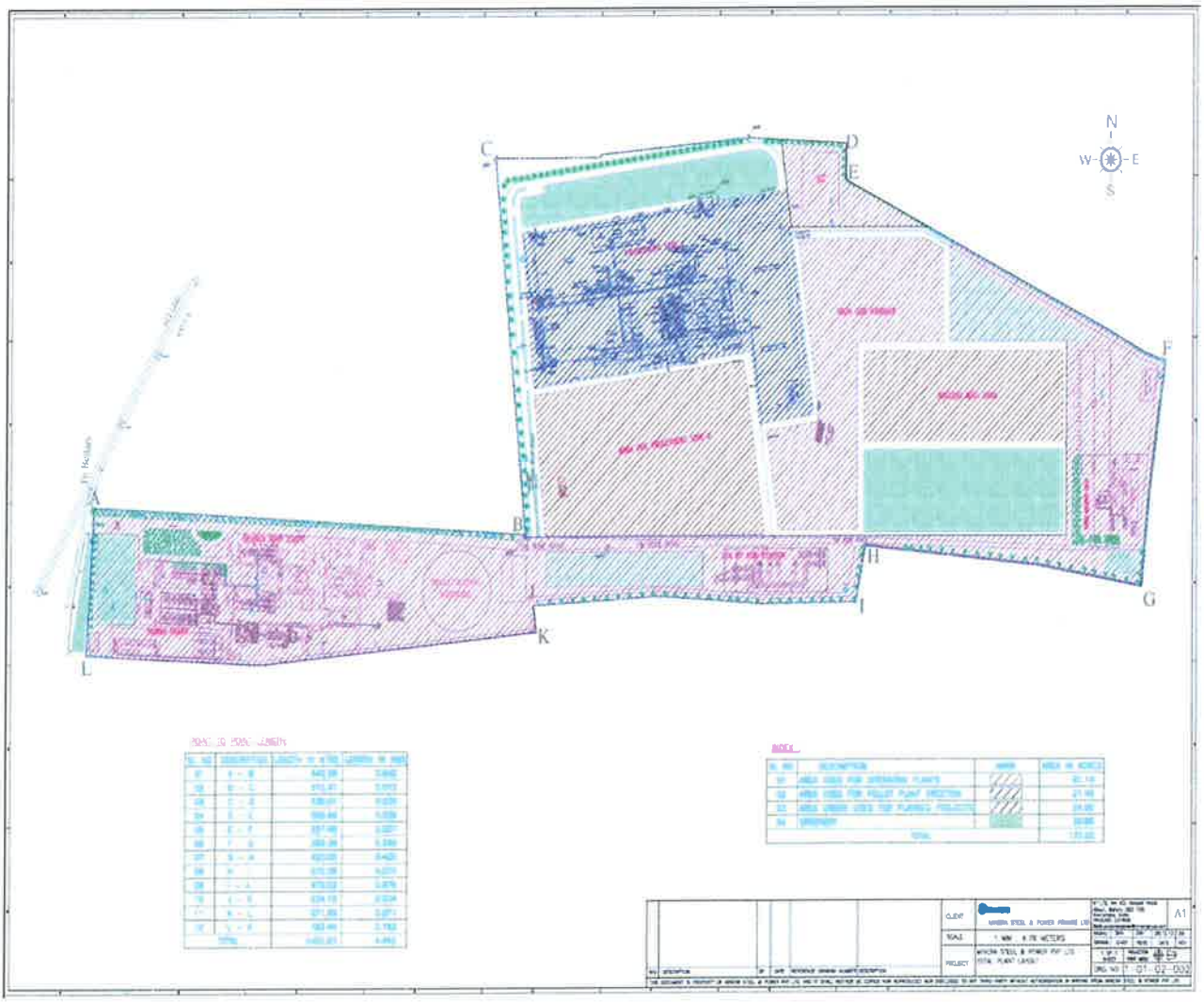
The terrain of the land is almost plain. The Sponge Iron Plant along with the steel manufacturing facilities of the company are located within the total area of 137.65 Acres of existing land in the plant premises of Minera Steel & Power & Power Pvt. Ltd., The Layout map showing the location of all the manufacturing units is shown below

Layout Plan of Minera Steel & Power & Power Pvt. Ltd.



Since the company proposes to increase the production capacity of its Sponge Iron Plant without any modification in the plant and machinery, **no additional land is required.**

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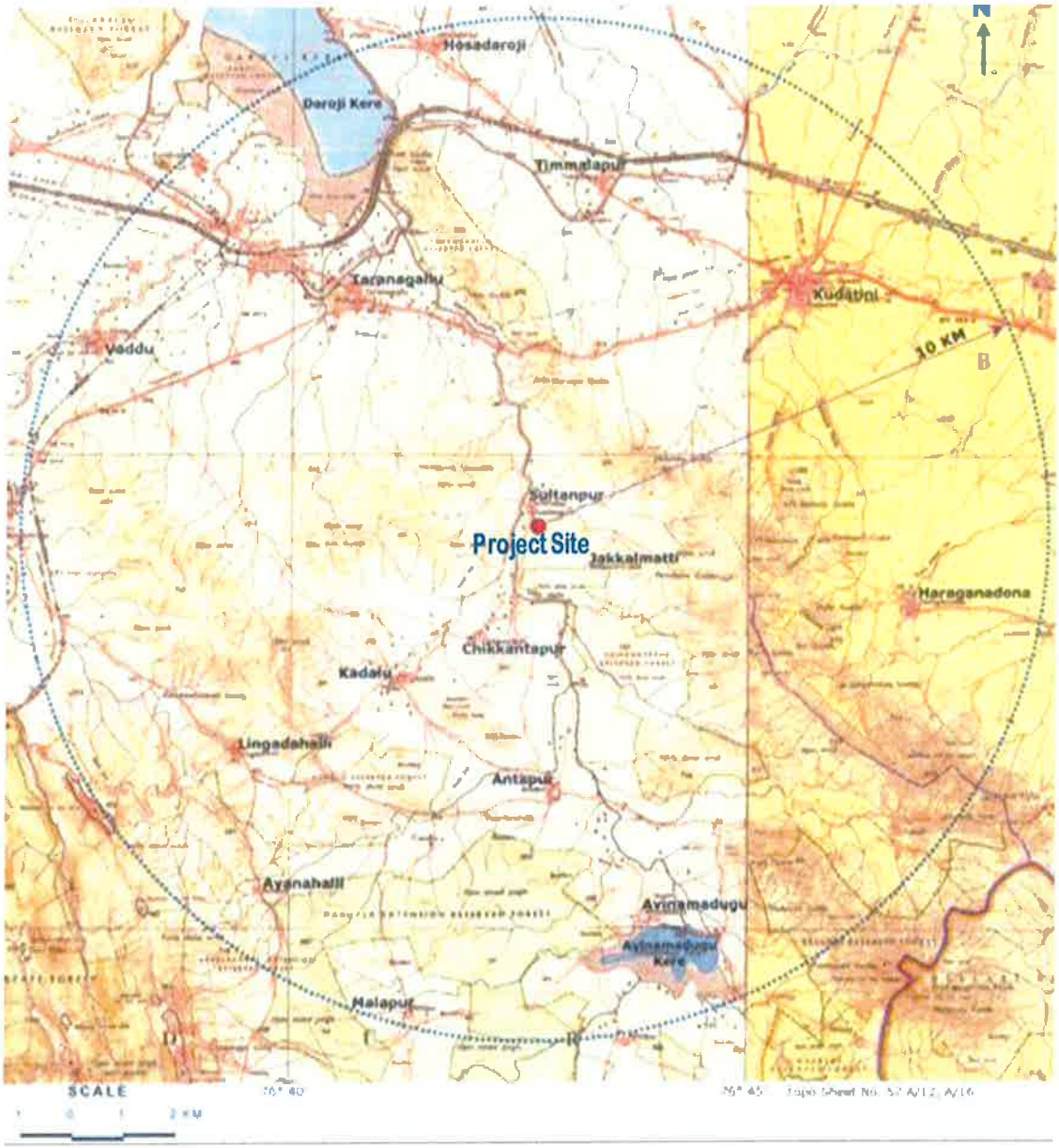
There are no ecologically sensitive places like national park, sanctuary, biosphere reserve, heritage sites, archeological monuments, defense installation, health resorts, scenic beauty etc. around 10 Kms. radius of the site. There is no route of migratory animals within the project site.

10 Km. Area Map on SOI Toposheet



Google Image of Project Site

Chapter –6

Process Descriptions of the Sponge Iron Plant

Raw Materials:

The primary raw materials currently being used for production of the sponge iron are coal, iron ore and dolomite.

We propose to change the feed material to iron ore pellets (captive production), mix of Indigenous & imported coal and dolomite.

Chemical Composition of Raw Materials:

Sl. No.	Current		Proposed	
1	Iron Ore	Fe : 62.5% to 65%, LOI: 3.5%	Pellet	Fe : 63.5% LOI: 0.5%
2	Coal	FC : 42%, Ash : 35%	Coal	FC : 52%, Ash : 22%
3	Dolomite	LOI : 50-52%	Dolomite	LOI : 50-52%

Manufacturing Process

Sponge Iron Plant

Process Description

In DRI making, a Rotary Kiln is used for direct reduction of ore. The rotary kiln is a refractory lined vessel on which several blowers are mounted. From the blowers, air pipes go through the shell and refractory, vertically and deliver the required amount of air, required for the process axially. The kiln has conical out let and inlet holds the material in the kiln. The Kiln is placed in a slope from feed end side at a slope of 2 ½%.

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Iron ore, coal, dolomite/limestone is fed in the weighed quantity and the kiln is rotated at a speed of about 0.5rpm. A temperature between 1000^0 C to 1100^0 C is maintained in about 70% of the kiln length towards discharge end side for required reaction.

After the reaction, the product is taken into an indirect cooling cylindrical cooler. The product is cooled to 100 deg. C and taken for product separation. The product is separated from the coal ash and coal char and then taken for final use.

The waste gas from the kiln contain lot of combustibles like coal volatiles, unused CO, about 10 to 12% carbon particles and other dust. The gas is taken to an after burner chamber and the combustibles are burnt and cooled to about 160^0 C in a gas waste heat recovery boiler and taken to ESP for final dust separation, before going to stack via ID Fans.

The construction of kiln and cooler is made in such a way that no outside air is allowed to go into the system. The outside air if goes to the kiln, deoxidizes the product ultimately upsetting the temperature profile. To avoid this, ID Fan damper is throttled to maintain +ve pressure in the kiln. The pressure of about +5mm water column is maintained at kiln firing hood. However, checking the sponge iron fracture sample checks the setting of pressure parameter. If the sample shows a re-oxidized periphery the pressure may be increased.

The rotational speed of the kiln is adjustable as per the feed rate and percentage of metallization. The percentage of inclination, rotational speed, the length of time the material is exposed to atmosphere, the kiln temperatures are all to be taken into consideration. So the kiln has three functions:

A. It is a heat exchanger.
B. It is a vessel for chemical reaction.
C. It is a conveyor of solids.

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Heat Transfer

Heat transfer across the flat and curved areas of the material bed is influenced by load faction, depth of the bed, angle of repose and material movement across the bed, slope and rate of rotation, kiln diameter. When the kiln rotates, the material bed remains in the inclined position. The bottom of the bed is called toe and the top of the bed is called shoulder. If the shoulder is too high (speed is too high) material at the shoulder will be cascading down towards toe. This cascading down will not expose the material surface properly. If the speed is correct and the shoulder height is correct the material will roll down, whereby the surfaces of the material will be exposed properly. The measure heat exchange also takes place to the material via the hot refractory lining leaves the material bed gets heat from the oxidizing zone.

As the kiln rotates the point goes further up and gets future heated up and while coming down enters the bad again, start transferring the acquired heat to the bed. Thus, if considered particular refractory point, before leaving the bed is coldest and before entering the bed is hottest. Better the heat transfer better is the moralization. In the process about 30-40% of required coal is injected from kiln discharge side. Out of this 30% i.e. 15% of the total coal is 0-5mm. This coal fines and coal fines generated from the bed, along with axially blown air from the kiln-mounted blower, creates a flame inside the kiln. These fuel gases or flame gases pass their heat to the kiln environment mainly by radiation and only to a small degree by convection. Only about 13-22% of the kiln volume is usually filled with the material. So the major portion of heat is transferred to the kiln lining by radiation.

Reaction Vessel

The kiln is also a reaction vessel. The following reaction takes place inside the kiln:

3 Fe_2O_3	2 Fe_3O_4	6 FeO	6 Fe

The degree of reduction in each step is as follows:

3 Fe_2O_3	11%	$2Fe_3O_4$	22%	6 FeO	67%	6Fe

The bye product of the above reaction is CO2. This carbon-di-oxide reacts with carbon from coal to produce Carbon-mono-oxide:

$$CO_2 + C = 2\ CO$$

The above reaction is known as Boudouvd reaction. So the complete reaction is :

$$CO_2 + C = 2\ CO$$
$$3Fe_2O_3 + CO = 2\ Fe_3O_4 +$$
$$CO_2\ CO_2 + C = 2\ CO$$
$$Fe_3O_4 + CO = 3\ FeO + CO$$
$$CO_2 + C = 2\ CO$$
$$FeO + C = Fe + CO_2$$

The hydrocarbon of coal breaks down to hydrogen and carbon. Some believed that Hydrogen also is used in Rotary Kiln as reductant. Since most of the kiln operates at +1000 deg. C the hydrogen being the lighter gas goes up quickly to the vacant space above the burden and helps in creating temperature.

The process of rate of reduction to final stage is effected by three main factors viz :

a) Quantity of Reductant
b) Temperature
c) Residence time

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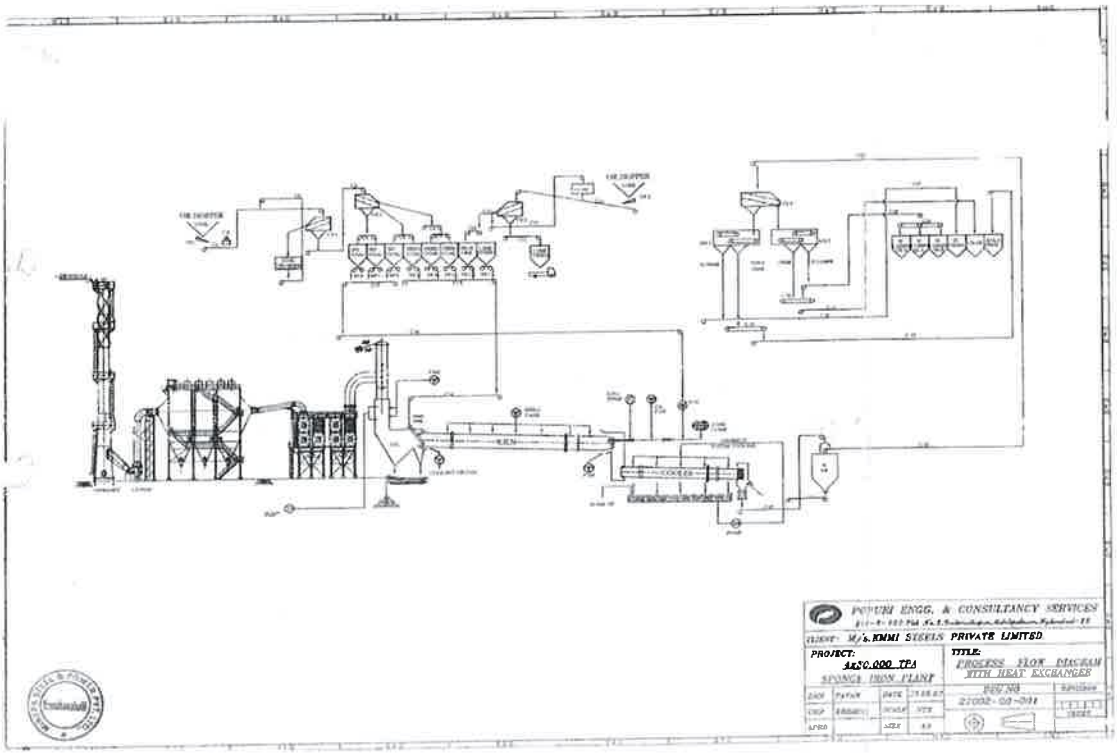
Process Flow Diagram of Sponge Iron Plant



There will be no change in the manufacturing process and process flow except change in feed material. The proposed raw materials mix is iron ore pellets, imported coal and dolomite instead of iron ore lumps, coal and dolomite.

In the above process, pellets may be read in lieu of iron ore for our proposed capacity expansion.

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Chapter – 7

Utilities

Raw Materials and Material Balance

Current Material Balance for production of 1 ton of Sponge Iron :

Input Raw Materials	Quantity (Ton)	Total Quantity (TPA)	Output from Kiln	Quantity (Ton)	Total Quantity (TPA)
Iron Ore	1.85	2,22,,000	Sponge Iron	1.00	1,20,000
Coal	1.00	1,20,000	Char & Dolochar	0.30	36.000
Dolomite	0.04	4,800	Dust from Settli	0.10	12,000
			ESP Dust	0.10	12,,000
			Carbon & Oxide Losses to Atmosphere	1.39	1,66,800
	2.89	**3,46,800**		**2.89**	**3,46,,800**

Proposed Material Balance for production of 1 ton of Sponge Iron :

Input Raw Materials	Quantity (Ton)	Total Quantity (TPA)	Output from Kiln	Quantity (Ton)	Total Quantity (TPA)
Pellet	1.42	2,34,300	Sponge Iron	1.00	1,65,000
Coal	0.85	1,40,250	Char & Dolochar	0.20	33,000
Dolomite	0.03	4,950	Dust from Settli	0.07	11,550
			ESP Dust	0.07	11,550
			Carbon & Oxide Losses to	0.96	1,58,400
	2.30	**3,79,500**		**2.30**	**379500**

Source of raw materials for proposed expansion :

i) **Pellets**: The requirement of Pellets will be met from our existing Iron Ore Pelletizing plant. This is the backward integration for utilization of iron ore fines as pellets in sponge iron kilns.

ii) **Coal:** Imported coal from South Africa will be utilized in the proposed expansion.

iii) **Dolomite:** The dolomite is sourced from open market.

Water requirement:

Current : 400KLD

Proposed : 400KLD

Source of water:

Source of Water will be from Tungabhadra River RBHLC. State Government has permitted the Industry to draw 1 MGD water, vide Lr.No: WRD 147 MTP 2010 dated 23.11.2010. Please ref **Annexure: 2**

Power

Existing	@ 55 Kwh x 16.7tons/hour = 919 KW = 0.92 MW
Proposed requirement	@ 48 Kwh x 21 tons/hour = 1008 KW= 1.01 MW

The power requirement is met from existing captive power generation sources.

Chapter – 8

Environmental Considerations of the Sponge Iron Plant

Environment Management

Environment management, in the current Sponge Iron Plant, includes ventilation, air- conditioning and pollution control facilities. Ventilation and air-conditioning systems are provided with proper working conditions necessary for maintaining environment compatible with human hygienic requirements and to maintain conditions necessary for proper storage of materials and working of plant and equipment. Pollution of the environment not only adversely affects the human beings, flora and fauna but also shortens the life of plant and equipment, for which adequate pollution control measures are already taken.

The ventilation and air-conditioning systems generally include one or more items of equipment and accessories such as fans, air filters, air-conditioning units, cooling water system instrumentation and controls, electrics, etc. Ventilation and air-conditioning system is provided with adequate measures for safety and fire fighting for fire hazardous areas and is of flame proof/explosion proof construction.

Pollution control

The pollutants in the form of gases generated from various points of the Sponge Iron Plant. This has been taken into account and adequate measures are being taken to arrest the emission of pollutants within the stipulations of statutory norms. Adoption of technology like recovery of dust/ash for re-use as raw material is fulfilling the twin objectives of material conservation and pollution control.

Pollution control measures

The measures to control the air pollution ensure the ambient air quality standards as laid down by Central Pollution Control Board for industrial and mixed use areas.

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Following pollution control equipments / measures are installed:

- ESPs are installed for all Sponge Iron units, Power plant and Pellet plants.
- Chimneys of adequate height to emission sources as per CPCB/ KSPCB norms have been provided.
- Continuous stack emission monitoring equipment as per CPCB directions have been provided.
- At all the points, Dust Collectors are installed.
- Water spraying on coal hip, coal yard and raw material is being done to control the fugitive emissions.
- The Waste Gases fed into the Waste Heat Recovery Boiler wherein Electro Static Precipitators are installed.
- For handling of Ash - Ash Handling System is installed & the ash is being used for fly ash brick manufacturing and land leveling.
- Continuous water sprinkling on the internal roads

Solid Waste Management

The solid waste generation from the Sponge Iron process is Char & Dolochar and dust from ESP & Bag filter.

Solid Waste generation	Current Quantity (TPA)	Proposed Quantit	Method of Disposal
Char & Dolochar	36,000	33,000	Used in captive
Dust from Settling	12,000	11,550	Used for brick manufacturing and land filling
ESP Dust	12,000	11,550	

Effluent Generation:

The effluent generation from the plant operations is used for continuous water sprinkling on roads and yards. Domestic waste water is treated in septic tanks followed by soak pits. The industry maintains a policy of Zero Discharge, and will continue to do so in future.

Pollution monitoring:

The Industry is carrying out continuous monitoring within and outside the Plant premises on regular basis as per the consent conditions issued by Karnataka State Pollution Control Board and monthly reports submitted to KSPCB.

Environmental Management Cell

An environmental monitoring cell is established. An environmental Engineer is appointed and. he reports to Manager (Admin) and in turn report to Plant Head. The cell is responsible for monitoring ambient air quality, stack emission, ambient noise in the plant and vicinity, wastewater quality and discharge, quality of water bodies receiving effluent, workplace air quality, occupational safety and health, and maintenance of analytical instruments. Additional responsibilities of the cell include the following:

- Conducting annual environmental audit and submit audit report to Karnataka State pollution Control Board (SPCB);
- Submit environmental monitoring report to KSPCB;
- Conduct regular training programs to educate plant personnel on safety practices to be followed in the plant;
- Conduct safety and health audits to ensure that recommended safety and health measures are being followed; and
- Inform the management regularly about conclusions/results of monitoring and recommend environmental protection measures.

The flue gas emitted out of the Sponge Iron kiln is utilized to drive turbines to generate power through Waste Heat Recovery Boilers (WHRB) – 8.0 MW.

Details of Existing & Proposed Pollution Load :

Sl. No.	Source of Emission	Existing					Proposed			
		Height of Chimney	**Production per hour**	**Average discharge flue gas through Chimney in Nm3/hr**	**Average emission of PM In mg/Nm³**	Total Pollution Load gm/hr	**Average discharge flue gas through Chimney in Nm3/hr**	**Production per hour**	**Average emission of PM in mg/NM³**	Total Pollution Load gm/hr
1	Rotary Kiln No. 1 & 2 (2x100TPD)	60m	8.33 ton	24000	80	1920	25500	10.41	75	1912
2	Rotary Kiln No. 3 & 4 (2x100TPD)	60m	8.33 ton	24000	80	1920	25500	10.41	75	1912
	Total					**3840**				**3824**

Total average PM discharge (existing) 3840 grams

Total average PM discharge post-capacity increase 3824 grams

Difference in PM discharge (-) 16 grams

Decrease Pollution load 0.5%

There will not be any significant change in Pollution Load.

Plantation & Green belt

Adequate green belt is provided all around the plant premises. Locally available types of trees with the guidance of State Forest Dept., have been planted, which are resistant to pollutants are planted. The total area brought under the greenbelt in the existing industrial complex is 34.5 Acres. The Industry has already planted 26000 of plants in & around the premises of the Industry.

Every year tree plantation is undertaken in a planned manner. Most of them including species having capability of pollution control Survival rate of plant is good. Extensive Plantation & grassing has been carried out to check the erosion from various plant activities. In addition to this, lawns, planted ornamental plants have also been developed.

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Photographs of Existing Plantation

Chapter - 9

Occupational Health & Socio-Economic Development

Occupational Health

Minera Steel & Power Pvt. Ltd., is following guidelines provided by the Directorate of Factory & Boilers, Industrial Health and Safety and Labour Ministry of State which is amended from time to time and as directed by the authority. The Industry has functional 24 x 7 Occupational Health Centre in the factory premises.

Functions of the Health Centre is :

- All the employees are examined by factory medical officer for occupational diseases every year periodically & a regular Immunization program is being conducted.
- Minera Steel & Power Pvt. Ltd ensures Medical fitness of all the new employees through Pre Employment Medical Examination by factory medical officer as per Form-32 as directed by Directorate of Factory & Boilers, Industrial Health and Safety.
- The Industry maintains Health register in Form 21 of all the employees working in our company with periodical medical check-up every year.

Socio-Economic Development

Minera Steel & Power Pvt. Ltd., has been actively supporting social causes for a very long time. The company strives to integrate social value within its daily business decision- making process with an aim to achieve positive and sustainable outcomes towards business, environment and the society at large. Apart from the various CSR activities, the company has taken the social initiatives towards conservation of environment, improvement of the social status of people in surrounding villages, contributions to relief funds, etc.

Under Corporate Social Responsibility (CSR) the needs of the nearby villages and surrounding area is being periodically addressed and the Company is committed to further identify and continue the same in future.

Minera Steel & Power Pvt. Ltd. is already executing various CSR activities in following fields.

Education:

1. Extending assistance to various Govt. Schools in surrounding area according to need.
2. Bearing total educational expenses of Poor & needy children.
3. Bearing salary of Teachers & Maid in local Govt. Higher Primary Schools of surrounding villages to make good the shortage.
4. Providing various facilities to the schools such as furniture's, computers in surrounding villages.
5. Book distribution for orphan children and children of AIDS affected families and Distribution of school bags, note books & sport materials
6. Midday meals being provided for 400 students through Akshay Pathra Foundation
7. Participating in the National Festivals, Sports and Cultural events conducted by the local Schools and distributing prizes, sweets & fruits.
8. Providing vehicle for educational tour of children.

Health:

1. Regular Medical health Check up Camps, Blood donation Camps, Free Eye Check up Camps etc., are being organized.
2. Free medicines, vehicle and operation expenses for the village people is being borne.
3. Sparing of Ambulance to villagers & conducting Health Camps Malaria / Epidemics eradication measures like Blood testing, Smear collection, treatment and Spraying/ fogging etc
4. Blood Testing and conducting AIDS awareness camp for employees and villagers of the surrounding
5. Financial Aid for AIDS affected children and children of AIDS affected parents

Infrastructure / Development:

1. Donation /contributions for local Jathars / festivals / Urs / Community functions etc
2. Laying of Cement concrete Road connecting to villages.
3. By providing assistances for Agricultural development by distributing Rs 5000 per acre of wet land & Rs 4000 per acre of dry land by sharing with a neighboring company.
4. Constructing a community hall as well as a temple as per the wish of villagers
5. Most of the labours are appointed from surrounding villages taking the total employment of the local people in the company to 97%.
6. Many of the Social events like Ambedkar Jayanathi and Vigraha Prathishtapana (Idol of deities installation) and Annadana for Ayyappa deities.
7. Utilizing the Tractors and other vehicles of local villagers in the factory.
8. Giving contracts in the company to the local people. Providing employment to the

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land loosers children and wards of local people.

9. The industry has spent 243.47 Lakh towards CSR activities during the last 8 year from 2008-09 to 2015-16(upto Dec2015)

Year wise expenditure is given below.

Year	Expenses (InLac)
FY:2008-09	**1.51**
FY:2009-10	**1.97**
FY: 2010-11	**6.04**
FY: 2011-12	**10.86**
FY: 2012-13	**14.91**
FY: 2013-14	**102.54**
FY: 2014-15	**73.84**
FY: 2015-16 as on Dec-2015	**31.80**

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Celebration of Children's Day

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Free Eye Check up Camp conducted in surrounding Villages (Chikkanthapura Village)

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Free Eye Check up Camp conducted in surrounding Villages (Sultanpur Village)

Free Eye Check up Camp (For Factory Employees)

Chapter - 10

Man power & Capital Cost

Man power

Minera Steel & Power Pvt. Ltd is providing direct employment to about 900 workers. The local persons have been given preference in employment as per their qualification and technical competence. Necessary training has been given to the unemployed youths of the nearby villages. Indirect employment opportunities have been created in the periphery of the plant automatically as the project started operation in the region. The manpower covers the top management, middle and junior level executives and other supporting staff including workforce.

The above manpower is based on production technologies, type of requirement for various units of the plant, level of mechanization and automation, the layout of the plant, the number of operating shifts for the various plant units, etc. Some provisions to accommodate, off and leave reserve requirement have been made.

Capital Cost

Sponge Iron Plant is a running unit. However, the total investment made in the entire manufacturing activities as on 31st March, 2015 is Rs.332.89 Crores. No additional investment is proposed for this modernization & expansion.

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