PROJECT FEASIBILITY REPORT

Expansion of Sri Ram Power & Steel Pvt. Ltd. from 60,000 TPA to 90,000 TPA Sponge Iron production, addition of 2x12 Ton Induction Furnace for production of 72,000 TPA Billet production and 12 MW Captive Power Plant

At

Village :Ara Saru Bera Road, PO-Kuju,

District -Ramgarh, State Jharkhand

Applicant

M/s Shri Ram Power & Steel Private Limited

At- Village :Ara Saru Bera Road, PO-Kuju,

Dist –Ramgarh ,Jharkhand

Environment Consultant

Vardan Environet

(QCI and NABET/EIA/1619/RA 0037)

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CHAPTER –1:
INTRODUCTION - PROFILE OF INDUSTRY

1.0 INTRODUCTION

Steel is crucial to the material development of any modern economy. It is a product of a large technologically complex industry having strong forward and backward linkages in terms of material flow and income generation. All major economies are not only characterized by existence of a strong steel industry, the growths of many of these economies have been largely shaped by the strength of their steel industries during their early stages of development. Some of the rapidly expanding newly industrialized countries like South Korea, China, and Brazil amongst others have built up substantial capacities not only to support their rapidly growing domestic economies, but also to export significantly to mark their presence in international markets.

India has seen nearly a century of steel making as it stands on the threshold of a new era. The face of Indian Iron and Steel Industry is changing at such a fast pace that it is difficult to focus it now in the historical perspective. Steel is a core industry and thus its demand is strongly linked to overall level of economic activity in the country. Given the inherent long-term potential of the Indian Economy and its cyclical nature, the long-term prospects of the steel industry are fairly comfortable. Liberalization and opening up of economy has given a new vitality to this sector. Demand and production have been growing at a healthy rate for past two years and forecast for next ten years is very bright. As the process of economic development takes off growth rate in industrial and infrastructure sectors such as capital goods, power, transport, telecommunication and hydrocarbons also increases leading to increased steel consumption.

The electric steel industry, which initially started as a result of general steel shortage and dual pricing policy in the country in the past, has grown significantly in the recent years. The older units have been modernizing while new units have been set up with latest technology enabling reduction in cost of production. The major factors contributing to the existence and growth of the industry are as follows:

- Lower investment cost and shorter gestation period as compared to BF-BOF route of steel making.
- Ability for wider dispersal.
- Less strain on transport and other infrastructural facilities.
- Fewer unit operations.
- Non-dependence on metallurgical coke and coking coal.
- Less manpower per ton of steel produced.
- Short conversion time from raw material to finished products.
- Lower Environmental and pollution problem.

- Flexibility in production of different qualities of steel and alloy steel.

Besides this above factors the Induction Furnace method of manufacturing steel, allows flexibility in the charge mix, amounts to reduced electricity consumption and decreased refractory electrode consumption which has resulted in the manufacture of international quality steel. Since India has rich reserves of coal, and the technology for manufacturing sponge iron is no more new, sponge iron production seems to have a bright future.

1.1. BACKGROUND

The existing project was granted environmental clearance vide file no. J-11011/260/2009-IA II (I) dated 30th September, 2010 by Ministry of Environment, Forest & Climate Change for expansion of existing Sponge Iron Plant from 30,000 to 90,000 TPA Sponge iron, Steel Melting Shop 60,000 TPA and 8 MW Power Plant through 3x100 TPD DRI Kilns, 2x10 Ton Induction Furnace and 8 MW Power generation through WHRB & AFBC Boiler.

Under the existing environment clearance, M/s Sri Ram Power & Steel Pvt. Ltd. has installed only 1x100 TPD DRI Kilns for production of 30,000 TPA sponge iron. Installation of 3rd DRI Kiln for production of 30,000 TPA was commenced as per the EC however installation was completed after the validity period.

M/s Sri Ram Power & Steel Pvt. Ltd. had applied for extension of the validity of the existing environment clearance on 21st December, 2017, however, the ministry rejected the proposal vide letter dated 9th April 2018 for extension of validity in view of no progress made at site by the project proponent in last 7 years.

1.2 COMPANY AND DIRECTORS' PROFILE

M/s Shri Ram Power & Steel Pvt. Ltd is a private limited company carrying out business in production of sponge iron. The Group has a long experience in mineral mining and metal trade also.

The company has been promoted by a group of experienced businessmen who are presently engaged in manufacturing and trading business of various products.

Details of Project Proponent

M/s **Shri Ram Power & Steel Pvt. Ltd**

Directors:

Mr.Mahabir Prasad Rungta
Mr.Samrat Jain
Mr.Swapna Sharan Verma
Mr.Vikas Sonthalia

SL No	Name & Designation	Age	Qualification	Experience
1	Mr.Mahabir Prasad Rungta	54	B. A.	About 23 years in Irrigation accessories manufacturing and 15 years Sponge Iron production and other sector
2	Mr.Samrat Jain	49	BBA (Finance & Supply chain management)	12 years' experience in real estate business & other sector.
3	Mr.Swapna Sharan Verma	70	B.Sc. and Diploma in business management	About 47 years in Cement manufacturing, Ingot manufacturing and Sponge Iron Manufacturing and other sector.
4	Mr.Vikas Sonthalia	42	B. Com.	About 13 years in Sponge Iron Manufacturing

1.3. PROPOSED PROJECT:

Proposed project is for expansion of existing Sponge iron plant from 60,000 TPA DRI production to 90,000 TPA DRI production and installation of 2x12 Ton Induction Furnaces for 72,000 TPA Billet production and 12 MW Captive Power generation using sensible heat of DRI gas in Waste Heat Recovery Boilers and utilizing dolochar, produced as by-product in DRI Kiln in AFBC Boiler, supplemented with Coal.

Capacities and Facilities of existing plant and proposed plant are as follows:

Units	Existing Units		Proposed Units		Final Configuration	
	Unit	Production TPA	Unit	Production TPA	Unit	Production TPA
Sponge Iron Plant – 90,000 TPA						
DRI Kilns	2x100 TPD	60,000	1x100 TPD*	30,000	3x100 TPD	90,000
Steel Melting Shop – 72,000 MS Billets						
Induction Furnace	--	--	2x12 Ton	73050	2x12 Ton	73050
Billet Caster	--	--	2x6/11 m radius	72000	2x6/11 m radius	72000

Captive Power Plant – 12 MW						
WHRB	--	--	3	6 MW	3	6 MW
AFBC Boiler	--	--	1	6 MW	1	6 MW

***** 3rd DRI Kiln has been installed, however will be operated after receipt of Environment Clearance

1.4. COST OF THE PROJECT

Cost of the existing project is Rs. 32.50 crores and for the proposed units is estimated Rs. 68 crores (Rs. 78.25 including IDC). Total cost of the project is 103.75 Crs. (including IDC)

1.5. POWER REQUIREMENT

Present permission for power withdrawal from DVC is 1.0 MW. Total power requirement for the project will be 11.80 MW which will be met from the existing permission and captive power generation. No additional permission from DVC shall be sought. Power from DVC shall be drawn only in case of emergency.

1.6. LOCATION AND LAND USE BREAKUP

Total area of the plant is 4.96 Ha. (12.24 Acres). The area is in possession and no additional land is required for the project. The area is having a very good infrastructural facility in terms of road connectivity as NH Ranchi-Hazaribagh, Ramgarh is at a distance of 1.5 Km from site, which is located at Ara Saru Bera Road P.O. – Kuju, District – Ramgarh Jharkhand. Total Land Area – 12.24 acres. Proposed approximate use of Land:

SL No	TYPE OF USE	AREA	
		Acres	Ha.
1	Plant area after expansion	5.46	2.21
2	Administrative offices and other	0.50	0.20
3	Roads and Paved Area	0.78	0.32
4	Storage and solid waste handling area	1.25	0.51
5	Green Belt & open area	4.25	1.72
	TOTAL LAND ACQUIRED	**12.24**	**4.96**

1.7. IMPLEMENTATION SCHEDULE OF PROPOSED EXPANSION

Based on the consideration that pre-project activities are accomplished prior to the award of the main machinery order, an implementation period of 24 months from the date of signing / effectiveness of the contract

1.8. CONNECTIVITY

Road

The proposed project site is located adjacent to Ara Saru Bera Pucca Road and NH 33 is at a distance of 1 Km from site. The location is also just 11 Km away from Ramgarh (Jharkhand)

Rail

The Nearest Railway Siding is Kuju at aerial distance of 0.5 Km (2.5 Km by road) and Barkakana Goods Shed at aerial distance of 6 Km (14.0 Km by road).

CHAPTER –2
BRIEF DESCRIPTION OF PROJECT

2.1 INTRODUCTION

Sponge Iron or Direct Reduced Iron, DRI as it is popularly known, is a high ferrous content charge material and is used as a substitute for steel scrap as the primary raw material in the Induction Furnace, during the process of manufacture of steel. It can be produced both in the lump and pellet form and in a compact and briquetted form known as hot briquette iron. Sponge Iron is becoming increasingly important around the world as a raw material source for high quality steel; India being no exception. In the mid- seventies, the Department of Steel had identified that sponge iron would play a major role in the growth of the secondary steel sector. Apart from making the secondary steel sector less vulnerable to fluctuations in the international scrap prices by reducing dependence on imports, increased domestic production of sponge iron and the consequent reduction of scrap imports have led to substantial savings in foreign exchange.

2.2 EXISTING UNIT: DRI - SPONGE IRON

Sponge iron or DRI (direct reduced iron) is the product obtained from direct reduction of iron ore with an iron content varying from 83 to 92%. Reduction causes elimination of oxygen leaving behind a honeycomb like porous structure which is “Spongy” in nature. Hence the name Sponge Iron

2.2.1 PROCESS:

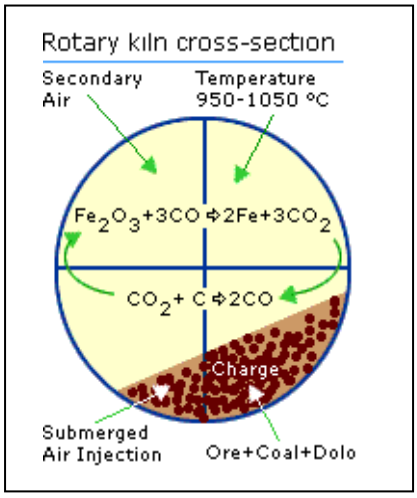
Selection of a suitable production process and the capacity of the production units form the nucleus around which the basic concept of a plant is developed. While the selection of a process takes into account factors like type of products, availability and amenability of local raw materials, process status, specific energy consumption, level of energy required, and environmental pollution etc., the capacity selection of major units would depend on the volume of production, available unit sizes, economies of scale etc.

The process of manufacture of sponge iron is very simple. The percentage of oxygen associated with iron as oxide is removed from the ore particle and the process is often referred to as "Percentage Reduction"; whereas the percentage of iron forming a part of the whole iron, and which exists in the metallic form, is called the degree of metallization in sponge iron making technology. There are two well-established processes for the manufacture of sponge iron, namely:

(a) The reformed natural gas process i.e. By the gaseous reduction of the iron ore.

(b) Coal based Rotary Kiln process- Solid reduction.

The basic raw materials required for the production of the sponge iron are the ore, coal and lime stone. The plant consists of iron and coal crushing plant for lime stone is envisaged. The iron ore is crushed to the required size and fed to the day bins. The coal will also be sized and screened. The different size fractions are fed to separate coal bins. The finer size is used for blowing from the discharge end of the kiln and the coarser sized coal is fed along with the iron ore, coal and lime stone. The sized materials are stored in day bins, from which the raw materials are fed to the rotary kiln through the volumetric feeders at a predetermined rate. The iron ore is pre-heated and reduced in the rotary kiln and passes to the rotary cooler where it gets cooled. The cooled material then passes to the belt conveyor system to the product separation system. A junction house is provided to take care of the any eventualities occurring due to the breakdown of the product separation system. The hot gasses will be cooled in the wet scrubber and cleaned before being let off through the chimney. Emergency stack provided for the escape of gasses when there is break down of the waste gas treatment system. Control room has the PLC operation from which the complete control and operation of the plant is carried out.



The kiln can be divided process-wise into two zones namely pre-heating zone and reduction zone. The pre-heating zone is approximately 3.3% of the total length of the kiln and the rest is taken as the reduction zone. The material gets heated to the reduction temperature in the pre-heating zone. Upto 200^{O}C, the iron ore, coal and limestone gets dried and all the moisture is vaporized. Up to 800^{O}C the iron ore gests roasted and any carbonates in it get calcinated. In the coal the volatile matter starts getting released. The limestone also gets calcinated and becomes active. The iron ore, which is in the form of hematite, get reduced to magnetite. After this the materials enter to the reduction zone where the magnetite is reduced to wustite and then to the metallic iron. The various stage wise reductions of iron ore is as shows below:-

$3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$

$Fe_3O_4 + CO \rightarrow 3FeO + CO_2$

$FeO + CO \rightarrow Fe + CO_2$

Thus the iron in the ore gets reduced to its metallic from. The sum total of the above reactions is endothermic. So to carry out these reactions to completion additional source of heat is required. This additional heat is obtained by burning the coal in the gas phase, which transfers the heat to the bed material.

Coal contains sulphur in it. During the decomposition of the coal the sulphur is released in the form of Iron sulphide. During the reduction process of iron ore the sponge iron picks up sulphur by the following reaction:

$FeO + H_2S \rightarrow FeS + H_2O$

The iron sulphide (FeS) has deleterious effect in the steel making and is to be removed. So lime stone(Dolomite) is used to prevent the sulphur pick up by the sponge iron. The reaction occurring is

$FeS + CaO + CO \rightarrow Fe + CaS + CO_2$

All the above reactions are possible only in the presence of CO. The generation of the CO is most important reaction, which is called the Boudard reaction.

The Boudard reaction is as given below:

CO + CO2 → 2CO

The reaction is highly endothermic which is also reversible. The conditions favourable for the forward reaction i.e. the generation of CO are:

1. The higher temperature favours the production of CO.
2. The concentration of the reactants has to be high so that the forward reaction occurs.
3. Low pressure favours the CO generation.

All the above reactions occur in the bed phase.

In the gas phase the following reactions occur:

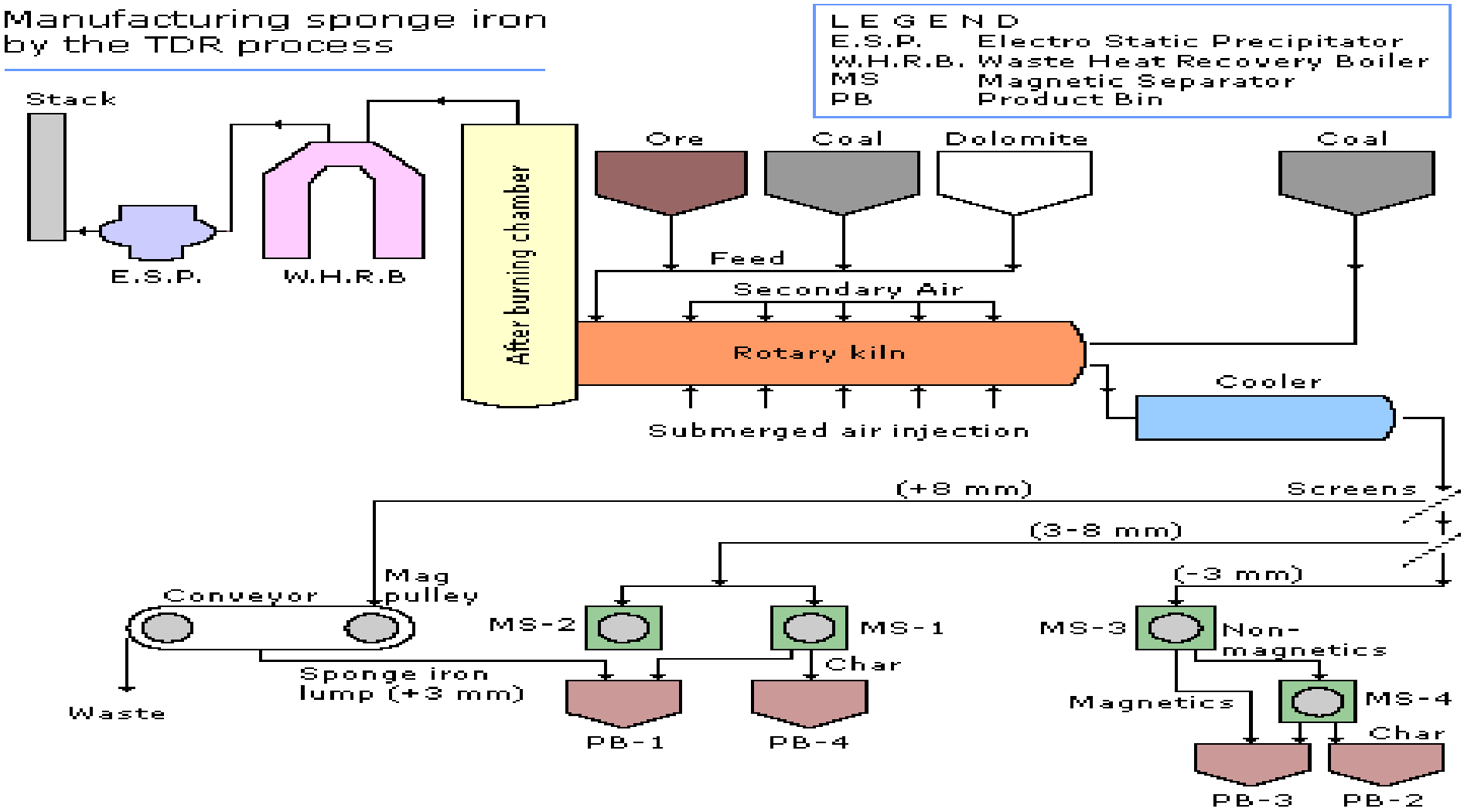
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

$2CO + O \rightarrow 2CO_2$

$C + O_2 \rightarrow CO_2$

The reduction of iron ore is topo-chemical i.e. the reduction proceeds from the surface in the core. The iron ore on partial reduction has all the different stages of the reduction. The hot material, after the reduction is complete, is transferred to the total cooler via the transfer chute. The cooler is 2.3 mtrs. in diameter and 22 mts. long and made up of Mild Steel sheet. It is also inclined at 1.43^O approximately and rotates at 1.4 rmp. It is driven by an AC motor. The water is sprayed on the top of the shell which cools the material inside the cooler indirectly. The heat from the material is extracted by the shell. In order to increase the surface area for the heat extraction, fins are welded inside. Complete shell is covered by thin layer of water. The heat is transferred from the shell to the water by convection. By this the material gets cooled to 80OC. and is discharged on the belt conveyor by the double pendulum valve. The double

pendulum valve acts as the seal for the prevention of the atmospheric air into the kiln cooler system. The total kiln cooler system is kept under positive pressure of about 0.3–0.5 mbar. This prevent the atmospheric air from getting into the system. The kiln has to be always operated on positive pressure as any leakage into the system will cause the re-oxidation of the sponge iron thereby causing the drop in the quality of the product.


Manufacturing sponge iron by the TDR process
LEGEND
E.S.P. Electro Static Precipitator
W.H.R.B. Waste Heat Recovery Boiler
MS Magnetic Separator
PB Product Bin
Stack
E.S.P.
W.H.R.B
After burning chamber
Ore
Coal
Dolomite
Coal
Feed
Secondary Air
Rotary kiln
Submerged air injection
Cooler
Screens
(+8 mm)
(3-8 mm)
(-3 mm)
Conveyor
Mag pulley
Waste
Sponge iron lump (+3 mm)
MS-2
MS-1
Char
PB-1
PB-4
MS-3
Non-magnetics
Magnetics
MS-4
Char
PB-3
PB-2

The material after the discharge from the cooler is dropped on to the cooler discharge conveyor. A diversion chute is provided at the head end of this conveyor for diversion of the material in case of break down in the production separation. The material is then sent to the product separation system. In product separation system, consisting of double deck screen, the material is screened to 0-3 mm and 3-20 mm size fractions. The oversize i.e. + 20mm obtained is small in quantity so it is taken on the floor or diverted to the sponge iron bin. The 0-3 mm sized fraction is called the fines and is fed to a drum type magnetic separator where the magnetic sponge iron fines and the non-magnetic dolochar get separated and are fed to the respective bins through the chutes and conveyor. The coarser fraction is similarly separated by another magnetic separator and fed to respective bins. This magnetic fraction is called the sponge iron lumps and the non-magnetic as char, which is the unburned coal.

The gasses, which flow in the counter current direction of the material, go to the dust-settling chamber where the heavier particles settle down. These particles are continuously removed by the wet scrapper system. The gases then pass to the after burner chamber where the residual carbon or CO are burned by the excess air available. The gases are at high temperature and have lot of heat energy, which can be utilized for the power generation through the waste heat recovery boiler. The hot gasses after the heat recovery boiler get cooled at 200^0C. The gases are then scrubbed and let of to the atmosphere at 80^0C through the chimney. Alternatively the hot gases are quenched and scrubbed to clean all the dust in it. And then are let off to the atmosphere through the stack.

2.2.2 Raw Materials – Sponge Iron

S.No.	Item	Requirement (TPA)			Source and Transportation
		Existing	Proposed	Total	
1.	Iron Ore	96,000	48,000	1,44,000	From mines in Odisha & Jharkhand – by Rail rake and by road.
2.	Non Coking Coal	78,000	39,000	1,17,000	From various mines of CCL – by Rail rake and/or road.
3.	Dolomite/ Limestone	1,800	900	2,700	From Chhatisgarh by road
Railway sidings – Kuju at 2.5 Km,Barakakana at 14 Km, Bhurkunda at 28 Km and Gola at 28 Km.					

2.2.3. PROPOSED: CAPTIVE POWER PLANT

Total power generation for the proposed power plant is taken as 12 MW using Steam Turbine Generator set. Production of steam required for power generation is proposed from following sources:

- Installation of three (3) nos of Waste Heat Recovery Steam Generators capable of producing 10T/h of steam each from the hot flue gases produced by existing 2 x 100T capacity DRI Rotary Kilns & 1 (1 x 100 TPD DRI Rotary Kiln) installed which will be operational after issue of CTO by JSPCB .
- Installation of AFBC type boiler for steam generation using waste char as fuel supplemented by coal firing to the extent required. Capacity of the boiler is proposed as 35 T/h of steam to ensure production of 12 MW power even when two out of three kilns are in operation.

Power Generation from Coal Based Sponge Iron Technology. Power is generated through Waste Recovery Boiler (WHRB) & fludized Bed Combustion Boiler (FBC).

S. No.	Particulars	Capacity
1.	With steam from WHRB	6 MW
2.	With steam from AFBC	6 MW
TOTAL POWER GENERATION (Common T.G.)		12 MW

Waste Heat Recovery Steam Generators (WHRSGs) for Sponge Iron Kilns

Each Kiln has a Waste Gas Volume of 22,000 to 25,000 Nm^3 discharged at 850 to 900^0C (950^0C maximum).The gas is presently being cooled in a Gas Cooler to a temperature of about 180^0C and then cleaned in an electrostatic precipitator and then discharged by an Induced Draught Fan into atmosphere through a Steel Chimney. The heat of the gases is presently not utilized for any useful purpose.

It is possible to utilize the heat of waste gases by installing a Waste Heat Recovery Steam Generator (WHRSG) for each Kiln. The well tried out configuration for WHRSG is comprised of an Evaporator, Super-heater in two (2) sections and an Economizer which will bring down the temperature of gases from 850-900^0C to 180^0C and produce 9 to 10 TPH Steam at a pressure of 66 Ata and 490^0C.

Technological Features of WHRSGs

The technological features of the WHRSG shall be as follows:

Type: Single Drum Water Tube with Radiant Chamber
Type of Water Circulation: Natural Circulation

The boiler pressure parts shall consist of water wall system of Fin Welded membrane construction, Super-heater Stage-I, Super-heater Stage-II, Spray Type De-super heater between the super-heater stages to control the steam superheat temperature to 490 ± 5°C, Economizer, Steam Drum, Risers & Down comers., The economizer shall be a plain tubular counter flow and drainable type construction. In the economizer, the feed water shall be heated to a temperature close to the saturation temperature by the outgoing gases.

In the steam drum, the water shall be received from economizer outlet header. The steam drum is sized to have adequate steam space and water space. The steam drum is equipped with internals, which remove the water particles from the saturated steam, before it enters into the super-heater.

The steam generated in the furnace water walls is taken to the steam drum through a series of riser tubes. The water wall bottom headers receive the water from the drum through a series of down-comers. The entire super-heater area is arranged in the convection and radiant zone. The super-heater heats the saturated steam from steam drum by absorbing the heat from the flue gas to the required temperature. The de-super-heater sprays feed water into the steam to maintain outlet steam temperature to the required level.

Common System for a Pair of Kilns

The following items of equipment are proposed to be common for each pair of Kilns to bring economy in capital cost without affecting the working:

- Deaerator-Cum-Storage Tank having 20' capacity.
- Boiler Feed Water (BFW) Pumps (1 working + 1 standby)
- Blow-down Tanks
- One H.P. Dosing System with 2 working + 1 standby pumps. One pump shall dose one WHRB.
- One L.P. Dosing System with 1 working + 1 standby pump for serving the common Deaerator.

The boiler shall have Digital Distributed Controls for the complete operation of the boiler in conjunction with T-G set operation. Considering the temperature in the area, water cooled condenser is installed for exhaust condensing.

ATOMOSPHERIC BUBBLING FLUIDIZED BED COMBUSTION (AFBC) BOILER

The boiler is envisaged to use the following solid fuels:

a. Char generated as solid waste in the existing Kilns. It has a calorific value ranging from 1800 to 2200 Kcal/Kg i.e. an average calorific value of 2000 Kcal/Kg. The annual generation of Char is 22,500 T.
b. Coal with an average calorific value of 3600 Kcal/Kg. Annual requirement is expected to be about 31,500 T

Selection of Type of Boiler

- Based on the experience of working of boilers for identical application in similar plants, an Atmospheric Bubbling Fluidized Bed Combustion (AFBC) Boiler is considered to be the ideal choice. It has the following advantages:
- No need to grind the coal as required for Pulverized fuel firing. The boiler uses a fuel size of -6 mm.
- As a result of better heat transfer, the unit size and hence the capital costs are reduced.
- It can respond rapidly to changes in load demand since thermal equilibrium between the fuel particles in the bed is quickly established.
- Low combustion temperature of 800 to 900^0C inhibits formation of nitrogen oxides.
- Due to low bed temperature, it can use coal of high ash content upto 50%. Even coals with 70% ash can be efficiently burnt.
- Dolomite / Lime are used in the bed material to take care of sulphur in the fuel from pollution point of view. Hence high sulphur coals can be used. The Flue Gas Desulphurization System is not required, thus reducing the capital cost.
- Combustion temperature can be controlled accurately which helps in achieving better life of tubes in boiler components.

Description of Proposed AFBC Boiler

The Boiler selected for Coal & Char firing is atmospheric bubbling type fluidized bed combustion boilers of 35 TPH steaming capacity to ensure total 6 MW Power even when two kilns are in operation) with following design features :

1. Natural Circulation Design
2. Balance Draft Furnace
3. Single Drum Construction
4. Under Bed Fuel Feeding System
5. Fluidized Bed Combustion
6. Top Supported Design
7. Semi outdoor Installation

The Boiler is designed for firing coal and char as the main fuel. The Boiler is lighted up using Diesel Oil. The complete furnace section is made of water cooled membrane wall construction arranged as a gas & pressure tight envelope. Refractory is provided inside the furnace on the water wall for a suitable height.

The steam drum is designed and provided simple and efficient drum internals, resulting in high steam purity at all load condition of boiler output.

The fuel preparation and firing system consists one twin type bunker for both coal and char. The fuel feeder is provided with VFD to control the fuel feed quantity. Primary air transports the fuel pneumatically into the bed through the fuel air mixing nozzles. Fuel is fed into the fluidized bed through under bed coal feed piping and bubble cap type fuel nozzle. The draft system for the boilers includes 1 no. I.D. Fan, 1 no. F.D. Fan, 2 nos. P.A. Fans.

Bed ash coolers are provided for cooling the ash discharged from the level of fluidized bed during operation. It consists of a small fluidized bed with air cooling. The complete boiler is top support design and integral piping, valves and fittings, air and flue gas ducting, refractory / insulation with necessary fixing components, aluminium claddings provided for boiler. Ducting system is provided with necessary supporting steel work, expansion joints, dampers etc. Primary and secondary air flow measuring devices are provided in the system. Necessary secondary and isolating dampers are provided for efficient and safe operation of the boiler. Secondary dampers are pneumatically operated and fan isolation dampers are motor operated.

Electrostatic precipitators are envisaged for dust collection. The ESP is designed to limit the outlet emission to 50 mg/Nm^3. The blow down system for the boiler includes one of CBD and one IBD tank with all associated drains and vents, level gauges, temperature and pressure gauges etc. The boiler is provided 2 nos. of feed pump along with motor drive. One spray-cum-tray deaerator with storage tank is provided.

T.G. SET

One Steam Turbo Generator set suitable with Air/ water Cooled Condenser with an output of 8 MW is proposed to be installed. The salient features of the equipment are:

Turbine

Type	:	Horizontal single cylinder, single controlled extraction (common to Process and Deaerator heating) cum Condensing, multistage.
Inlet Steam Pressure	:	66 Ata
Inlet Steam Temperature	:	490^0C

Generator

Rated Output	:	12 MW
Speed	:	1500-1800 RPM
Output Voltage	:	11 KV
Power Factor	:	0.8 – 0.85

TG Set will include Gear Box, Lubricating Oil system and all other accessories including control system.

FUEL REQUIREMENT

Calculation of mixed fuel requirement:

WHRB			
HOT FLUE GASES	3 x 25000 Nm^3/hr from ABC of DRI kilns		
AFBC			
Item	**Composition per unit of fuel**	**Requirement MT per day**	**Requirement MT per year**
CHAR (CV – 2000 Kcal/Kg)	0.40	70.00	21000.00
COAL (CV – 3600 Kcal/Kg)	0.60	105.00	31500.00

2.3 PROCESS DESCRIPTION FOR STEEL MAKING SHOP

Suitable technology and optimum equipment have to be selected for manufacture of 72,000 TPA of Mild Steel Billets using in house produced DRI. Project investment as well as the manufacturing costs is to be kept as low as possible with minimal impact on environment. Sponge Iron is to be utilized as raw material to maximum extent possible.

Electric Steel Making through Melting in an Electric Induction Furnace (IF) and Billet Casting in a Continuous Casting Machine (CCM) is the only and well established technology for meeting the objectives. During the last four decades, there has been tremendous development in Electric Steel Melting. This technology today is widely used not only for recycling of scrap (which was the original objective) but also for manufacture of steel from the primary raw materials (in the shape of DRI, HBI, SI, IC etc.)

For producing 72000 TPA Billets, it is proposed to install 2 Nos. Induction Furnaces of 12 T capacity each with matching Billet Caster.

Production Capacity

Description	**Unit**	
Billet Production (Yield 98%)	tons/ yr	72,000
Liquid Steel Production	tons/ yr	73,050
Operating Days	days/yr	300
Liquid steel	tons/day	245
Tap-to-tap time	Min	130-140
No. of Heats (each furnace)	Per day	10 approx.
Furnace capacity (each furnace)	Tons	12

Number of Furnaces (set)	Nos.	2

Raw Material Requirement

Name of Raw Material	Qty. required / MT output Liquid Steel	Total qty. required
Sponge Iron	1.0 MT	73500 TPA
Purchased & Return Scrap	0.24 MT	17500 TPA

In Induction Furnace, Steel Scrap & DRI are melted and converted into high quality steel by using induction heating. IF is a tool to melt solid raw materials to liquid steel as fast as possible and then refine to get desired quality of steel.

Scrap will be charged into the crucibles for generating the hot heel. Necessary carbon in the form of petroleum coke will be added into the crucibles to ensure the availability of necessary carbon in the bath. Pig iron also can be used for maintaining proper operating conditions. Once the molten bath has been formed and the minimum temperature of the bath has been achieved, DRI will be charged continuously through vibro feeder and the slag formed will be removed periodically. After the completion of charging and melting, a sample will be drawn to determine the composition of the bath. After achieving the desired melt analysis, the temperature will be raised to the tapping temperature and furnace is tapped rapidly into preheated ladle.

Fumes generated during the process are sucked through collection hood and are passed through cyclone cum spark arrestor before entry to pulse jet type bag filter for removal of dust particles. ID fans are used for suction of the fumes and discharge in to atmosphere through stack. Dust content at stack outlet will not exceed 50 mg/Nm^3.

Billet Caster

Liquid steel after tapping from IF is taken to the continuous casting machine. The ladle is raised and placed on to a ladle stand above the tundish. Liquid metal flows out of the ladle into the tundish and then into water-cooled copper mould. Solidification begins in the mould, and continues through the first zone and strand guide. In this configuration, the strand is straightened, torch-cut and then discharged for intermediate storage or hot charged for finished rolling.

2-Strand 6/11m radius Billet Caster with annual production capacity to cast 72,000 T of 100x100 mm square size is proposed to be installed. The billet caster shall be complete with ladle stand, mould assembly, Strand guide segments and supports withdrawal and

straightening system, mould cooling system, Cut-off equipment including length measuring device, marking machine etc. Requisite dummy bar and facilities for Dummy bar disconnecting and a dummy bar receiver will be included.

2.4 UTILITIES REQUIREMENT – ALL UNITS

Water

Water requirement for power has been envisaged for "Water Cooled Condensers". For the existing unit and units in expansion total "Make-up" water requirement is as below:

Unit	Final Installed Capacity	Existing m^3/day	Expansion m^3/day	Make-up water m^3/day
DRI Plant	300 TPD	120.00	60.00	180.00
SMS with CCM	180 TPD	-	150.00	150.00
Power Plant	12 MW	-	900 .00	900 .00
Drinking &		5.0	6.0	11.00
Plantation & Environment.		1.00	3.0	4.00 (Treated
Total		**126.00**	**1119.00**	**1245.00**

Water requirement is presently sourced from ground water. For the expansion and at final stage water will be sourced from River Damodar through surface pipeline to be laid after due permission of the department.

Water Treatment Plant

The plant requires treated water in the water circuits meant to cool the equipment.

Raw water will be made to pass through the "Dual Media Filter" to arrest the suspended particles, turbidity and iron present in water. Filtration systems remove particulate matter and, because of the large surface area of filter media, they also can be used to drive chemical reactions that result in the removal of several contaminants.

The filtered water is then made to pass through the "Softener" which will remove the calcium and magnesium salts present in water by exchanging the same by sodium salts, by passing the filtered water through a bed of cation exchange resin. Soft water will be stored in a storage tank. Soft water is then used in primary cooling & secondary cooling of CCM as well as coil cooling of Induction furnace.

Apart from the above, the electrical control panel of Induction furnace needs to be cooled by De-mineralized water or Distilled water instead of soft water primarily to avoid any electrical conduction through cooling water. To achieve this, a mixed bed ionizer is installed. This controls the dissolved ions controlling the conductivity.

The equipment details given by the furnace & CCM suppliers set basis of capacity calculation. Moreover, following factors are taken into consideration while deciding the capacity:

1. The evaporation loss in Cooling towers & spray cooling in secondary circuit of CCM.
2. The rate by which the hardness or conductivity of water increases in the Circulating water due to contamination.

Plant Water System

Water will be required in Cooling Tower as make up. Water will also be required to produce treated water to maintain its ppm or conductivity increased due to contamination in cooling line. Raw water requirement for Cooling Tower, DM plant, area cleaning system etc will be will met from Borewells. Water tank of adequate capacity (depending upon equipment requirement & workforce) will be constructed within the premises.

Cranes

2 No. 35/10MT, 1No. 10MT and 1No. 15 MT Double girders, EOT Cranes will be required to handle the raw material and finished product. All cranes will comply IS 4137 which is meant for EOT Cranes in Steel Plants.

Compressed Air System

Compressed air is required primarily at three locations in the plant viz. in Induction Furnace, in CCM & in Dust Extraction System (bag filter).CCM & Induction Furnace require 60 to 100 cfm (FAD) air compressed up to 10-12 kg/cm2. Bag filter requires 2.1 Nm3/min (FAD) of air compressed to a pressure of 6 to 7 kg/cm2. Two (2) air compressors will be installed along with the drier to cater the above demands.

Fire Protection System

Adequate number of portable fire extinguishers will be provided at various locations in the plant shed, LT panel room & DG Set Room.

Plant Electrical System

Plant electrical system will have a 33 kV outdoor type substation. It will have one incomer with CT, PT, surge arrestor, isolators etc. It will have five outgoing feeders (two for furnace transformers of approx. 7200 kVA (33kV/ 1000-1000V)). The power supply through furnace transformers will be supplied to furnace whereas power supply through aux. transformer

which will be used for EOT crane operations, CCM operations, furnace auxiliaries, pumps for cooling water lighting etc.

Cables, Cable Trays & Cable Trenches

Cables for Breaker operated feeders shall be chosen based on:

- Load current with de-rating factor for ambient temperature, mode of laying, grouping factor etc.
- Short time current ratings with 0.2 seconds withstand time.
- Cable for Switch-fuse controlled feeders shall be chosen based on:
- Load current with de-rating factor for ambient temperature, mode of laying, grouping factor etc.

Emergency power

1 X 500 KVA silent type DG sets have envisaged to power to the auxiliaries of Plant when DVC power is not available. This will also be useful for Emergency power to take care of safe shut down of important auxiliaries of Plant. During total power failure, above DG set will also support for Emergency lighting for personnel movement in important steel plant locations.

It has been proposed to install additional 1x500 KVA and 1x250 KVA Silent type DG Sets.

Auxiliary Transformers

One (1) number 1750 kVA, 33KV / 433V transformers will be provided for all the plant auxiliary loads. These transformers will be two winding, three phase type with ONAN Cooling. Off Circuit tap changer has been envisaged.

Control & Relaying

The Steel plant Electrical power control is done at two different locations. One control & Relay panel is installed in 33 kV substation for feeders whereas LT control is done by LT control panels installed in LT panel Room or near the equipment (if required). All required control, protective relays and metering for electrical installations to against abnormal system conditions will be provided in these control rooms.

Protective System

For protection of equipment against abnormal system conditions, adequate protective devices will be installed in the respective switchgears and/or control and relay panels. A group of such protective devices will be necessary to protect the equipment under different abnormal conditions arising in the system.

The following protection will be provided for major electrical equipment:

(a) For Furnace Transformer

1. Over Current Relay
2. Earth Fault Relay

(b) For Auxiliary transformers:

1. Inverse time over-current relay with high set instantaneous unit for phase faults.
2. Definite time over current relay for earth fault
3. Back-up earth fault on LV-neutral

The protections provided for different kind of feeders in 33 kV switchgears are as follows:

(a) Incomer/Tie/Feeder

1. Inverse time over current relay for phase fault
2. Definite time over current relay for earth fault

(b) Motors

3. Comprehensive motor protection relay
4. Differential protection for motors rated above 1 MW (if any)

In all cases, proper discrimination would be achieved so as to isolate the faulty elements only, keeping the healthy part of the system in service.

Power

Power sourced initially from DVC for construction/erection and preliminary work. Presently 1 MW load sanctioned. Later on power will be sourced through the CPP as it will be commissioned simultaneously with the other units. After the installation of expansion units the power generation of 12 MW will be used as below:

Unit	Existing (MW)	Proposed (MW)	Total (MW)
DRI Sponge	0.50	0.25	0.75
SMS & CCM	-	10.25	10.25
CPP Auxiliary	-	0.80	0.80
TOTAL	**0.50**	**11.30**	**11.80**

Manpower

A total of 243 personnel comprising Technical Managerial & Supervisory Staff and Directly Employed Manpower is proposed to be newly employed as follows:

Unit	Existing	Proposed
Existing Sponge Iron Plant	100	25
Power Plant		54
Steel Melting Shop		64
Total	**100**	**143**

Total (Existing + Proposed)	**243**

Indirect employment generation is expected to be more than 700 persons.

Facilities for the Employees

The following facilities will be provided in the power plant;

- Administration building and technical office
- Construction offices and stores
- Time and security offices
- First aid and rest rooms
- Canteen and welfare center
- Toilets and change rooms
- Car parks and cycle/scooter stands.

2.5 POLLUTION CONTROL DEVICES/SYSTEM

The following measures for minimizing adverse impact on the environment have been incorporated for DRI and proposed for SMS plant and CPP.

	UNIT	AIR POLLUTION CONTROL SYSTEM
1	Sponge Iron Plant	ESP used to control dust emission through flue gases from DRI kilns after WHRB. All conveyors covered. Stack Height will be raised to meet the emission norms. Bag filters used installed at Stock House, Crusher House, Coal injection point, Intermediate bin, Cooler discharge section and product House to control fugitive dust pollution Solid waste (dolochar, coal fines) will be used as fuel in captive power (AFBC) plant
2	Captive Power Plant	ESP will be provided to control dust emission through flue gases from AFBC. Stack Height will be raised to meet the emission norms. Fly ash generated will be supplied to cement industries or disposed as per prevailing norms. Dry collection of fly ash and storage in silos. Transportation of fly ash in closed containers.
3	Induction Furnace & CCM	Fume extractor system followed by Bag filters for cleaning of gases Solid waste (slag) will be used for recovery of metal and thereafter supplied for construction filling and other uses.

	UNIT	AIR POLLUTION CONTROL SYSTEM
4	Raw Material & Product Handling (Fugitive Emissions)	Bag filters will be used at Coal handling section, Iron ore handling section, Stock house & Product house section to control fugitive dust pollution Water sprinkling will be done during unloading/loading of trucks to control fugitive emissions Raw materials & Products will be kept in covered sheds or bunkers & all conveyors will be covered.
5	Overall Plant Area	Pucca roads within the premises, water sprinkling in dusty areas and green belt/green cover in 33% of total area to arrest the fugitive dust emission

- Fugitive emissions will also be kept low by making pucca haul roads within the premises and making arrangements for water spraying at all the dusty places in the premises and during loading, unloading process.
- Control of Stack Emissions and Fugitive Emissions will have a direct impact on the ambient conditions.
- Development of planned green belt in the industry will also control ambient conditions.
- The fugitive emissions of particulate matter will be maintained below 2000 µg/m3 at a distance of 10 m from the sources.
- The onsite & off-site emergency plan will be an integral part of any major hazard control system. It will be based on those hazards/risks identified by the works management, which could affect people and the environment outside the works.
- Water will be in closed circuit system. Hence no industrial effluent will be generated.
- Domestic waste water will be partly used for horticulture and partly disposed through septic tank pit combination.
- Solid waste generated will be reused as follows:

➢ Dust from bag filters will be partly re-used in process or construction material and filling

➢ Dolochar & coal fines used as fuel in AFBC. Fly ash generated from the process sent to cement plants.

➢ Slag from induction furnace will sold to metal recovery units and will be used for road making etc.

- Implementation of Rain Water Harvesting for use of harvested water in the plant.
- Peripheral development activities will be undertaken as detailed in later chapters.
- Stack height for all de-dusting units will be **30 m** as per CPCB regulation.
- Waste heat utilization for power generation will be followed.
- Adequately designed ESP will be installed to achieve the prescribed stack emission standards of 50 mg/Nm^3.

Pollution Control and Monitoring areas

SL	Area	Monitoring Location
1	Raw material handling area	Wagon tippler, Screen area, Transfer Points, Stock
2	Crusher area	Crushing plant, vibrating screen, transfer points
3	Raw material feed area	Feeder area, Mixing area, transfer points
4	Cooler discharge area	Over size discharge area, Transfer Points
5	Product processing area	Intermediate stock bin area. Screening plant, Magnetic Separation unit, Transfer Points, Over size
6	Other areas	Areas as specified by State Pollution Control Board

Waste Water Treatment

Water Pollution mainly comprises of inorganic solids, oil, grease etc. in suspension, solution, and emulsion. Two aspects to be considered for water treatment are:

- In view of the technological constraints, there will be blow downs from each of the systems to ensure safe operations of the plant. It is suggested that the blow downs water be collected centrally and treated to make the water usable in less critical applications like slag quenching, green belt development etc.
- Neutralization of acidic water /alkaline water from, Neutralisation Pit, Settling and clarification followed by filtration will be implemented for making the waste water reusable.
- All efforts will be made to re-use and re-circulate the water and to maintain zero effluent discharge.

CHAPTER –3
SITE ANALYSIS

3.1 LOCATION

The site is located at Ara Saru Bera Road, P.O. –Kuju ,Dist-Ramgarh , in the state of Jharkhand and is about 2.50 km from Kuju railway station and 1.50 Km from Ramgarh-Hazaribagh- Ranchi National Highway .

Impact due to project location is envisaged in absence of proper pollution abatement measures and environment monitoring plan, as it is situated at a close distance from various environmental sensitive locations like human habitation, railway line, water course, etc.Adjacent habitation at village Murpa is in the vicinity of 2 km, densely populated area-Murpa at 2 Km, River Damoder at 9 Km. The land is fallow – open scrub and will change permanently to industrial.

The site is located close to the raw material area and even closer to users of product. Electricity for the plant will be sourced through its Captive Power Plant and JSEB. Transportation facilities to access various markets are readily available. Both skilled and unskilled labour is available in the area. Also the location of the plant is suitable as it meets distance criteria from the various landmarks for environment related requirements.

Environmental consideration while selecting the site:

- Existing site with facilities and no additional land requirement
- Proximity to Raw Material sources
- Easy accessibility of rail & road infrastructure
- Existing topography of land with slope & drainage in the area
- Availability of land avoiding:
  Forest Land
  Prime Agriculture Land
  Displacement & Rehabilitation or Scarce resources

Plant layout developed considering the placement of technological and services units so there is no interference and the movement of man/material is easy and minimum.

SITE DESCRIPTION

No.	Features	Details
1	Village, District and State	Ara Saru Bera Road, P.O: Kuju,District - Ramgarh, State Jharkhand
2	Land use at the proposed project site	Use in industrial activity
3	Nearest Highway/State High Way	National Highway Ramgarh- Hazaribagh-Ranchi – 1.50Km
4	Nearest Railway Station	Kuju– 2.50 Km

No.	Features	Details
5	Nearest major habitation	Sarubera-6 Km Lapanga - 1.5 Km (W)
6	Nearest River	Damodar River – 9 Km (N)
7	Forest	Forest, Hills, in buffer zone only
8	Ecologically sensitive zone	Nil within 10 Km radius
9	Nearest Port	Paradeep & Dhamra in Orissa (about 400 km)
10	Defense Installation	Nil within 12 Km radius
11	Historical Places	Nil within 16 Km radius
12	Dams and Barrages	Nil within 20 Km radius

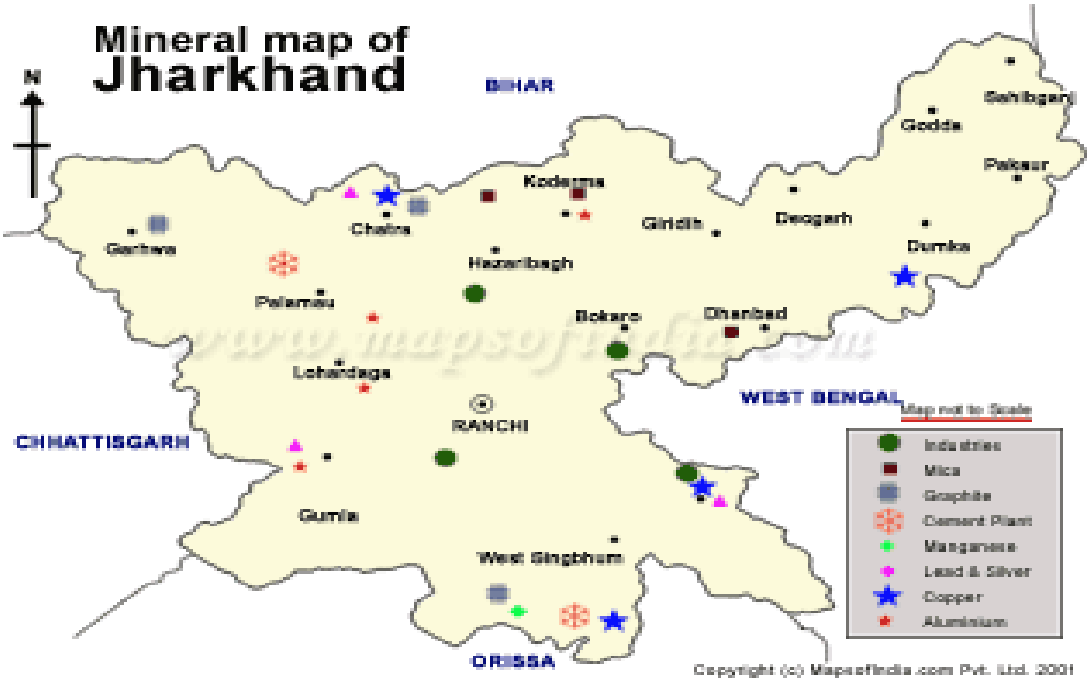
The general layout of the proposed plant has been developed keeping in the view the following factors:

- Uninterrupted flow of materials in accordance with the technological requirements.
- Contours and gradient of the site
- Optimum lead for transport of materials and for service lines
- Predominant wind direction
- Logistic approach in location of technological units as well as service facilities
- Safety clearances & statutory provisions
- Close proximity to rich raw material sources

Land use Break-Up

Sl No	Type Of Use	Area (Acres)	Area (Ha.)
1	Plant area after expansion	5.46	2.21
2	Administrative offices and other buildings.	0.50	0.20
3	Roads and Paved Area	0.78	0.32
4	Storage and solid waste handling area	1.25	0.51
5	Green Belt & open area	4.25	1.72
	Total Land Acquired	**12.24**	**4.96**

LOCATION ADVANTAGE - Advantage Jharkhand



Jharkhand shares its border with the states of Bihar to the north, Uttar Pradesh and Chhattisgarh to the west, Orissa to the south, and West Bengal to the east. The commercial city of Ranchi is its capital. The other major cities and industrial centers are Jamshedpur, Bokaro, Giridih and Dhanbad.

CHAPTER -4
PLANING BRIEF

M/s Shri Ram Power & Steel Pvt. Ltd is promoting Sponge Iron Plant for which the configuration of the unit is as follows:

Existing:

2 x 100 TPD DRI Kilns (Sponge Iron Plant)

Proposed:

1x100 TPD DRI Kilns (Sponge Iron Plant)

12 MW Power Plant using WHRB and AFBC boiler

2 x 12 T SMS with 6/11 radius 2 strand Concast

3rd DRI Kiln has been installed, however not in operation.

The promoters have a long experience in mineral and metal trade and implementation of the project in time will not be a problem.

Schedule of implementation of the project is the most reasonable time during which the proposed project can be implemented. This takes into account the time required for various activates i.e. detailed engineering of the unit including architectural and structural designs, civil construction Procurement of equipment and machinery including utilities and services, equipment test and trial runs etc.

Key factors that would facilitate successful and timely project implementation are:

- Proper choice of technology and machinery suppliers.
- Adequate diligence in formulating the technical concept and system design / selection of the plant.
- Proper choice of contractors for civil construction and erection of equipment.
- Formulation of effective project team led by an experienced Project Manager.
- Establishment of an efficient system for project planning & monitoring including reporting procedures for progress review & co-ordination.
- Customization of project execution plan to suit the promoter's profile.

Implementation Strategy:

Typically any project has four core dimensions viz:

- Engineering: this directly impacts the smooth operations of the plant over its life.
- Procurement: is critical on account of the impact that it has on investment and performance benchmarks and also in ensuring the choice of appropriate technology.
- Construction: is critical in terms of its impact on completion quality and the duration of the project phase.
- Project Management: other than its obvious impact on project timeliness it also contributes to risk minimization for the promoter.

"Zero date" for a project is generally reckoned as the date on which the contract for "main machinery" becomes effective.

The plant & machinery for a project can be procured in three modes:

- Turnkey/ Semi-turnkey
- Package
- Shopping

For the project the turnkey mode of procurement for project execution is proposed. The proposed solution shall help the company in optimizing project investment and minimizing entrepreneur risk due to cost escalation. In the proposed solution, two agencies one for off shore activities and the other for on shore activities have been considered.

Based on the consideration that pre-project activities are accomplished prior to the award of the main machinery order, an implementation period of 24 months from the date of signing / effectiveness of the contract has been envisaged.

CHAPTER-5
PROPOSED INFRASTRUCTURE

Processing Area

The processing area will comprise of various plant facilities within the premises they are – Raw material handling plant, DRI Kiln, Boiler Area, TG House, Condenser, Cooling Tower, Induction Furnaces, CCM, Roads & infrastructure and water reservoir. Thus total area of 5.99 acre will be developed as processing area.

Non - processing area

There is no proposal of any residential colony as the required manpower will be sourced from local populace. Few highly skilled posts may be filled from outsiders for whom houses will be leased in nearby residential area. Non-processing area will comprise of facilities within the premises such as – Store & administrative block, road & yards and vacant area 2.53 acre.

Green belt area

Green belt and plantation will be developed over the vacant plant area. Indigenous trees will be planted in three tier system. Plantation will be started along with the construction. Total area of (4.25 acres) will be developed as green belt and plantation.

Occupational Hazards

No major occupational health hazards are envisaged in plant after proper safety and environmental protection measures. However the general hazards of iron & steel industry will be there. The personnel will be trained to take sufficient precautionary measures for safety and hygiene. Project activities are not likely to cause changes in occurrence of disease or affect disease vector. Though, medical check-up of workers will be regularly done as per statute.

Hot Metal handling

The hot metal tapped from the spout will be collected in a ladle. The slag will be collected in C.I. Pots mounted on rails. The liquid metal from the ladle will be poured to CCM section with the help of a crane.

Resource optimization

Graded raw material with minimum impurities will be used for manufacture of DRI, SMS and CPP. Handling of material will be done in an environment friendly manner. Process water will be kept in closed circuit and will be recycled. Any waste water generated will be reused for horticulture or dust suppression within the premises.

Solid Waste Generation and Handling

SL	PLANT SECTION	NATURE	TPA	Utilization
1	DRI Process	Char	22500	Use as Fuel in AFBC Power Plant – in house
2	DRI APCS	Fines & Dust	6750	Reuse in Process & Low Land Filling
3	WHRB ESP	Fly ash	16500	Sale to fly ash bricks/blocks manufacturers – outside party
4	SMS & CCM (Induction Furnace)	Slag	15000	Sale to slag processing units for village & other road making after recovery & removal of iron content by outside parties
5	CPP (AFBC - ESP)	Bottom Ash Fly ash	3825 15300	Fly Ash Sale to Cement manufacturers. Bottom Ash for Road Making

Hazardous waste: There is no hazardous waste from the plant except for used oil ~ 240 litres per annum from various sections. This is saleable to the registered recyclers in the market.

CHAPTER-6
REHABILITATION & RESETTLEMENT (R&R) PLAN

R&R Plan – not required

Total 12.24 acre (4.96 Ha.) of land in possession and in industrial use. No new/additional land is to be acquired for the project. The existing land was purchased from the villagers on mutual consent. Full amount has been paid and land acquired and bounded. There is no displacement of any houses, habitation or livestock. Also the land acquisition has not rendered any rayat land less or any worker on the land jobless, thus the project is not covered under R&R plan.

Preference in employment given to land sellers and locals.

CHAPTER-7
PROJECT SCHEDULE & COST ESTIMATE

M/s Shri Ram Power & Steel Pvt.Ltd. has initiated to get clearances from the statutory bodies. The site selected and land for the project is in industrial use and no additional land required to establish the project.

The Consents required under Air, Water Acts will be obtained from JSPCB giving details of Processes involved.

As land is Industrial land and not belongs to Forest, no clearance under Forest Act is required.

Project Implementation Schedule

The project schedule includes various activities like civil works, engineering, procurement, erection and commissioning. It will be imperative to complete many activities before the zero date and soon afterwards. These include:

- Basic engineering
- Clearance from statutory authorities
- Land acquisition
- Preparation & issue of tender document for major technological units
- Placement of orders for major technological units
- Financial tie-ups, if any and
- Finalization of terms with overseas agencies if any.

The schedule for implementing the proposed project is as under

Particulars	Start	Completion
Civil Works	Zero date	04 months
Placement of Orders	1 months	06 months
Fabrication	2 months	14-16 months
Erection & Installation	8 months	20-22 months
Trial Production		23 months
Commercial Production		24 months

Cost of Project: Total Project

SL No	Details	Rs. In Crores EXISTING	Rs. In Crores PROPOSED
1	Land & Site development incl. Boundary	0.20	-
2	Office Building, Shed Civil etc.	3.00	2.50
3	Plant & Machinery (incl. Pollution Control)	22.30	65.50
4	Contingencies	-	10.25
Total Cost		**25.50**	**78.25**
Total (Existing + Proposed)		**103.75**	

The company proposes for expansion to set up a SMS with CCM with capacity 72000 TPA from the existing Sponge Iron with Captive Power Plant, After reviewing the various probable options including economic viability, power balancing, implementation schedule, it was concluded that the above set up would be best suited for the project.

CHAPTER: 8
ANALYSIS OF PROPOSAL

Sri Venkatesh Iron & Alloys (India) Ltd. has initiated to get clearances from the statutory bodies. The expansion will be within the existing premises. l land for green cover, utilities etc. Details are as below:

PROMOTERS	**M/S Shri Ram Power & Steel Pvt.Ltd.**
Project	Iron & Steel
Plant location	Ara Saru Bera Road, Naya More, Kuju, District –Ramgarh, State Jharkhand
Markets	Jharkhand, Orissa & West Bengal – well connected
Plant capacity proposed	Sponge Iron – 90000 TPA, Billets – 72000 TPA and Power 12 MW
Raw material sources	Iron ore Mines in Odisha & Jharkhand & Coal from CCL (Linkage & e-auction) – raw material available
Fuel	Indian coal – raw material easily available through Linkage & e-auction
Water requirement	For process, domestic & others – 1245 m^3/day
Water sources	Being applied for Water Permission from WRD, GoJ
Basis for assessment	Per tonne of finished products
Max. power demand	11.80 MW
Main units	DRI Unit, , CPP and SMS units
Main storages	For raw materials and products – space available
Estimated manpower	243 Nos. (Total after expansion)
Implementation period	24 months
Total Investment cost	Expansion RS 68 crores (Including IDC - Rs. 78.25 crores)

CHAPTER: 9
EXECUTIVE SUMMARY

1	Name of the Company	**M/s Shri Ram Power & Steel Pvt. Ltd.**
2	Registered Office Factory	33A Jawaharlal Nehru Road, Chatterji International, Flat no.-8,Kolkata-700071 (WB) Ara Saru Bera Road, Naya More,Kuju, District -Ramgarh, State Jharkhand
3	Name of the Directors	Mr. Mahabir Prasad Rungta Mr. Samrat Jain Mr. Vikas Sonthalia Mr. S.S. Verma
4	Present Business	Iron & Steel
5	Area of plant	12.24 acre.
6	Topo Sheet No	73 E/6
7	Latitude	N
8	Longitude	E
9	Existing	DRI (Sponge Iron) –60000 TPA
10	Proposed	DRI (Sponge Iron) – 30,000 TPA Induction Furnace with CCM – 72000 TPA Power Plant (WHRB+AFBC) - 12 MW
11	Cost of Project	Existing – 25.50 crores Proposed – 78.25 crores
12	Manpower requirement	Total – 243 Nos. (Existing – 125 Nos + Proposed – 118 Nos)
13	Power requirement	Existing – 0.50 MW Expansion – 11.30 MW Total – 11.80 MW
14	DG sets	2 x 500 KVA 1 x 250 KVA

9.1 SELECTION OF PROCESS ROUTE

The present facilities of the plant are:

Sponge Iron Plant - having three (2) Nos. Coal Based Rotary Kilns each of 100 TPD capacity, with an annual capacity of 60000 Metric Tons. Sponge Iron Plant has its own material storage and handling facilities and other auxiliary plant units.

After expansion, the following configuration is proposed for the Steel and Power Plant.

Sponge Iron Plant

1 Nos. Coal Based Rotary Kilns each of 100 TPD capacity, with an annual capacity of 30000 Metric Tons will be installed.

Steel Melting Shop

Steel Melting Shop will convert Sponge Iron to liquid steel of required grade in Induction Furnaces which will be converted in to billets in continuous casting machine.

Two (2) Induction furnaces of capacity 12 T each will be installed to produce liquid steel

2 Strand 6/11m radius Continuous Casting machine will produce 72000 T of billets per year for sale to rolling mills/market.

Power Plant

The power is proposed to be produced in the most cost effective manner. The steam shall be produced in three (3) nos. Waste Heat Recovery Boilers (WHRBs) utilizing the sensible heat of waste gases of Sponge Iron Kilns. Each WHRB shall produce 9 to 10 t of steam and shall comprise an evaporator, super-heaters & economizer to recover the sensible of heat of kiln gases by cooling them from 850-900^{0}C to 180^{0}C. Steam generated from each WHRB can generate about 2 MW of power.

The balance requirement of steam to produce total 12 MW of power is proposed to be met by installation of an Atmospheric Fluidized Bed Combustion (AFBC) Boiler which shall use Char & Low C.V. Coal in the ratio of 40% & 60%.

Selection of Steam pressure and temperature at 66 Ata & 490^{0}C respectively is optimum considering high efficiency and capital cost investment and maintenance cost for the proposed size of 12 MW for the Power Plant. T.G. Set of modern features and controls is proposed to be inst

9.3 CONFIGURATION AFTER EXPANSION:

3 x 100 TPD Sponge Iron Plant (Existing)
12MW Power Plant using WHRB and AFBC boiler and
2 x 12 T Induction Furnace with CCM

The proposal has been made with the following assumptions:

- Total number of working days for all the units is 300 days per annum and output 100% efficiency in year of operations henceforth.
- Power Plants will generate 12 MW out of which 6 MW with steam from Waste Heat Recovery and balance 6 MW steam by using the dolochar and coal fines generated in Sponge Iron Production.
- Slag of induction furnace will be crushed and metal recovery done for recovery of resources.

Name of unit	No. of units	Capacity of Each Unit	Production Capacity
Sponge Iron (DRI)	2	100 TPD	200 TPD~ 60000 TPA
Proposed – Expansion (Addition)			
Sponge Iron (DRI)	1	100 TPD	100 TPD~ 30000 TPA
CPP (WHRB + AFBC)	WHRB - 2 x 2MW AFBC - 1 x 8MW	6 MW 6 MW	Power ~12 MW
SMS - IF & Billet Caster	2	12 Tons	240 TPD ~ 72000 TPA