CHAPTER – 01

EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY :

Name of the Project	:	**M/S. MSP METALLICS LIMITED** (Enhancement in production capacities & reduction of certain production capacities) in the existing Integrated steel project.
Project Location	:	Village & Post: Marakuta, District : Jharsugda -768202, Odisha.

Existing Plant Capacity :

Product	**Annual Capacity (LTPA)**
Sponge Iron	2.40
Iron Ore Pellet	6.00
Iron Ore Sinter	4.60
MBF / Pig Iron	1.88
SMS / M.S. Billet	2.60
Coal Washery	7.00
Coke Oven	0.24
Captive Power Plant	24 MW (8 –WHRB + 16 – FBC)

Proposed Plant Capacity	:	Details are placed at **ANNEXURE - A**
Raw Materials	:	Iron ore, Non-coking coal, Coking coal, Dolomite, Bentonite, Ferro Alloys, Lime stone, etc.
Source of water	:	Ground water permitted till the drawal from IB river source is activated.
Total Project cost	:	Rs. 1278.18 crs. (Break-up details in **ANNEXURE - B**)
Total land Available	:	250.00 Acres - for industrial use only. (No additional land is envisaged for the present proposal)

CHAPTER – 02

INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT :

MSP GROUP is an established steel manufacturer in secondary sector in eastern India. Manufacturing facilities are located in the state of West Bengal, Orissa, Chhattisgarh, Andhra Pradesh, Maharashtra and Jharkhand. MSP group is the second largest coal based sponge iron manufacturer after Jindals. Group turnover from manufacturing operations was Rs.346 Crores during FY 2005-06 and is likely to cross Rs. 500 crores in current year.

Group is poised for vertical and horizontal growth in steel by virtue of integrated steel complex with coal mine, railway siding, captive power plant and other related steel units. Group strength are briefed here under:-

2.1.1 Combined Manufacturing facilities of the Group :

Sl. No.	Plant/Product	Technology	Annual Capacity (LTPA)
1)	Iron ore Pellet	Grate Kiln Technology	15.00
2)	Sponge Iron	Coal base Rotary Kiln	7.60
3)	Iron ore Sinter	Linear Sinter Machine	4.60
4)	Pig Iron	Blast Furnace	1.88
5)	M S Billet		4.00
6)	Re-rolling mill	Hot Rolling	4.00
7)	Captive Power Plant	WHRB + FBC	106 MW
8)	Oxygen	Air Separation	210 M^3
9)	Ferroy Alloys	Arc Furnace	0.30

Sl. No.	Plant/Product	Technology	Annual Capacity (LTPA)
10)	Coal Benefication	Dry Type	14.0
11)	Coke Oven	Non Recovery	2.40
12)	Cement	Slack	10.00 (In Joint venture)
13)	Railway Siding		4. 0 KM
14)	Iron Ore Benefication	Dry Grinding	9.0

2.1.2 Background Information :

MSP Group's Strength :

- Group has been allotted coal block in the name of MSP Steel & power Limited in the state of Chhattisgarh along with other four companies namely M/s.Chhattisgarh Electricity Co. Limited, Hindustan Copper Limited, Akshay Investment Private Limited and others. Mining will become operational within next 2 years.
- Iron ore mines allotment is at an advance stage and the group is expecting to get the mines within next 12-15 months. This will further strengthen the bottom line of the group.
- Own railway siding at the Raigarh factory of MSP Steel & Power Limited has been commissioned and operational from September, 2006.
- Group has also signed MOU with Orissa Government for setting up a 0.25 million ton integrated steel plant. As per the MOU, group will get the captive coal block and iron ore mine for applicant company namely M/s MSP Metallics Limited.
- 1.71 Million Ton/annum Capacity Cement manufacturing unit at Meghalaya in joint venture with Adhunik Group in the name of M/s. Adhunik Cement Ltd. (Which is under implementation).

Company's Background :

MSP METALLICS LIMITED (MSPML) was incorporated on 29th November,1996 in the name of Adhunik Industries Pvt. Ltd. Subsequently, the name of the company has been changed to MSP Metallics Pvt. Ltd. on 28th December, 2001. Presently, the status of the company has been changed from "Private Limited" to "Public Limited." Director of the company are Mr. P.M. Agarwal, Mr. S.K. Agarwal, Mr. Manish Agarwal and Mr. Saket Agarwal.

The company has entered in to an MOU with the Odisha Government, as per the terms of which the Odisha government would allot both iron ore and non-coking coal mines to the company subject to the company fulfilling certain conditions.

2.1.3 Promoters' Background :

MSP Metallics Limited is promoted by Mr. Puran Mal Agarwal, Mr. Suresh Kumar Agarwal, Mr. Manish Agarwal and Mr. Saket Agarwal. Promoters have an experience of over two decades in the steel industry.
Mr. Puran Mal Agarwal, 55 years, is a commerce graduate having around 27 years of experience in steel and industrial oxygen gas manufacturing sectors. He is in charge of overall administration of the company.

Mr. Suresh Kumar Agarwal, 51 years, (brother of Mr. P. M. Agarwal) is a mechanical engineer. He has been involved with the steel industry for the past 22 years. He is also a Director in MSP Metallics Limited, Ashirwad Steels and Industries Pvt. Limited, Howrah Gases Limited and MSP Steels Pvt. Limted. He is looking after the technical matters besides marketing and factory operations.

Mr. Manish Agarwal, 26 years, (son of Mr. P.M. Agarwal) is a management graduate from IMI, New Delhi. He has around 5 years of experience in Steel and industrial oxygen manufacturing sectors. He is looking after the raw material purchases and MIS for the company.

Mr. Saket Agarwal, 26 years, (son of Mr. S.K. Agarwal) is a management graduate from IMI, New Delhi, having around 5 years of experience in steel and industrial oxygen manufacturing sectors. He is looking after the accounts and day to day operation of the company.

M/s. MSP Metallics Ltd. (MSPML), at present is operating an Integrated Steel Plant at Marakuta, Jharsuguda, Odisha, producing about 260,000 Tons of Steel billets per year adopting DR - IF- CC route. Beside this, it also produces 600,000 Tons Pellets for in-house use in Sponge iron plant and Blast Furnace as well as for sale from its existing Pellet plant. MSPL also operates a 215cum Blast Furnace to produce about 185,000 Tons Saleable Pig Iron per annum. The total captive power generation of 24MW also exists in this plant, which utilizes waste heat from Sponge Iron Plant and also solid carbonaceous waste generated in the plant in the form of Dolo Char, Middilings and Coal fines. The present premises of MSPML consist of about 260 acres of land. The present facility occupies about 160 acres, thus having a vacant land of 100 acres for the proposed Expansion Plan. No additional land is envisaged for the present proposal.

2.2 BRIEF DESCRIPTION OF NATURE OF PRODUCT :

Project Proponent is targeting to produced value added steel products from the natural resources (coal/iron ore/ limestone/ Bentonite etc.) indigenously available in plenty.

Pelletisation : Pelletising is an agglomeration process utilizing iron ore fines as a metallic input of steel making through both DRI & BF Route. Iron ore Pelletisation process through Travelling Grate Oven and Rotary kiln broadly consists of Grinding Proportioning Mixing Green Pelletisation Drying Pre-heating Induration Cooling. Green Pellets/balls are dehydrated, dried and preheated in Travelling Grate machine and indurated in Rotary Kiln and cooled in annular cooler. Fine dust collected and heat of whole system are fully recycled and utilized so as to ensure zero wastes.

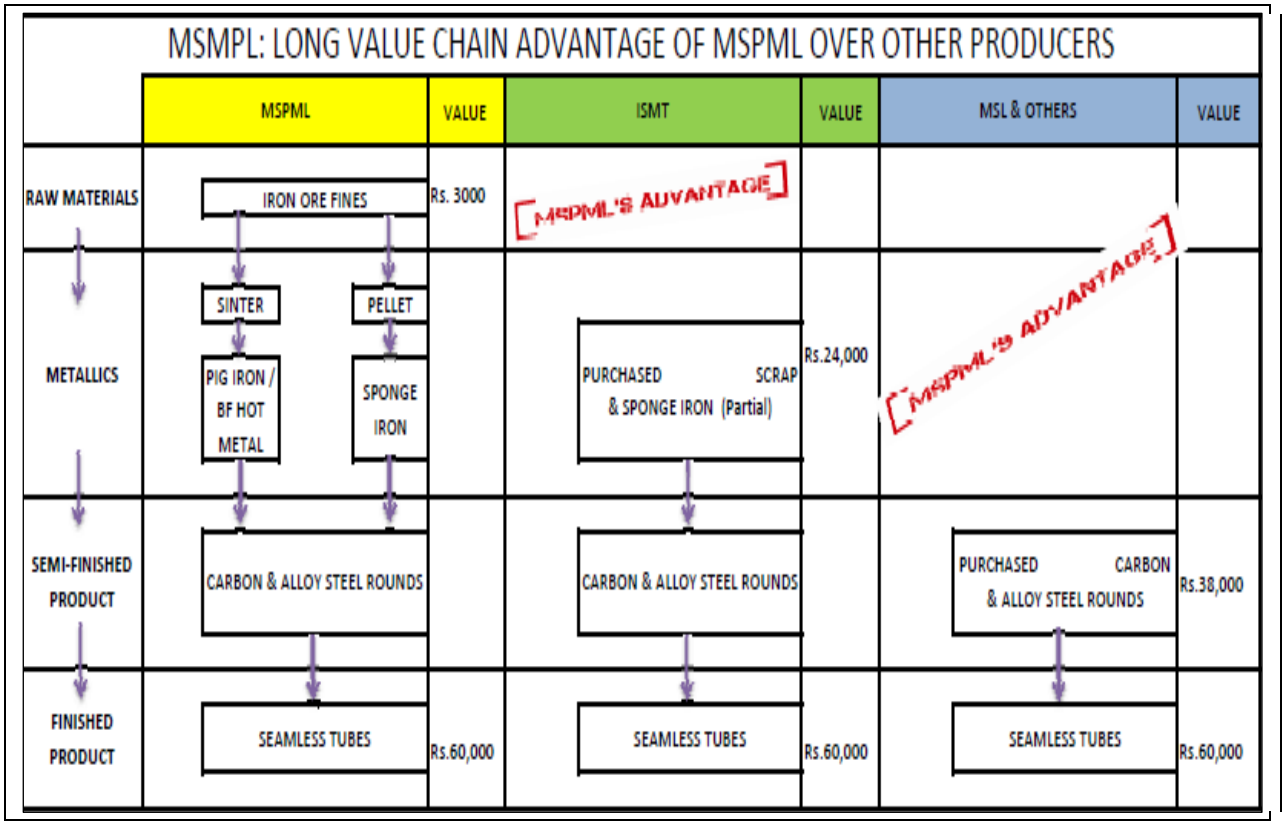
Sinter : Sintering is a technology for agglomeration of low grade iron ore fines into useful Blast Furnace feed material. Iron ore fines mixed with lime stone, dolomite and others metallurgical wastes at desired proportion is loaded in sinter machine passed through a traveling grate kiln having high combustion zone. Finished sinter cakes are crushed into smaller size as BF burden.

Thus value addition chain starts from crude iron ore grains to higher quality steel having globally appreciated demand.

2.3 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY OR REGION :

MSPML has conceptualized the proposed Expansion Plan around the basic philosophy of augmentation of existing capacity with a premium value addition of the finished product.

This edge of long value chain will make MSPML a market leader in the seamless tube and it is a justified decision for MSPML to select seamless tube as their major finished product for the proposed expansion plan.



The Product :

MSPML intends to increase their quantum production to 0.64 Million Tons per annum finished steel with value addition to their existing semi finished steel. In

this endeavour , however, MSPML want to a mix and match Metallics and between bulk steel market i.e. TMT Bars/Rods which has a broad base local demand a Nish value added products like **Seamless Tube/ Pipes** as their finished products and decided to go for a 200,000 tons per year bar and rod mill to produce TMT Re-Bars/ Rods and 400,000 tons per annum capacity Seamless Tube mill to produce various grades in the size range of 38mm to 180mm diameter, 5mm to 15mm thickness and 8m to 12m length of seamless tubes.

MSPML also do not want to lose their existing proposed raw materials and metallic products market and therefore, also have envisaged to increase their pellet and pig iron producing capacity by doubling the existing pellet producing capacity and also will continue to sale the excess quantity of pig iron and sponge iron after meeting the captive metallics need of the plant to produce steel.

Facilities :

To increase the existing production level as well as to produce quality steel required for Seamless Tube production MSPML has planned for the process modification and upgradation of their existing induction furnace based steel making unit by addition of suitable sized LD converter, Ladle Refining Furnace (LRF), Vacuum Degasing (VD) Unit and Continuous Casting Machine to produce Rounds for feeding the Seamless Tube Mill.

The basic reason to select LD Converter as a down steam facility to Induction Furnace has been selected for the following reasons:

- It can reduce high phosphorus level of the liquid melt obtained from Induction Furnace
- It can consume hot metal from Blast Furnace as additional metallic feed.
- It does not require high electric power

- It is very high productive with a tap to tap time of 32min.
- It can generate gas having a fuel value of 2000 Kcal/Nm^3, which can be used as plant fuel and reducing the fuel cost.

To produce required high quality steel for Seamless Tube, desulphurization station, LRF and VD station has been also envisaged in the augmentation programme of the existing Steel melt Shop.

To meet the additional demand of in-house requirement and saleable pellets, a Pellet plant with same capacity as of the existing one has been envisaged.
A 300 cum Blast Furnace with Pulverized Coal Injection facility has been planned to meet the demand for additional metallic input to steel melt shop for capacity augmentation.

To feed the additional requirement of raw materials to Pellet plant and Blast Furnace, MSPML will also install a Dry Grinding system for Iron Ore and a Sinter Plant of 40 sqm capacity respectively.

To reduce the purchase metallurgical Coke requirement for Blast Furnace, MSPML also proposed to add new capacity to their existing Coke oven facilities to produce total 240,000 Tons of Metallurgical Coke per annum through Non-recovery Coke ovens with WHRB to produce power from the sensible heat of the coke oven flue gas.

To utilize the excess Dolo char waste generated from existing Sponge Iron Kilns and to utilize the waste heat to be generated from Coke oven flue gas, MSPML have envisaged to augment their Captive Power Plant capacity by 18MW and 15MW through Atmospheric Fluidized Bed Boiler and Waste Heat Boiler route respectively to generate steam for driving Turbines to produce electric power.

To meet the Oxygen, Nitrogen and Argon requirement in the steel melt shop an Oxygen plant has been envisaged which will use Air Separation Process to produce above gases.

Almost 95% of the additional fuel requirement after completion of expansion plan will be met from the in-plant fuel to be recovered in the form of Blast Furnace Gas (700Kcal/Nm^3) and LD Converter gas (2000 Kcal/Nm^3) and balance 5% only to be met by pulverized imported Anthracite coal injection in the closed area (6500Kcal/Kg). Thus there will be hardly any requirement of purchased fuel for expansion plan and most of the fuel will be clean gaseous fuel in the form of by-product gas.

Closed circuit water system will be installed for all units wherever water is used as indirect coolant. Only make up water to be consumed to compensate the evaporation loss and water consumed in the process. 'Zero discharge' scheme will be adopted by utilizing the blow down water in quenching of pig iron and dust suppression system. Rain water harvesting scheme will also be adopted in the plant for water conservation.

All units will be provided with adequate dust collection/suppression systems in the form of multi cyclones, Bag filter, ESP, Sprinklers and Dry fog systems as per the requirement to keep the air pollution level very much within the CPCB norm. Stacks with the required height as per the pollution control norm and continuous pollution monitoring system will also be provided to keep the environment free from air pollution by suspended matter. And harmful gasses.
Adequate green belt and water body will also be created around the entire plant area. A suitable sized dump yard for dumping waste materials will also be created.

Thus MSPML has envisaged installing an energy efficient, pollution free and eco-friendly Integrated Steel plant in the vacant land of their existing plant premises at Jharsuguda, Orissa.

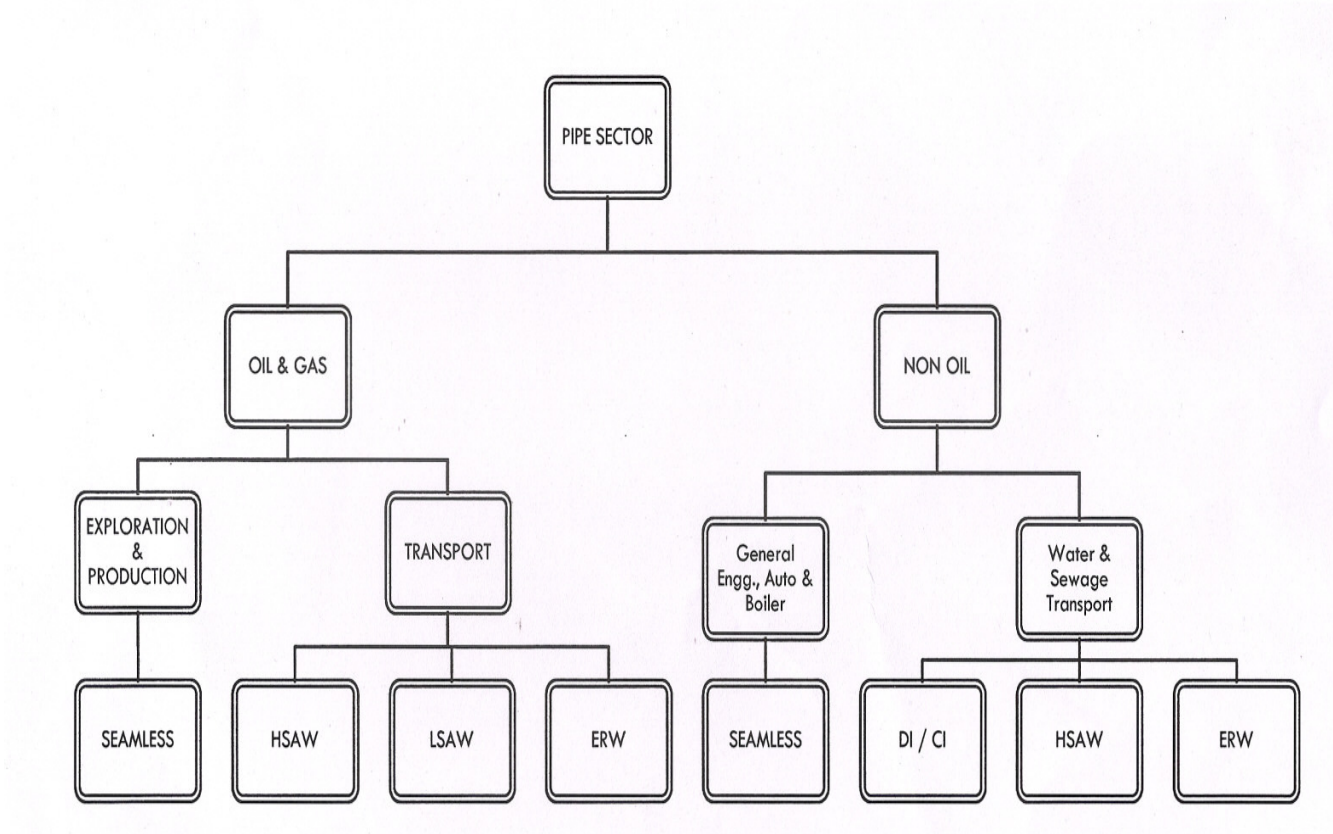
2.3.1 Importance & Rationale for proposed product :

- **Seamless Tube :**

The Rationale for selecting Seamless tube as finished product for the proposed expansion plan of MSPML are described briefly below:

The basic utilization scheme of the pipe sector has been shown in below:

DEMAND DRIVES FOR PIPES & TUBE INDUSTRY



It may be observed that both in Oil and Gas as well as in Non Oil sector, seamless tube do not have any substitution or competitors for its specific usage, namely, exploration and production of Oil & Gas as well as its use in general engineering automotive and energy sector (i.e. Boiler tube). Hence, it is a very Nish value added product and directly used by the end users.

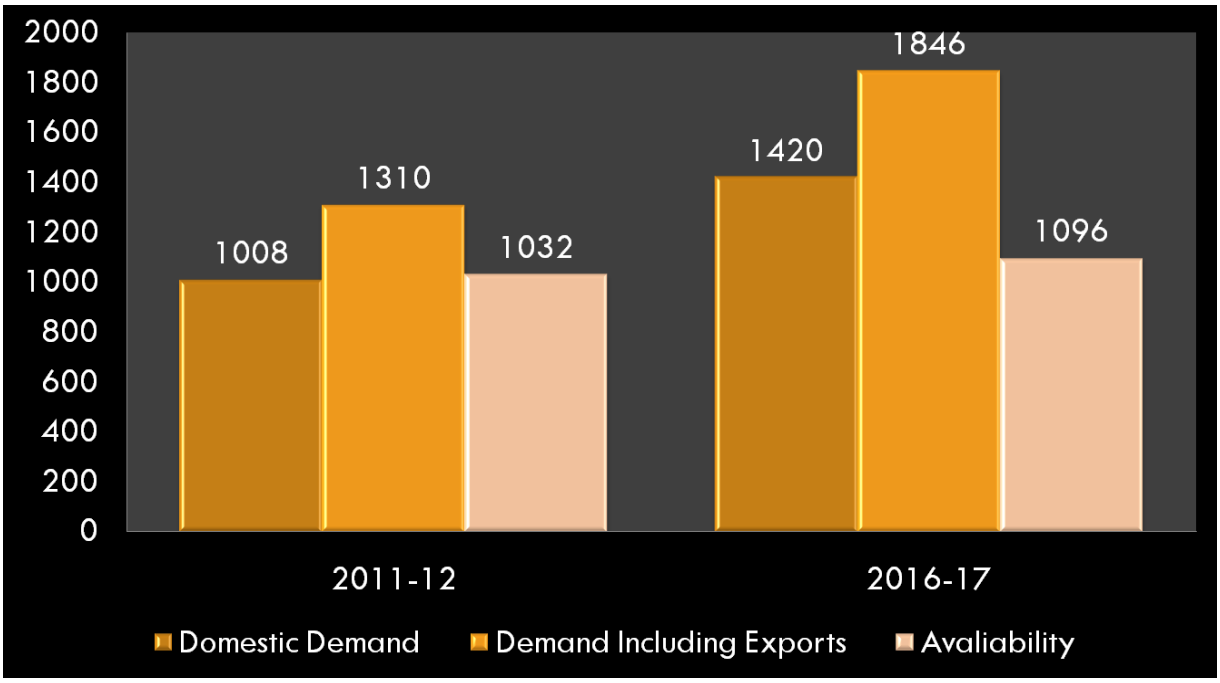
2.4 DEMAND AND SUPPLY TREND :

Major Demand Drivers for Indian Manufacturers are given below:

- Growing oil and gas demand across the world and the zeal with which oil companies are investing on adding pipeline infrastructure promise higher revenues for Indian steel pipes makers.
- Global demand-supply scenario favours Indian manufacturers
- Depleting crude reserves stimulating demand for seamless pipes
- Global demand – supply set to remain in favour of India
- Depleting reserves stimulating seamless pipes' demand
- Booming oil economy to boost pipe demand
- US to be the largest importer
- China is the largest producer & consumer also (almost 50%) and antidumping duty on Chinese Seamless tube by US has been imposed.
- Asia to lead pipe demand with strong growth in energy consumption
- Middle East – an important destination for Indian players
- Gas transportation pipelines – a major boost
- Water resources management – another key area
- India set to benefit from global demand supply imbalance
- Mamoth capacity additions planned in 11th & 12th five year s plan for thermal power production(100,000 MW) in India will create massive demand for seamless tubes to be used as boiler pipes, which constitutes about 90 % of the boiler weight.
- The projected increase in automotive production by 2016-17 is estimated at 83 %, boosting the demand of seamless pipes & tubes

- During 2007-08 automotive component exports from India were valued at around USD 3.6 billions and the Automotive Mission Plan (2006-2016) has predicted that this figure will be around USD 20-25 billion level by 2015 pushing the demand of seamless pipes & tubes.

GAP ANALYSIS – SCOPE FOR A NEW ENTRANT



Projected Indian Demand Supply Scenareo In Two Terminal Years

It may be observed from the above bar graph that there is a clear gap of 750,000 TPY by the year 2016-17 in the Indian market, which has been predicted by a reliable source (M.B Market Research).

2.5 IMPORTS VS. INDIGENOUS PRODUCTION :

The Present Status of Indian Producers of Seamless Tube are presented below :

Name of Unit	Capacity in Operation including expansion (in TPA)
Indian Seamless Metal Tubes Ltd, Pune, MH	450,000
Maharashtra Seamless Ltd, Nagothane, MH	350,000
OCTL, Nalgonda, AP	300,000
Jindal SAW Ltd., Nasik, MH	100,000
Remi Metals Gujarat Ltd., Baruch, GJ	50,000
BHEL, Trichy, TN	40,000
Total	**1,290,000**

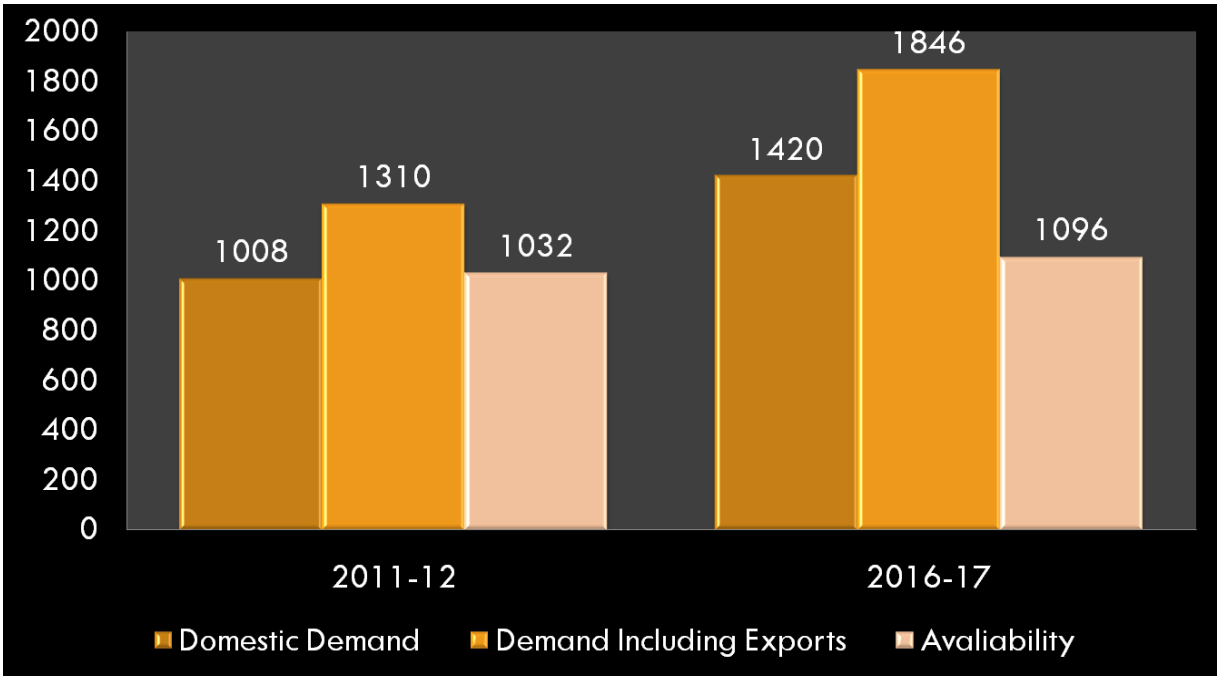
From the above list it may be observed that there is practically no Seamless Tube Producer in the Eastern Part of India. All are mostly located in Western part and few are in the Southern Part of the Country.

Thus there is definitely a good scope of installing an integrated unit to produce Seamless Tube in the Eastern sector of India.

2.6 EXPORT POSSIBILITY & DOMESTIC/EXPORT MARKETS :

The Gap Analysis between domestic demand and availability of Seamless Tube in the year 2011-12 and 2016-17 has been represented in bar graph below :

GAP ANALYSIS – SCOPE FOR A NEW ENTRANT



Projected Indian Demand Supply Scenareo In Two Terminal Years

It may be observed from the above bar graph that there is a clear gap of 750,000 TPY by the year 2016-17 in the Indian market, which has been predicted by a reliable source (M.B Market Research).

2.6.1 Market Demand by Product Sizes are given below

Estimated Split of market according to OD – *outer diameter*

25 – 114 mm OD	30%
115 – 160 mm	10%
161 – 300 mm	30%
301 – 460 mm	30%

Estimated Split of market according to With – *wall thickness*

5 – 10 mm	40%
11 – 20 mm	20%
21 – 30 mm	20%
≥31 mm	2³0%

2.7 EMPLOYMENT GENERATION (DIRECT AND INDIRECT) DUE TO THE PROJECT :

There will be increasing impact on the generation of employment both directly & indirectly. As per the norms of state government priority is given to the local employment. Present employment status and future employment possibility is stated in the table below :

Sl. No.	**Category / Status**	**Direct**	**Indirect**	**Total**
01.	Existing Project	881	237	1118
02.	Expansion	506	240	746
	TOTAL	**1387**	**477**	**1864**

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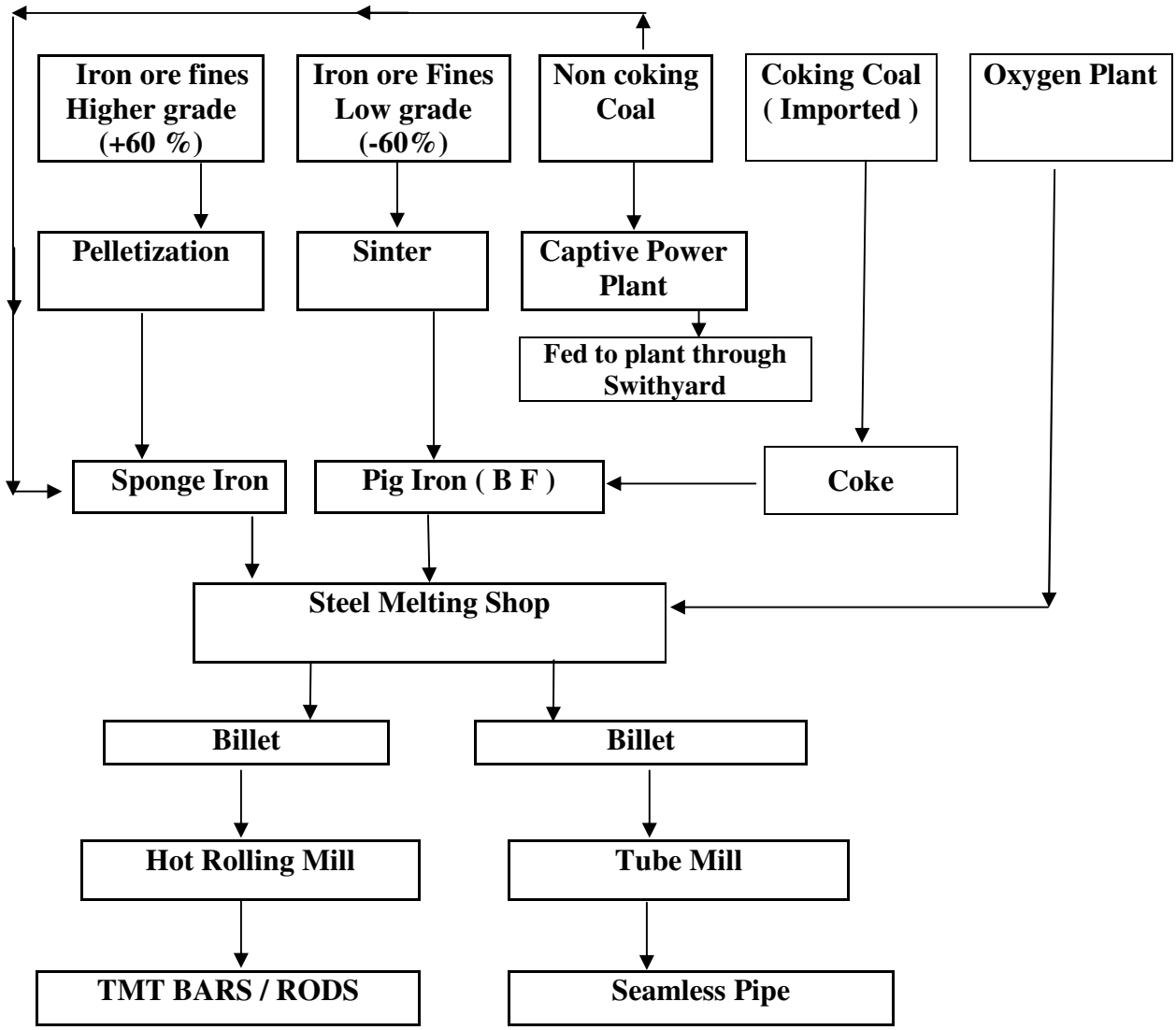
CHAPTER - 3

PROJECT DESCRIPTION

3.1 TYPE OF PROJECTS & THEIR INTERDEPENDENCY :

The expansion projects and some value addition facilities are envisaged in the existing unit in alignment with existing having integrated steel making facilities as shown herein below.



3.2 LOCATION MAP (GENERAL / SPECIFIC WITH COORDINATE) :

Existing project site is located at village & Post : Marakuta, Tehsil & District : Jharsugda in the State of Odisha. The expansion projct proposed will be contemplated at the existing premises comprising of 250 Acres of land for which EC has already been accorded on 13.07.2009. No additional land is required for the project. Details of Location Map and the Site layout Map are placed at **Annexure – C & D.**

3.3 CONSIDERATION OF ALTERNATE SITE :

Additional facilities under the expansion proegramme are proposed to be set up in integration with the pre-existing plant facilities within the existing premises. All requie infrastructures, utilities and support services will be common involving nominal modification/ extension. Therefore, no alternative site has been proposed / examined.

3.4 SIZE OR MAGNITUDE OF OPERATION :

Sl. No.	Plant/Product	Existing Set up (in LTPA)	Facilities Pro-posed for Surrender (in LTPA)	Addition of facilities (in LTPA)	Final Capacity (In LTPA)
1.	Sponge Iron	2.40	**4.22 1x300 TPD 2 x 550 TPD**	'----	2.40
2.	CPP	24 MW			
		8 MW – WHRB	**20 MW**	----	8 MW - WHRB
		16 MW - FBC	**---**	----	16 MW
3.	Iron ore Sinter	4.60	**---**	4.60	9.20

Sl. No.	Plant/Product	Existing Set up (in LTPA)	Facilities Pro-posed for Surrender (in LTPA)	Addition of facilities (in LTPA)	Final Capacity (In LTPA)
4.	Iron ore Pellet	6.00	**----**	6.00	12.00
5.	Seamless Pipe	---	**---**	4.00	4.00
6.	M B F	1.88	**---**	2.50 (EC obtained)	4.38 (EC obtained)
7.	Coal Washery	7.00	**8.00**	----	7.00
8.	Coke Oven	2.40	**1.00**	---	2.40
9.	S M S	2.60	**-----**	4.50	7.1
10	TMT Bars/Rods	---	**---**	2.40	2.40
11.	Oxygen Gas	---	**---**	465.7 lac NM^3	465.7 lac NM^3

3.5 PROJECT DESCRIPTION WITH PROCESS DETAILS & FLOW CHART :

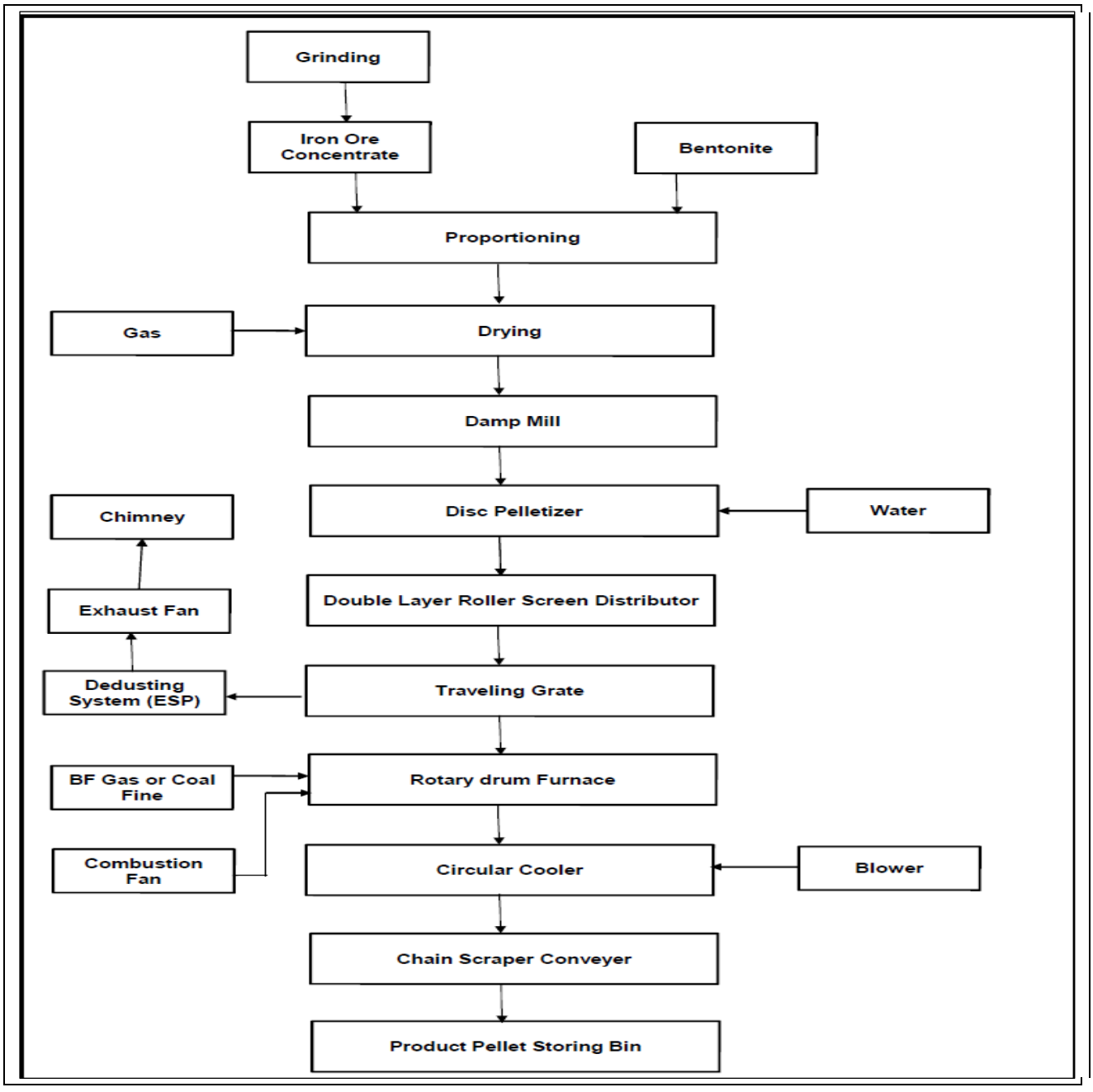
Project description of capacity enhancement of some products and addition of some new facilities are enumerated hereunder with their process flow chart.

Products proposed for capacity enhancement / expansion are : Iron Ore Sinter, Iron Ore Pellet and M. S. Billet.

New facilities proposed in integration are : Seamless Tubes Mill and Hot Rolling Mill to produce Seamless Tubes & TMT Bars/Rods.

Besides there will Oxygen gas producing plant required to produce higher quality treated steel through VDF & LRF process.

3.5.1 PELLET PLANT - PROCESS FLOW CHART :



PROCESS DESCRIPTION OF PELLET PLANT :

The finely ground wet iron ore concentrate is mixed with flux and bentonite (binding material) in defined proportion is induced for better binding

properties and then mixed in a mixture drum. The mixed material is then fed to boiling disc for producing spherical balls called the green pellets of size ranging from 5 to 16 mm. The green pellets are then screened for the right size green balls and the under size/ oversize green balls are recycled to the process. The right size balls are fed to an endless linear traveling grate machine which travel in a furnace. The green balls are dried and pre-heated to 1000-1100^{0}C by hot gases recycled from the rotary kiln and cooler. The pre-heated balls are then transferred to a rotary kiln for enduration at 1350^{0}C to attains compressive strength for handling. The rotary kiln is fired from the discharge end using pulverized coal and blast furnace gas. The gas from the rotary kiln also used for pellet pre heating .The finished product is then cooled in an annular cooling machine to 150^{0}C before conveying to the storage yard. The cooled product is screened to get finished pellets of right granulometry. The undersize/-oversized pellets are stored separately for use in Blast Furnace.

Mixing

Mixing is performed in one high intensive paddle type mixer. With the controlled addition of process water, the moisture content of the material is raised to approximately 9 – 10%.

In the mixing area, ground ore is mixed with a variety of additives in order to form green pellets with sufficient mechanical strength to withstand the subsequent transportation, screening and heat treatment process and to adjust the chemistry of the product pellets to favours their reducibility during subsequent reduction processes (in blast furnaces or direct reduction plants).

After the intensive mixing the mixed material is transferred by belt conveyors to the green palletizing area.

Green Pelletizing

The production of green pellets is performed in three closed palletizing disc circuits. Palletizing discs were selected over palletizing drums because of their minor space requirements, and their self-classifying effect.

The mixed material is received into separate bins. The material discharge from each mixed material bin is done by a vibrating mouth and controlled by weigh feeders equipped with variable speed drivers, thus feeding of required amount of mixed material onto the corresponding palletizing disc take place. The charging is done automatically in accordance with a pre-set time schedule. A control loop, governed by the filling degree of the bins, is superimposed on this schedule for determining the destination of feed. The bins filling degree is measured by load cells.

The weight feeder discharges into the disc feeding chutes are equipped with fluffier for a disintegration of any compacted material as well as for distribution of the mixed material on the palletizing disc.

The green pellets are formed in the discs with a diameter of 6.0m each, with simultaneous and variable addition of water. The inclination of each disc is variable and optimum setting will be determined during start-up, according to mixed material properties, desired green pellet diameter and feed-rate. The rotary speed of the disc can also be varied during operation by means of frequency-controlled motors, depending on the palletizing characteristic of the concentrate mixtures.

The green pellets produced are discharged onto a reversible belt conveyor,. Incase of emergency and also during start-up of a disc when the green pallets do not have the required properties, the disc discharge can thus be recycled or discharged to an emergency stock pite by means of another reversible belt conveyor.

During normal operation the green pellets are discharged to the green pellet collecting belt conveyor, which ensures the smooth handling of the green pellets. A belt weighing equipment is installed in this belt conveyor for weighting the total amount of green pellets discharged from the palletizing discs. This belt weighing machine is used for mass balancing and serviced as a standby signal for the speed control. Green pellets are distributed onto the wide belt conveyor by the reciprocating head of belt conveyor. The head pulley of this conveyor is supported in a reciprocating carriage, which moves the head pulley over the width of the downstream perpendicular arranged wide belt conveyor. The forward velocity of the carriage with the heady pulley is identical to the belt speed and during the backward stroke, green pellets are discharged onto the wide belt conveyor.

The wide belt conveyor discharges the green pellets onto the double deck roller screen which consists of an upper and a lower roller deck. The upper deck screens oversize green pellets and the lower deck has the function to screen out undersize green pellets of <6.0 mm.

Undersize and oversize green pellets are recycled by belt conveyors back to the green palletizing area.

Main Process & Equipment

The main workshops of palletizing production line include Dry grinding Ground Iron Ore store, Bentonite store, Lime stone and Coal fines Store, Blender mixer, Palletizing, Green ball screening & distributing system, traveling grate-rotary kiln-circular cooler system, main I.D. fan system, product storing & transportation system and etc.

Dry Grinding of Iron

The proposed 140 TPH, Dry Grinding system comprises of following major units :

Iron Ore Dryer

The overall objective is to bring down the moisture in Iron ore from 14% to 2% for all seasons.

The Rotary Dryer of size 4. 2 M. 0 X 24.00 m long for 140 TPH is proposed to dry the feed moisture in IRON ORE from 14% to 2% has been envisaged.

The Rotary Dryer consists of a MS fabricated feed hopper, weigh feeder, Rotary dryer, Hot air generator, Belt conveyor, bag filter for dedusting the system.

Material from hopper is fed to Dryer in required proportion by electronic weigh feeder. The Dryer is supported on two supports and driven by girth gear and pinion. The dryer shell is equipped with Spiral type lifter at the feed end and followed by angle type lifters and liners. The dryer is of parallel flow type with off gases exiting through the discharge hood. A hot gas generator, (FO / LPG fired) with outlet temperature of max 750 Deg C is considered for generating necessary heat for drying.

The product of Dryer is conveyed to Hopper by a Belt Conveyor. The dryer will be also equipped with cyclone and bag filter at the exit end to make the exhaust of the dryer clean as per the pollution control norm.

Open Circuit Mill

The Grinding Ball Mill of size 4.40m 0 x 1 2.0 m long, is able to grind IRON ORE with a capacity of 140 TPH Ball mill is being Proposed for grinding of iron ore to 95% passing through 200 mesh.

Shell

The shell is made of Boiler quality plates, with two steel flanges welded to the ends. Seams are double butt-welded. The two oval manhole openings provided for each compartment are re-enforced with heavy plates securely welded to the shell. The flanges are faced and turned to ensure accurate alignment for the trunion's and true concentricity of the shell. The shell liner bolt-holes are accurately spaced and drilled. The flanges are also drilled for the bolts, which secure the heads to the shell.

Main Bearing

These are spherical seating journal type trunion bearings, lined with thermit liner. These journal bearings have 120 Deg. contacts and designed to be subjected to a bearing pressure of 20 Kg/cm 2.

Forced Lubrication and Prejacking Units

An independent lube pump assembly is provided for each trunion bearing. Each assembly is completely piped and mounted on a base. A common pre-jacking pump is also provided between two bearings.

Feed Spout

An adequately sized feed spout with a bolting flange is provided. It is made of carbon steel with carbon steel half liners. The trunion liner is made conical to assist the flow of material into the mill.

Girth Gear

The girth gear is cast steel, split ring type. The two halves are secured with heavy fitted bolts. Holding flange is finished in both the sides and counter bored, to fit the mill flange. Boltholes are drilled to template and the gear is reversible so that

both the faces of the teeth are used. Extended ring flanges are provided on gear for the gear guard sealing arrangements.

Pinion and Counter Shaft

Driving pinion is forged alloy steel and is mounted on the pinion shaft keyed and shrunk- fit. Shaft is symmetrical and reversible so that both faces of the pinion may be used. The pinion shaft is provided with two heavy-duty roller bearings.

Mixing Unit

The iron ore fines will be dried in rotary driers and mixed with proportioned quantity of limestone and coal/coke and ground in Ball Mills. The ground material stored in day bin will be mixed with bentonite and conveyed to the mixer. Slurry from thickener and water in controlled quantities will be added to the mixer. This mix will be taken by conveyors to Balling discs to form green pellets. The green pellets will be treated in Indurating furnace to get the required fired pellets. The Paddle Mixers shall be capable of good mixing of pellet feed and additives and suitable for production of finished pellets of 9 to 16 mm size based 330 days of working per year.

Proportioning Building

There are 6 bins in proportioning building. One for Bentonite, three for Ground Iron Ore, one for Lime stone fines and one for Coal fines, under which there is belt conveyer and an electronic belt scale.

The iron ore fine bin is equipped with a weighing belt, a sensor detecting the level of materials in bin and commanding the operation of material supply system and

therefore the proportion /ratio of mixture is controlled and regulated automatically.

Bentonite storage include Bentonite storage silo and bentonite feed system. Bentonite feed system includes a bulk elevator, speed-adjustable weighing screw feeder and adding dosage of bentonite is 2% of the concentrate. There is also a bag filter at the top of the bin.

After drying process the mixing shall be carried by a belt conveyer into a damp mill for further grinding and blending. There is a 3.2 X 5.4m damp mill having capacity of 50t/h. After the mill, the mesh size 200 will be 85% of the blended.

Pelletizing Building

The blended materials shall be carried by a belt conveyer onto the upper part of the palletizing building and discharged into the 2 blending bins separately, the effective capacity of which is 55m^3 for each and under which there are 2 X 6.0m disc pelletizers with capacity of 50t/h each.

The blending bin is equipped with a 1.0m wide conveyer belt weighing equipment from where the blended materials are fed to palletizing disc, whose speed and tilting angle are both adjustable. Water in required proportion added during palletizing process to ensure the optimal moisture

in the mixture. Green balls shall be collected by a belt conveyer and transferred to the green ball screening & distribution system.

Green Ball Screening & Distributing System

It consists of big ball roll screen, wide belt conveyer, roll distributor and belt conveyer returning fine. The big ball roll screen is made up of 20 rolls whose length is 2200mm, diameter is 120mm and gap is adjustable. The oversized (16mm) green balls shall be collected by a belt conveyer and conveyed back to be reused for balling, white the undersized (<16mm) to be conveyed by the wide belt conveyer to the roller conveyer. The speed of wide belt conveyer (B=2400) is regulated by a frequency modulator. The 36-roll roller conveyer, whose roll length is 2200mm and diameter of 120mm, to separate and reject the small balls of 8mm and at same time distribute the balls of 8-16mm onto the traveling grate. The undersized green balls (<8mm) shall be collected by a belt conveyer and conveyed back to the disc pelletizer.

TRAVELING GRATE-ROTARY KILN-CIRCULAR COOLER SYSTEM

The roasting system is made up of the three major equipments traveling grate, rotary kiln and circular cooler. Green balls to be dried and preheated at traveling grate and followed by roasting & indurations in rotary kiln and then to be cooled in circular cooler.

Traveling Grate

Its effective area: 66m^2 . There are 12 wind boxes with a length of 2.5 m each. The bed thickness is 160-180 mm. The normal speed is 1.5m/min. There are 3 zones: Drying zone 10m long, Drying zone 7.5m long and Preheating zone 12.5 m long.

Exhausting & Drying Zone (1st zone)

The main heating source is the waste gas from preheating zone and the required temperature of flue gas is 250-300, which is needed for fully drying of green ball.

Exhausting & Drying Zone (2nd Zone)

In this zone the temperature of flue gas is about 650 which keeps drying process going on and oxidization of green balls starts. The heating source is mainly the waste gas from the second cooling zone of circular cooler and partially is the hot gas from preheating section with temperature of 1000^{0} when the temperature of the waste gas is not high enough. The waste gas from both, one are released by exhaust fan and through multi cyclone.

Preheating zone

In this zone the heating source is the waste flue gas from the feed end of rotary kiln with temp. of 1000^{0}C, which keeps oxidization of balls going on, getting the balls to be consolidated & hardened partly resulting in the compression resistance (50N/P) required by roasting process in rotary kiln.

It takes about 25 min. for green ball to be dried and preheated n traveling grate and after getting sufficient strength the ball come into rotary kiln through shoveling plate and chute.

A necessary space to be reserved alongside the traveling grate so as to be used as passage of safety or for maintenance operation.

Returning pellet System

The returning pellet collected from the feed end and discharge end to be sent back through a chute with the help of bucket elevator to rotary kiln.

ROTARY KILN

Specification: 3.2x30 m Rotary speed: 1.1 rpm

Slope: 4.0% Double supports

Adopt phosphate mud wear resistance bricks and high strength thermal isolating casting compound lining so that the lining has properties of heat shock resistant, anti-impact, wear resistant, thermal isolating, long life and reduces shell temperature.

Retaining time in rotary kiln: 30min.

Filling ratio: 7%

After pre-heating in rotary kiln, pellet ore will be discharged to the feed end through shoveling plate and chute. Discharging end equips with specially designed extension spray gun. Burning intensity and flame shape will be regulated by controlling the extension spray gun. Pellet will receive heat radiation in rotary kiln and rotating while roasting so that pellet will be roasted evenly. Roasting temperature in rotary kiln is 1250-1350^{0}C. Rotation speed can be regulated in accordance with different materials so as to determine its retaining time in rotary kiln and to determine quality of pellet.

Discharge hood and feed hood of rotary kiln adopt new type of sealing device and are equipped with structural cooling fan. Maintenance walkway will be installed at the foundation of first and second support.

Rotary kiln temperature will be inspected and controlled by combined temperature measuring method i.e. infrared-twin color-fixed thermal couple.

Roasted pellet will be discharged to receiving hopper of annual cooler through chute and fixed screen in the discharge hood of rotary kiln.

CIRCULAR COOLER

(A) Efficient cooling area: 40m^2 Normal capacity: 100t/h

Mean diameter: 12.5m Normal cooling time: 45 min

Width of pallet: 1.30m Bed height: 760mm

(B) Annual cooler consists of rotating part, wind box, driving unit, stand frame and upper hood; equipped with 3 sets of blower and 2 sets of structural cooling fan.

Annual cooler receives hot pellet with temp. up to 1300^{0}C coming from rotary kiln. Pellet size is 8-16mm. Oversize pellet will be discharged as the result of high temp operation in rotary kiln. It will be separated by fixed screen equipped in the discharge hood and be discharged and treated through chuter for over size pellet. Pellet ore enters into annual cooler through distributing device. According to the discharging volume, bed height of cooler shall be adjusted.

Annual cooler is composed of 9 blast boxes equipped with 3 sets of blower. Every blower is responded with 3 blast boxes. Hood of annual cooler is divided into 3 parts:

- **Cooling section I:** hot blast with temp. of 1000-1100^{0}C will be feedback to Rotary Drum Furnace through discharging hood above receiving hopper and parallel pipeline directly. It will be used to increase temperature.

- **Cooling section II:** hot blast with temp. of 500-600^{0}C will be feedback to hood of preheating section II of chain grate through hot blast pipe directly. It will be used to dry and preheat green pellet;

- **Cooling Section III:** Waste gas with temp. of 90-110^{0}C will be discharged through chimney directly with concentration 80mg/m^3 . Volume of cooling air will be regulated by damper. Automatically to control temp. of hot blast. So, most part of recovered heat used for cooling pellet will be effectively used to integrated pellet production process.

Buffering bin will be equipped with discharging hopper of annual cooler with volume capacity of 20m^3. Equalized discharging will be controlled by valve. Temperature of cold pellet will go down below 150^{0}C. It will be discharged into product belt conveyer and transported to production yard for storage.

Main I.D. Fan System

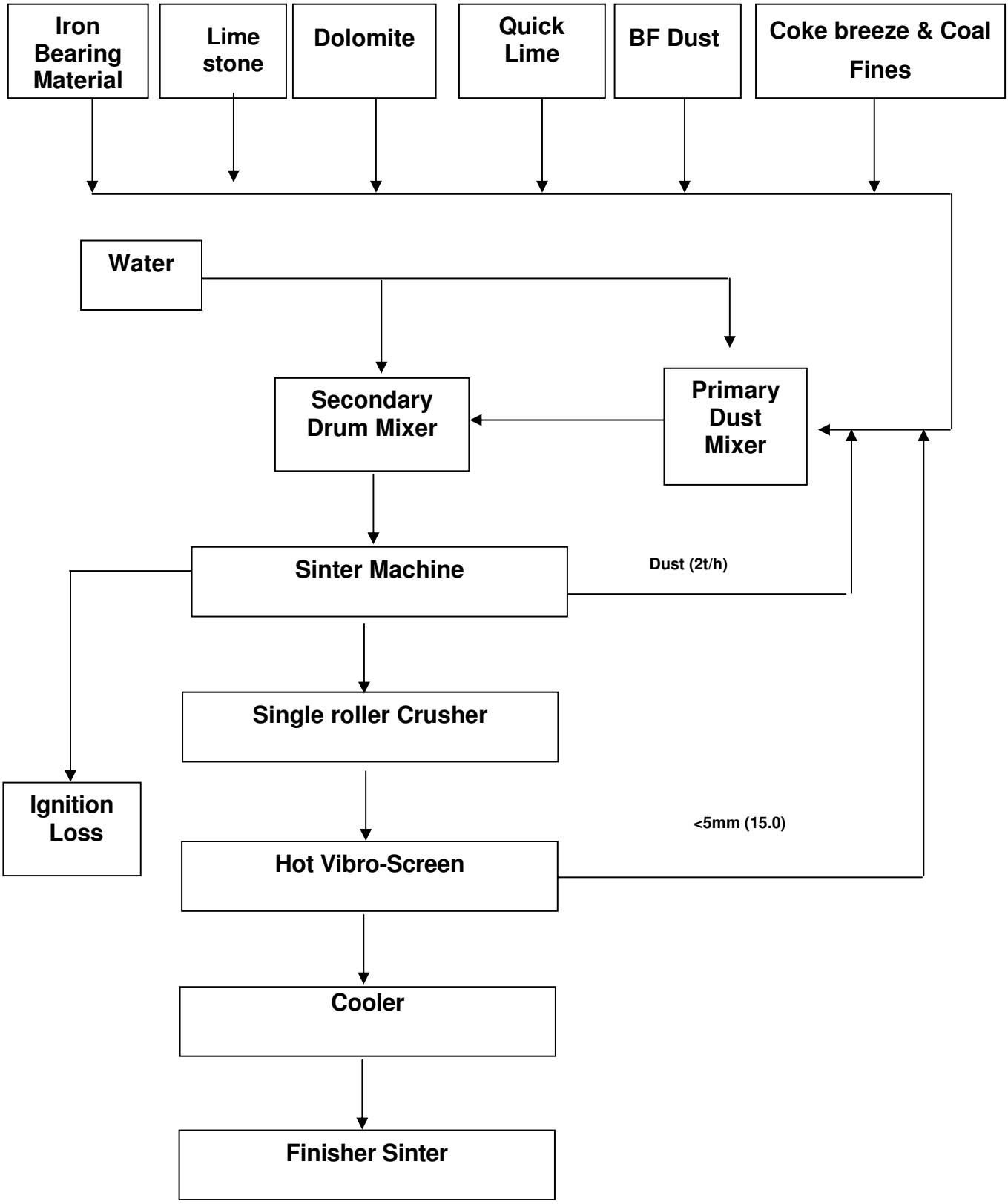
Waste gas coming from blast box of drying section of chain grate will be collected and discharged through static deduster or multi tube deduster, main I.D. fan, fume channel and chimney. Deduster will be equipped with measuring device for temperature, pressure and gas flow inspection along with inspecting hole for inspecting of dust concentration on inlet and outlet of pipelines.

Normal blast volume of I.D. fan: 320,000 m^3 /h: negative pressure: 6k Pa. Dust concentration of waste gas discharged through deduster, main I.D. fan and chimney: ≤ 80mg/m^3.

Product System

Cold pellet ore discharged from discharge hopper of annular cooler will be transported to product stock house through chain-scraper conveyer.

3.5.2 SINTER PLANT – PROCESS FLOW CHART :



Process description of Sinter Plant :

Sintering

Sintering is a technology for agglomeration of iron ore fines into useful blast furnace burden material. This technology was developed for the treatment of waste of Iron ore fines in the early 20th century. Since then sinter has become the widely accepted and preferred blast furnace burden material. Presently more than 70% of hot material in the world is produced through the sinter route. In India approx. 50% of hot material is produced using sintered feed in blast furnaces.

The major advantages of using sinter in MBFs are:

- Use of iron fines, coke breeze, metallurgical waste, lime, dolomite for hot metal production.
- Better reducibility and other high temperature properties
- Increase BF productivity
- Improve quality of hot metal
- Reduction in coke rate in blast furnace

Sinter Process

The raw materials used are as follows- iron ore fines (-10mm), coke breeze (-3mm), Lime stone and dolomite fines (-3mm), and other metallurgical waste. The raw material are mixed at desired proportion and moistened in a mixing drum. The mix is loaded on sinter machine through a feeder into a moving grate (pallet) and then the mixture is rolled through segregation plate so that the coarse material settle at the bottom and fines into the top. The top surface of mix is ignited through stationary burners at 1200^{0}C. As the palate moves foreword, the air is sucked through wind box situated under the grate. A high combustion zone is

created in the charge bed due to combustion of fuel to the mix and regeneration of heat of incandescent sinter and out going gases. Due to forward movement of pallet the sinter process travels vertically down. Sinter is produced as a combined result of locally limited melting, grain boundary diffusion and recrystallisation of iron oxides.

On the completion of sintering process, finished sinter cake is crossed and cooled. The cooled sinter is crushed, then screened and +6 mm fraction is dispatched to blast furnace and -6 mm is recirculated as return sinter.

The chemical analyses of major raw materials to be used in the proposed sinter plant are given in Table 2 (typical). The chemical analysis of finished sinter is given in Table-3.

Table 2 : Chemical Analyses of Raw materials charged through Sinter

Sl.No.	Description	Iron Ore Fines	Lime Stone	Dolomite	Coke Breeze(ash)
1.	Size	0-5 mm	0-50 mm	0-50 mm	0-25 mm
2.	Fe	63.00%	0.8%	0.7%	1.2%
3.	SiO_2	2.5%	5.0%	4.0%	10.9%
4.	Al_2O_3	3.0%	1.0%	1.0%	3.2%
5.	CaO	-	50.0%	29.0%	0.6%
6.	MgO	-	2.0%	20.0%	0.3%
7.	P_2O_5	0.06%	-	-	0.1%
8.	Others	-	-	0.5%	-
9.	LOI	4.0%	41.0%	44.5%	88.0%

Table 3 : Chemical Analysis of Finished Sinter

Fe (t)	:	56.3%
FeO	:	7.0%
SiO_2	:	5.36%
$A1_20_3$	:	3.17%
CaO	:	9.14%
MgO	:	2.2%
Basicity	:	1.7%

The Sinter plant will consist of the following main technological units.

- Fuel & flux crushing unit
- Flux screening unit
- Proportioning unit
- Mixing and nodulising units (Primary & Secondary)
- Sinter braking / crushing
- Sinter screening unit
- Exhauster unit
- Waste gas de-dusting unit
- Plant de-dusting unit

The above units will be connected by conveyor galleries and junction houses for conveying of crushed flux and fuel, sinter mix, finished sinter; hearth layer and sinter return fines.

A brief description of major equipment facilities proposed in the different technological units is given subsequently.

Fuel & flux crushing unit

The building is provided with two bays namely bunker bay & crusher bay Fluxing materials i.e., limestone & dolomite of feed size -50 mm will be received in a steel bin of 110 m^3 effective volume, placed above the crusher. The flux will be fed to individual reversible hammer crusher of 30t/h capacity by means of vibratory feeder provided at the discharge end of the bin.

The crushing of coke breeze to -3 mm will be achieved in Four Roll Crusher. The -25 mm size coke will be fed to individual crusher through overhead bin of 110 m^3 effective volume with the help of feeder provided above the crusher. The crushed coke breeze will be conveyed to the proportioning unit.

Flux screening unit

The crushed flux received from the flux-crushing unit will be screened in vibrating screen. One vibrating screen of size of 2100 mm X6000 mm and capacity 30 t/h has been envisaged for screening of flux. The -3 mm fraction will be conveyed to the proportioning unit, while + 3 mm will be recycled in the process through the flux crusher.

Proportioning unit:

Iron ore fines, crushed fuel and flux, steel plant arising, in plant /BF sinter return fines will be stored in 12 overhead cylindrical steel bins of 100 m^3 effective volume with conical outlets.

The sinter mix constituents will be extracted from the bins by means of electronic belt weigh feeders in preset quantities and fed to a collecting conveyor leading to a intermediate storage bunker of 150m^3 volume housed in mixing & nodulising unit.

Mixing unit

Intermediate storage bunker with twin outlet will be provided n mixing & nodulising unit. Vibro feeder will be provided at each outlet for feeding individual mixing and nodulising drum.

One mixing drum of 3.0 m diameter and 9.0 m length will be provided in a common building for through mixing and micro – palletizing of various mix constituents. The drum located at ground floor will be provided with lifters

in the mixing section for through mixing and forward movement of the material. Bulk of water will be added to the mixing section while controlled amount will be sprayed in the nodulising approx. 5 minutes to ensure proper mixing and nodulising. The drum will be fitted with variable speed DCV drive. In the event of stoppage of the drum itself or the drum-feeding conveyor, water flow to the drum shall be automatically cut off

Sintering and Cooling unit

A common sintering building shall house both the sintering machine & corresponding cooler.

The sintering machine will have 40m^2 sintering area and 1.5m width and will be complete with ancillaries such as shuttle mix distributor, ignition hood, SG iron pallets fitted with high chrome grate bars etc.

Sinter mix and hearth layer hopper will be mounted on load cells and will be provided with roll feeders and adjustable gates. The hearth layer (10 to 20 mm size) will be spread on to the sintering machine first, followed by sinter mix. The height of the sinter mix bed onto the machine will be about 400 mm. the sinter mix will be ignited by fuel oil. The machine speed will be in the range of 0.8mm/min to 2.4 m/min with normal speed of about 1.4m/min

The sinter cake discharged from sintering machine will pass through a replaceable teeth hot sinter breaker to crush it to -150 mm size before feeding it to a straight line cooler of 46 m^2 effective cooling area. Each cooler will have about 0.8m bed height and one hour retention time. Three forced draft cooler fans of 82,000 m^3/h capacity each at 270m WC pressure will be provided to cool the sinter below 100 Deg. C for onward transportation by belt conveyors to the common cold sinter screening unit.

Sinter screening unit

Screening of sinter coming out from cooler will be carried out in separating single deck vibrating screen with three apertures. The first part will have 5 mm aperture while the second and third part will have 10 & 20 mm aperture respectively. The product will be separated into four fractions, namely – 5mm, +5 to 10mm, +10 to 20 mm and +20mm. The +10-20 mm fraction will be transported in the desired quantity by a series of belt conveyors to heart layer hopper located at the feed end of sintering machine. The surplus quantity of hearth layer and the +20mm fraction will join the finished sinter conveyor stream. The – 5mm fraction will be conveyed back to the return fines bunkers in the proportioning building, whereas +5 to -10 mm size fraction will join the finished sinter conveyor.

Exhauster Unit

For suction of air through sinter mix bed on the sintering machine, one exhauster of 3500 m^3/min capacity at 170^0 C and 1200m WC suction at fan inlet shall be envisaged for each sinter machine. Both the exhausters will be housed in one building.

Waste gas de-dusting unit

Separate dry type electrostatic precipitator of 210,000 m^3/h capacities at 170^0 C shall be envisaged for de-dusting of waste gases before entering the main exhauster. The unit will have high efficiency to ensure less than 100 mg/ NM^3 of dust in the outgoing gases for stack. Dust valves and drag link chain conveyors will be provided for discharge of dust from dust collector mains

and electrostatic precipitator. The discharge of dust will be in dry state and will be recycled in the sintering process, if alkali content of the dust is within permissible limits; else the same will be disposed of by a dump truck. The waste gas or the process gas coming out from two exhausters will be let out to the atmosphere through a RCC stack of 60m height after its de-dusting in the ESPs.

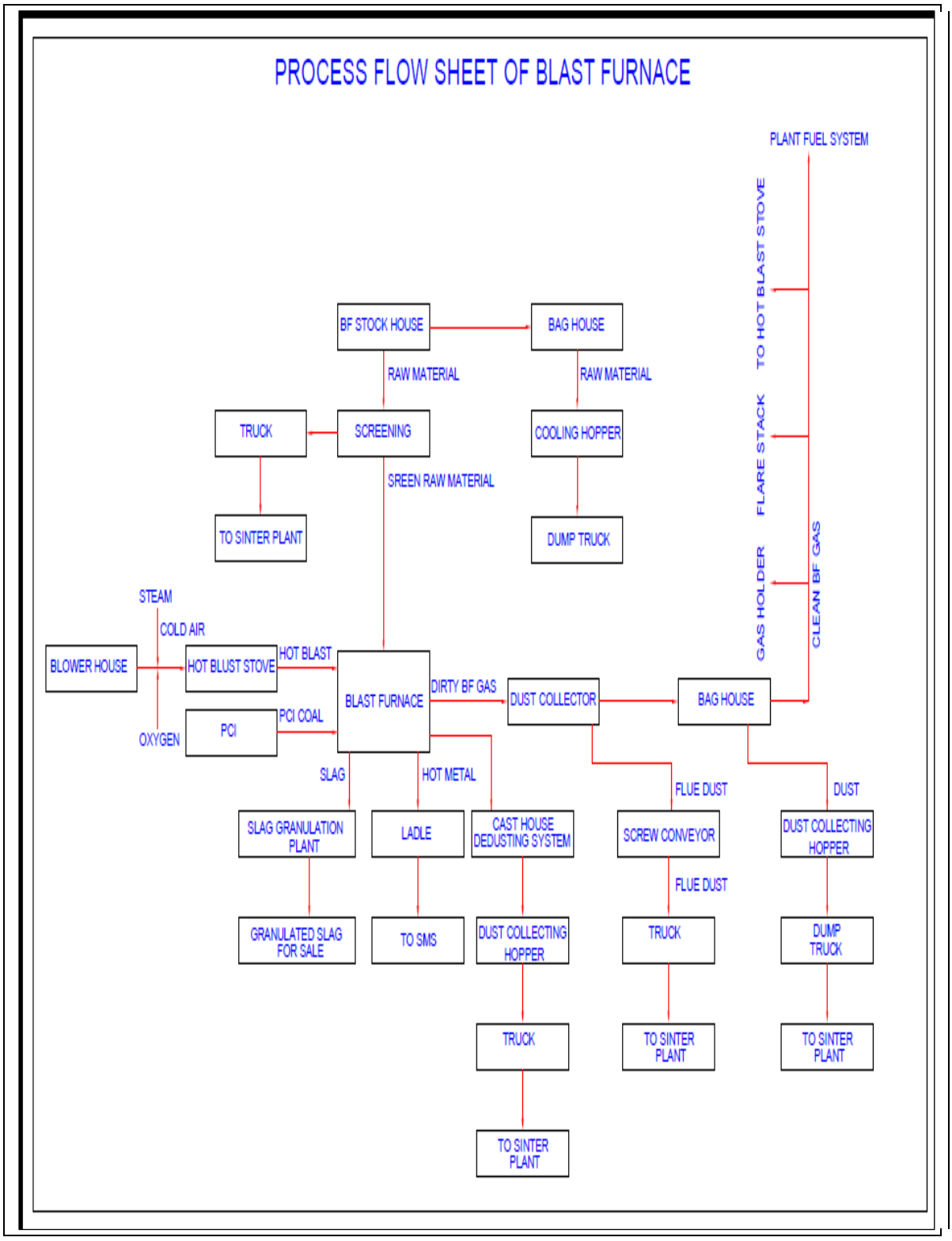
Plant De-dusting unit

The dust laden air from the fuel and flux crushing units, flux screening unit, feed and discharge ends of the cooler, sintering machine discharge end, sinter screening station and other dust generating points like conveyor transfer points, bunkers in storage and proportioning unit, combined mixing and nodulising unit etc., will be connected to the plant de-dusting system before being discharged into the atmosphere. Two electrostatic precipitators of 300,000m^3/h capacity shall be envisaged for the entire sinter plant complex along with suitable ducts and hoods for this purpose. The unit will have high efficiency to ensure less than 100 mg/Nm^3 of dust in the outgoing de-dusted air connected to the steel stack of 45m heights. Dust valves and drag links chain conveyors will be provided for discharge of dust from ESP and the same will be recycled in the sintering process.

Utilities & services

Apart from the main technological units described above, all the services facilities like power, water, gas stream, compressed air etc. shall be envisaged from normal functioning of the sinter plant complex.

3.5.3 BLAST FURNACE PLANT & PROCESS FLOW CHART :



The additional blast furnace complex comprise of one blast furnace of 300 m^3 useful volume along with its auxiliaries.

It has been envisaged to operate BF with inhouse as well as purchased coke. 336,000 tons per year of hot metal will be taken to SMS.

Technical Parameters

SI. No.	Description	Unit	Parameters
1	No. of blast furnace	No.	1(one)
2	Useful volume	m^3	300
3	Specific productivity (on useful	t/ m^3/ d	3.2
4	Daily production (gross)	t/ d	960
5	Slag volume (design)	kg/thm	350
6	Furnace annual availability	Days/Year	350
7	Blast Volume	Nm^3/Wm	1380
8	Blast temperature	0 C	1150-1180
9	Nos. of tuyeres	No.	12
10	PCI (average)	kg/thm	120
11	Humidity	g/ Nm^3	
12	0_2 enrichment	%	3.0 (max)
13	BF top pressure (design)	atg	1.5
14	BF top pressure (working)	atg	1.2
15	Top gas volume	Nm^3ithm	1990
16	Top gas temperature	˚C	100 - 250

Blast Furnace Design

The blast furnace (BF) will be state - of - the art design suitable for intense operation at higher productivity level for a campaign life of 15 years and above. The BF

will be free standing type with four poster structure and single tap holes. No slag notch has been envisaged.

The BF belly and shaft will be refractory free, except for the bosh which is lined with silicon carbide (SiC) bricks. The BF cooling system is based on the latest generation of copper stave coolers in the areas of high thermal loads - in the bosh, belly and lower stack. Cast iron stave coolers are provided in hearth area. SG iron staves are provided in the middle stack and upper stack. The arrangement of the stave coolers guarantees a constant and smooth BF profile maintaining a smoother burden descent. The protection from high heat loads is provided by the accretion layer deposition in front of the staves.

The BF hearth envisages an optimized design for an expected campaign life of over 15 years with graphite, high conductivity carbon and super micropore carbon in conjunction with an efficient under hearth water cooling system, The refractory lining is the most critical area of BF design. Burdening techniques, extent of injection of auxiliary fuels, quality of raw materials and levels of oxygen enrichment determine the productivity levels and the thermal flow through the refractory / cooling system of the BF**.** The hearth wall will be provided with super micropore carbon. The tuyere zone will be provided with high conductivity carbon with a ring of silicon carbide (SiC) around the tuyere cooler.

The BF will be equipped with bell less top (BLT) charging system that ensures uniform burden distribution as well as provides adequate tool/ controls to the operator for any specific charging requirement due to BF operation anomalies. BF will also be equipped with a EDT crane of 15t capacity on top for maintenance of top equipment.

The blast furnace proper will have following units/ system :

- Under hearth water cooling system
- Staves cooling system
- Tap hole
- Various process instruments
- Tuyere, tuyere cooler and tuyere stock assembly
- Water/ steam injection at cone
- Bell less top charging system
- Stock level indicator
- Radar probe
- Off-takes and up-takes
- Down-corner

MAJOR UNITS OF BLAST FURNACE COMPLEX

	Unit Description
1.	Stock house and BF charging conveyor/ system
2.	Blast furnace proper with bell less top charging
3.	Cast houses with one tap hole
4.	Slag granulation system and dry slag pits
5.	Hot blast stoves
6.	Dust catcher, gas cleaning plant and flare stack
7.	Cast house dedusting system
8.	Stock house dedusting system
9.	Effluent treatment plant with filter press
10.	Pulverized coal preparation and injection system
11.	Water circulation system including soft water plant
12.	Utility systems: oxygen. nitrogen, steam, compressed
13.	Pig casting machine
14.	Ladle repair shop cum hot metal transfer bay
15.	Ladles and ladle cars

Description of Major Units of Blast Furnace Complex

Stock House and Charging System:

There will be vibro feeder below all the bunkers opening to facilitate easy discharge of raw material from the bunkers. The vibro feeders in turns discharge the raw material on vibratory screen. The over size raw material from screen will be led to individual weigh **hopper for** Iron ore, sinter and coke. The under size from the **screen** will be **led** to **individual** respective fines bunkers. The weigh hopper will discharge the material on to blast furnace charging conveyor which **in** turns discharge the materials in to the receiving hopper of bell less top charging equipment.

BF Proper with Bell Less Top (BLT) Charging Equipment

The BF design will be of free standing type construction with bottom anchoring. The shell will consist of plates of various thicknesses. The lower end of the shell will consist of a bottom plate and bottom ring. The upper end of the shell will consist of the cone supporting the furnace off-takes connected to the top cone. The cone will have an opening for the dismantling of the rotating chute of BLT.

The bell less top charging equipment will generally consist of following units:

a) Upper material receiving hopper
b) Upper and lower bank of valves
c) Transfer hopper
d) Centering device with multi bellow
e) Goggle valve
f) Transmission gear box with drives

g) Distribution chute with high temperature resistant steel

h) Pressure equalizing/ relief line along with its accessories

i) Centralised grease lubrication system

Flat Cast house with Single Tap

The BF will be equipped with flat cast house. Cast house will have one tap hole. All runners will be sunk in the cast house floor and will be provided with removal covers. One (1) set of cast house equipment (i.e., clay gun, tap hole drilling machine and trough cover manipulator) will be installed in cast house. The cast house floor will be completely flat without any equipment protruding from floor top level so that vehicle movement is smooth all over the area. The cast house is fabricated from steel structures and the floor made up with steel beams. The cast house floor height will be such to allow the movement of 70 ton capacity open top ladles on ladle car below it.

Cast house will be equipped with one EOT crane of 25110 t capacity by which the tilting runner, runner covers, slag runner and iron runner will be maintained, Monorails and hoist will be provided for maintenance of cast house equipment as required. Suitable numbers of Jib cranes will be provided in cast house for maintenance activities where EOT crane approach is not possible.

Slag granulation system (SGP) and dry slag pits

Molten slag discharged from the BF is separated from the hot metal and flows through the hot slag runner towards the granulation tank. At the blowing box, fitted below the hot runner spout inside the granulation tank, the hot slag is quickly cooled down by water jets. Cast house will be provided with one blowing box for granulation of slag. Granulated slag from the blowing box will

be transferred to gravity filter bed (GFB) by gravity / slurry pump. The GFB will be of R.C.0 construction with all facilities to de-water the granulated slag. From GFB the de-watered slag will be lifted by grab bucket crane on to the bins. The granulated slag from the bottom of the bins will be carried by truck and discharged at designated place. Dry slag pits will be provided to dump the slag during emergency or when the GFB is under maintenance.

Hot Blast Stoves System

A battery of three (3) regenerative type top fired hot blast stoves with internal combustion chamber has been envisaged to obtain hot blast temperature of 1000° C. The stoves will be of welded steel shell construction, lined with refractory bricks and filled with refractory checker bricks. The stoves will consist of fuel gas and combustion air system along with the top dome firing facility , flue gas exhaust, flue gas chimney, cold blast system and hot blast system along with valves and controls. The heated blast from stoves will be led through hot blast main, bustle main and tuyere stocks to the blast furnace. The hot blast stoves will be designed with the following technical parameters:

Number of operating stoves	-	3 Nos.
Hot blast volume	-	55,200 Nm^3/ hr
Blast temperature	-	1180°C (max.)
Blast time	-	45 minutes
Oxygen injection	-	upto 3 %
Steam injection	-	upto 40 g/ Nm^3

The hot blast stoves will be lined with high alumina bricks ranging from 65% to 40% at various zones and Silica brick in the top dome.

Dust Catcher, Gas cleaning plant and Flare stack

The raw gas leaves the BF through off-takes, up-takes and is conveyed to the gas cleaning plant via down comer, dust catcher, raw gas main. The dust catcher will be of welded steel construction. The gas cleaning plant (GCP) will be of dry type latest design ensuring high degree of gas cleanliness upto 5 mg/ Nm^3 to meet the fuel requirements of various consumers of the BF complex. The GCP will be suitable for BF operation with coal dust injection and hence appropriate corrosion protection, as required, will be applied.

The required clean gas is fed into the plant network and surplus gas is burnt out through the flare stack. The flare stack will be designed to flare off the surplus clean BF gas. The GCP will be complete with all necessary instrumentation and controls, electrics, service platforms and supporting structures, stairs/ ladders for easy approach to various instruments/ valves/ equipment, handling facilities as required, etc. for easy operation and maintenance. The top gas pressure of blast furnace will be controlled from the GCP.

Cast House Dedusting System

The control of dusty emissions arising during the operative! non — operative phases of the cast house will be ensured through an effective defuming/ dedusting system to reach good working conditions and minimum impact on the ambient air quality/ environment. The dedusting plant will be designed to suck and clean the dusty air coming out from the tap hole area, iron trough, iron runner, skimmer, slag runner, metal discharge points, etc., The top charging area where the material falls into the hopper will also be dedusted.

The sucked dusty air will be passed through the pulse jet bag filters and the clean air is allowed to pass to the atmosphere through the stack. The filtered dust will be charged into longitudinal conveyors below the hoppers at the bottom of the bag filter. The collected dust in the bag filter will be charged in a closed chamber or truck to discharge in a designated area.

Stock House Dedusting System

The control of dusty emissions arising during the operative phases of the charging system of stock house will be carried out with respect to the indoor and outdoor environment. The dedusting plant will be designed to suck and clean the dusty air arising from bunkers, material transfer points, belt conveyor transfer points, vibrating feeders, vibro-screens, weighing hoppers and all other dust generating points. The area covered by the dedusting system will extend from the discharging points of the belt conveyors that feed the stock house to the feeding points of main charging conveyor of blast furnace including the extraction and storage bunkers of fines.

The dusty air collected from the several suction hoods will reach through a duct network, the bag filter, the I.D fan and it will be discharged to the atmosphere by means of a stack. The collected dust in the bag filter will be charged into the bottom silo and finally the dust will be stored in closed chamber or truck to discharge in a designated area.

Pulverised Coal Preparation and Injection system

The system will comprise of coal storage yard, raw coal handling, drying unit, pulverises, conveying facility, coal dust collection unit, storage bunker and

pulverised coal injection system. There will be one grinding mill for catering to the requirement of blast furnace.

The raw coal of required size will be made available by conveyor to raw coal bin. There will be a suspended magnet and metal detector over the belt feeder for separating unwanted metallic material in the coal. Raw coal silo of required capacity will be provided.

Raw coal from the silo will be fed to the grinding mill through drag chain conveyor. Design of the grinding mill will be such that it will produce pulverised coal of 80% below 75 micron. The mill will be hot inert gas swept type, serving dual purpose of drying and pulverisation of coal. The hot flue gas from blast furnace stoves is proposed to be used as hot inert gas. Forced draft fan will be provided to force stove flue gases from stove flue gas main with it's heat further enhanced whenever higher temperature inert gas will be required by mixing stove flue gas with higher temperature gas from hot gas generator. The hot gas generator will use BF gas as primary fuel for pilot burner. A combustion air fan will be provided for combustion in the hot gas generator.

The raw coal will be pulverised and required size range swept by hot gas from grinding mill to the bag filters through ID fan which will suck the gases through the mill and carry it to the bag filter. A nitrogen line will be provided in the bag filter for discharge of coal on to the screw conveyor from where the

fine coal caught in the bag filters unit will be led to the fines bunker. The fine coal from this bunker will be discharged into the injection system located below, The fines bunker will have two outlets with a required storage capacity. The

pulverized coal dust will be pressurized, fluidized and transported to the static pulverized coal distributor from where the coal dust will be injected to the BF through tuyeres, Nitrogen will be used as the transport media for pulverised coal from the pressurised vessel to the distributor. The distributor is located at a higher elevated to ensure equal distribution of pulverised coal to all tuyeres. The waste gas after ID fan will be discharged to the atmosphere through chimney / stack or will be recirculated in the system as per requirement.

The grinding mill and the coal injection plant will be designed based on the requirement of coal dust injection of 150 kg/thm to blast furnace,

Water Circulation System including Soft Water Plant

The primary BF cooling system will be with soft water. Required numbers of circuits will be provided in order to obtain satisfactory and efficient cooling of the BF. The secondary circuit for cooling systems, emergency cooling systems will be with industrial water.

Utility systems : oxygen, nitrogen, steam, compressed air

To supply the utility services to the BF, the following facilities have been envisaged:

- **Steam: Will** be provided for cold blast humidification, purge and utilities. In order to reduce the steam pressure, if required for distribution system, steam pressure reducing station will be provided. Steam inject provision will also be incorporated inside the 13F top cone.
- **Compressed air:** Dry type compressed air will be used for operation of instruments and its valves. Compressed air will be used for general cleaning

purpose. It will be also required for pulse jet in cast house and stock house dedusting bag filters.

- **Nitrogen:** High pressure nitrogen will be used for **PCI** system. Nitrogen will also be used for purging and media for secondary pressure equalizing system.
- **Oxygen:** Will be used for oxygen enrichment in cold blast, oxygen lancing in tap hole and general cutting purposes.
- **LGP:** LPG will be used for pilot burners in stoves, BF top ignition, if required, trough, iron and slag runner heating in cast house.
- **Industrial water:** All open circuit cooling will be done by industrial water. All heat exchangers will be cooled by industrial water.
- **BF Gas**: Clean BF gas from GCP will be used as fuel in hot blast stoves, primary pressure equalizing at BF top and also may be required for heating of cast house runners, PCM moulds, etc.

Ladle Repair Shop (LRS) cum Hot Metal Transfer Bay

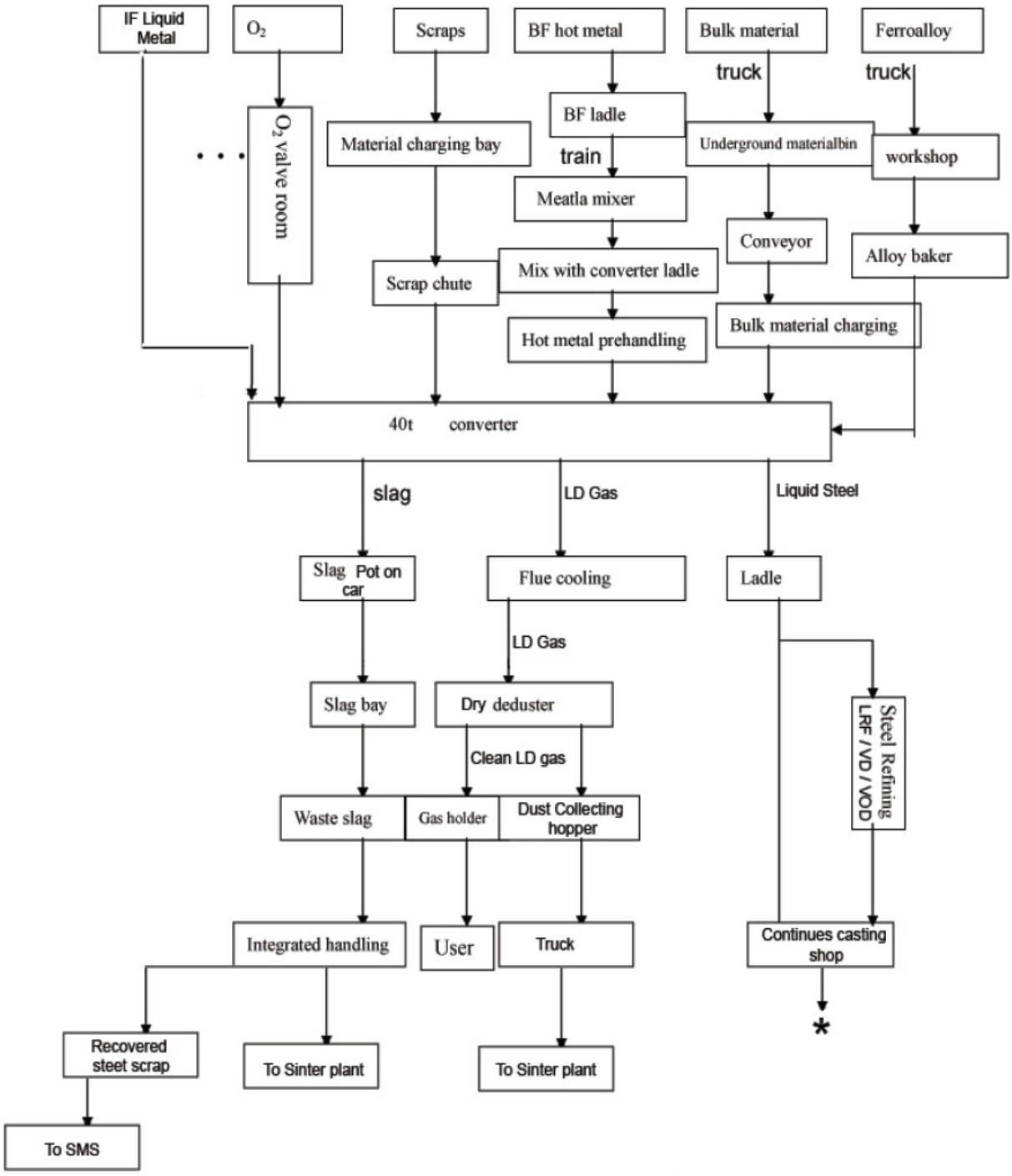
Ladle repair shop will be of structural building where ladle repair and relining will be carried out. The shop will be equipped with two Nos. EOT crane. This building will accommodate two pig casting machines of casting of pigs. Necessary facilities for ladle maintenance and heating of ladles will be provided in the ladle repair shop. A track leading to down stream steel making facilities will also be provided on which self driven ladle cars will be provided for transportation of hot metal to SMS

Ladles and Ladle Cars

Eight (8) Nos. of open top ladle of 40 ton capacity (each) mounted on ladle cars have been envisaged for transportation of hot metal from BF hot metal runner to

SMS. Hot metal loaded ladle will be brought to SMS unit by diesel loco. The ladles will be suitably lined with refractory bricks.

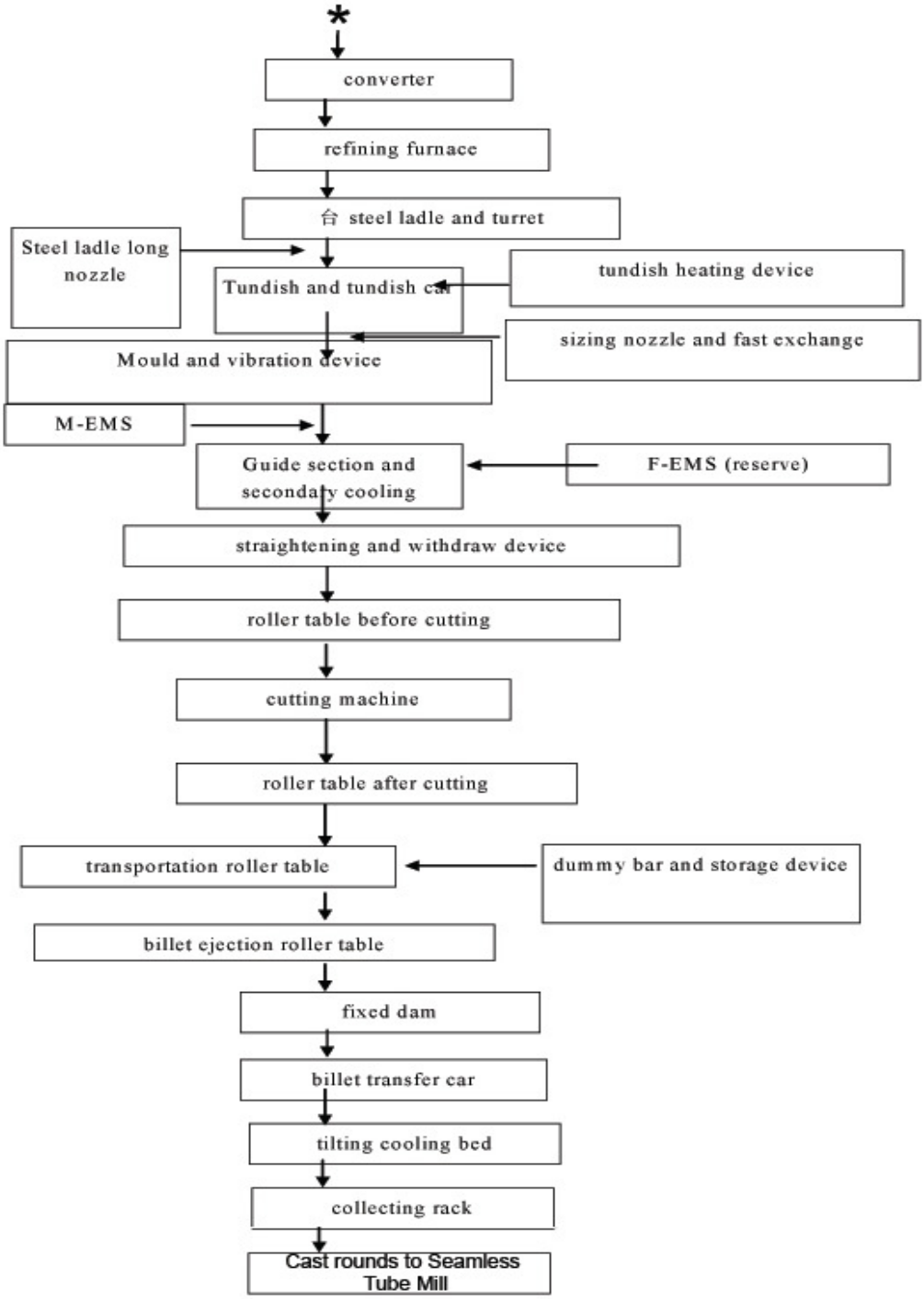
3.5.4. STEEL MELTING AND CONTINUOUS CASTING SHOP & PROCESS FLOW CHART :



PROCESS FLOWSHEET OF STEEL MELTING SHOP

Process description of Steel Melting Shop :

The modified steelmaking shop will comprise the



PROCESS FLOWSHEET OF STEEL MELTING SHOP

following new major plant facilities in addition to the existing Induction Furnace Shop facilities.

- 1 No. of desulphursation unit
- 1 x 40 t Basic oxygen furnace (BOF)
- 1 x 40 t Ladle furnace (LF), 8 MVA
- I x 40 t vacuum degassing unit (VD / VOD)

Brief Process Description of major steelmaking production units are as follows.

Receipt of Hot Metal

Hot metal and Liquid Metal will be received in the charging bay of LD (BOF) shop by hot metal transfer cars from Blast Furnace and Induction Furnace respectively. Carry over BF slag will be removed from charging ladle by means of slag raking machine. Facilities for measurement of weight and temperature of hot metal and for taking sample from charging ladle for chemical analysis will be provided.

Hot Metal Desulphurisation

After receipt of hot metal in I-TM charging ladle, it is taken into desulphurisation station of capacity 40 t. It is an enclosed chamber where desulphurisation reagents are injected into hot metal by injection lance. After completion of desulphurisation operation, slag is again removed by slag raking machine in the slag pot.

After hot metal de-sulphurized, hot metal is poured in to basic oxygen furnace of capacity 40 t for production of steel.

Scrap handling

A scrap area will be provided in line with the charging bay of BOF shop to provide for a buffer stock of purchased scrap required for charging into converters. The

scrap will be stored in pits provided in the scrap bay. which will have a storage capacity of about 7 days requirement of scrap. The bay will be served by one magnet cranes of 10/5 t capacity. The cranes will be utilized for unloading of scrap from incoming vehicles by roads into the storage pits and subsequent loading into scrap charging boxes.

Scrap charging box will be charged to converter by scrap charging EOT crane. Weighing facility will be provided in the scrap bay for weight measurement of the loaded scrap boxes.

Liquid Metal Charging

Liquid metal produced out of Sponge Iron and Blast Furnace hot metal in Induction Furnace will be transferred to BOF shop by transfer Ladle of 30t capacity and required amount will be poured in to BOF vessel for final steelmaking operation.

Bulk Material and Ferro-Alloy Charging

Bulk materials e.g. iron ore, calcined lime and burnt dolo from lime and dolo plant respectively and coke for preheating will be transported to converter shop by belt conveyor and will be discharged onto a reversible shuttle conveyor for distribution into their respective service bunkers. These bunkers will be arranged in one single row on either side of the converter. All the bunkers will be fabricated from steel with replaceable wear resistant liner plates. Bunkers will be so arranged that charging into the converter from both sides is possible. Adequate storage capacity of the bunkers has been envisaged for each material.

Material will be withdrawn from the service bunkers by means of vibratory feeders provided at the outlet of each bunker. The vibro-feeders will in turn discharge the material to respective weigh hoppers provided below the group of bunkers on either side of the converter. From the weigh hoppers, the weighed charge will be

fed to the charge holding hopper (intermediate bunker), through drop chute. From charge holding hopper, the flux material will be added directly into the converter via a drop chute holding hopper below each group of service bunker.

Ferro-alloys, e.g. silico-manganese and HC ferro-manganese, Al-shorts and coke breeze required for ladle addition, will be brought from ferro-alloys storage in the self — discharging containers and will be stored in their respective bunkers provided in the converter shop with the help of 20/5 t ferro — alloys handling crane provided in the EF (bulk material handling) bay, As and when required, the ferro-alloys will be withdrawn by vibrofeeders. The predetermined quantity of material will be charged into the ladles automatically from the control room. Al-bars / shorts will be manually charged into the ladle.

Basic oxygen furnace operation

The hot metal and liquid metal will be charged into 40t BOF converter with the help of charging crane. Hot metal, scrap and Liquid metal will comprise the major charge-mix for the BOF operation. The scrap and iron ore act as coolant in BOF steelmaking. Maximum 35 heats/day will be required to meet the target annual production. The converter will be of symmetrically top with fixed converter bottom. Facilities for inert gas blowing from converter have been envisaged. Top conical portion of the converter vessel will be water cooled.

The slag will be disposed of using slag pot transfer car to the slag pits in the slag bay.

Soft brunt lime and calcined dolomite will be used as flux in the converter. The use of calcined dolomite in addition to lime as flux in the converter has been envisaged as one of the measures to improve the converter lining life. Silicious slag formed during the early stages of steelmaking operation of BOF is generally

unsaturated with MgO lime. This results in considerable refractory wear due to slag attack on the lining during early stages of blow. One of the methods to reduce the slag attack is to supersaturate the initial slag with MgO. This is achieved by the addition of calcined dolomite and thus the dissolution of MgO from the lining is minimized.

For deoxidiation and control of liquid steel chemistry, fero-manganese, ferro-silicon and aluminum will be added.

As soon as the charge is melted, bath sample is taken and the steel temperature is measured. When desired temperature is attained, the steel at this stage is ready for tapping. If necessary, the temperature is adjusted and the steel is tapped into a pre-heated ladle.

Predetermined quantity of ferro-alloys and de-oxidisers will be added into the ladle during tapping based on desired steel grade. After tapping, furnace walls and banks are inspected and if necessary, fettled with MgO. The furnace is then ready to commence the next melting operation. Slag splashing will be done by using splashing of N2 with the help of oxygen lance.

Steel Handling

Liquid steel from the converter will be tapped into the casting ladle of 40 t capacity placed on the self-propelled transfer car operating beneath the converter. During the end of tapping the converter tap hole will be closed with a dart with the help of slag retaining device to minimize slag carry over into the ladle.

The movement of the steel ladle transfer car will be remotely controlled from local control pulpit / auxiliary control pulpit of converter. Filled steel will be taken to ladle furnace station at secondary refining bay for further treatment.

Slag Handling

De-slagging will be carried out from the converter and other areas into slag pot placed on self-propelled slag transfer car. The filled slag pot will then be transported to the slag handling (AB) bay by the transfer car. Hot slag will be dumped into the slag pit with the help of Crane and water will be sprayed to cool the slag. Cooled slag from the pit will be dispatched by road to slag dump for further processing. Processing of solid slag for recovery of scrap and usable slag will be carried out. Return slag from caster will also be transported to the slag handling bay through the return transfer line. Slag from hot metal desulphoriation station will also be transported to the slag bay through the slag cum ladle transfer car and poured in a separate slag pit.

BOF Gas Cleaning Plant

Gases generated during steel making in the converter are rich in CO and can be used as fuel in the plant units after cleaning to the desired level of cleanliness. To achieve this suppressed combustion process (air factor 0.1) will be used for gas collection, cooling & cleaning. The cleaned converter gas having dust content < 50 mg/Nm^3 will either be flared or recovered for storage, final collection, cooling & cleaning and export through switch over device.

The cleaned converter gas will be stored in a dry seal gas holder downstream of which ESP will be provided for final cleaning to a dust level at 5 mg/Nm^3. The finally cleaned gas will be boosted to the pressure required for plant gas network. The suppressed combustion process of gas combustion, cooling, cleaning and recovery unit comprises of following main equipment/sub-units.

Skirt, Hood and stack: where BOF gases are collected from converter mouth and cooled for further processing.

Scrubbing tower: The gases are further cooled and cleaned in fixed throat and variable throat venturies. The gases after scrubbing tower contain dust level to 50 mg/Nm^3.

Switch over station: This will divert the clean gas after scrubbing tower to either flare stack or towards gas holder.

Flare stack: Gases lean in CO are flared into atmosphere/burnt at flare top and discharged into atmosphere at a safe level.

Gas holder: Dry seal gas holder will be provided for storage of BOF gas rich in CO for further use in the plant units, either by mixing in BF gas or in mixed gas

.

ESP: Wet type vertical Electro Static Precipitators provided downstream of gas holder will be used for final cleaning of gases stored in the gas holder. The cleanliness achieved after ESP is [i] 5 mg/Nm^3.

Gas Booster: Downstream of ESPs gas boosters will be provided to boost the clean gas pressure to the level suitable for injecting in the BF/mixed gas of the plant network as required.

Interlocks and controls have been considered as required. Most of the operations of GCP will be automatically controlled through PLC. Gas

Analysers will be provided for continuous analysis of gases in the stack as well as before switch over station for percentage of CO, H2 & Oxygen.

Maintenance provision i.e. cranes, hoists, platforms, etc. will be provided for various units for trouble free and safe maintenance & replacement of various equipment of GCP.

Ladle Furnace Operation

One (1) Ladle Furnace of 40t capacity for SMS has been envisaged for refining liquid steel. The ladle is placed on ladle transfer car. The ladle transfer car with the ladle is moved to the ladle furnace station. The LF roof is lowered over the rim and heating starts by striking the arcs. Inert gas (argon) is bubbled through a porous plug provided at the ladle bottom throughout the LF treatment. During the treatment, temperature is measured and samples are taken periodically. Lime, ferro-alloys, aluminium and fluorspar are added as per requirement and the final temperature and chemical composition are adjusted, The ladle is transported to VD/VOD station with the help of EOT crane for further treatment before casting.

For steel grades requiring deep de-sulphurisation, facility of feeding cored wire Ca-Si is provided at the LF station. The wire feeder also feeds aluminium wire for Al-killed steel production.

Vacuum Degassing Operation

One (1) VD of 40t capacity has been envisaged for refining of liquid steel. The degassing process begins when a crane lifts a ladle holding 40 tons of liquid steel into the tank degasser through the top opening. The vacuum tank is a two-piece assembly consisting of an upright cylindrical tank and a flanged tank cover that is moved on and off the tank by hydraulics.

The ladle rests within the tank on spreader beams supported at their ends by stub columns connected to the tank base plate. The stub columns and the tank interior are lined with protective refractories. The empty volume
below the ladle can hold the entire 40 tons of liquid steel in case of a mishap.
Once the ladle is set in place, the tank is covered. The cover has a machined mating flange that compresses a silicone rubber 0-ring to provide an airtight seal during degassing. When the cover is removed, water floods a trough that the 0-ring sits in to protect it from the heat the cover picks up from the molten steel.
When the tank is sealed, five series-connected steam-jet ejector stages create a vacuum of 1/2 torr or less. At the same time, argon purging gas is percolated through porous refractory material in the bottom of the ladle. This stirs the steel, promoting the removal of hydrogen, which is drawn off and vented with the other off-gases.
The steam-ejector patterns are automated through programmable logic controllers, but the change in vacuum rate and argon-circulating rate can be done manually to control action in the ladle. This ensures sufficient time at low vacuum to remove the hydrogen. Hydrogen content is checked at the caster to ensure the steel meets required hydrogen levels.

Vacuum Oxygen Decarburisation operation

With a lower partial pressure above the melt bath, the end of the C-O reaction is deferred in favour of lower levels of Carbon and oxygen. The reason for this is an inhibition to form nucleus gas bubbles through the surface tension of the melt. Largest quantity of carbon is removed during the first phase of degassing, almost independent of the final C content. This reaction begins below 250 mbar and ends after ~.8 minutes at ~5 bar.

The CO reaction takes place only on the bath surface during this phase, due to the reduced formation of nucleus gas — bubbles inside the melt and ferrostatic pressure. A further reduction of C-content occurs steadily.

The success of the treatment during this process phase is depending upon the treatment duration below I mbar, which must be as long as possible, and the rate of stirring gas must be raised. Improvement of the decarburisation is only possible when the rate of stirring is increased (this is due to the ferro-static pressure in the bath)

Analysis correction by addition of alloying materials and final deoxidisation takes place after completion of the vacuum dccarburisation as far as necessary.

A soft argon rinsing treatment to remove inclusions takes place after that. This post-treatment step can be conducted at atmospheric pressure.

For high Cr boiler grade steel, Fe-Cr will be added in LF. For decreasing carbon percentage of this grade steel, VOD operation will be done.

Continuous Casting

The steel ladle after treatment at the secondary refining units will be picked up by ladle handling crane and placed on the ladle turret of the Round caster. A preheated refractory lined tundish mounted on tundish car will be moved from its parking position to the casting position. The ladle turret will be rotated through 180° to bring the steel ladle into the casting position. A refractory shroud will be fixed to the ladle slide gate, which will then be opened to allow flow of liquid steel into the tundish.

Prior to the start of the casting operation, the dummy bar will be introduced into the mould. The tundish-submerged nozzles will be opened to allow flow of metal into the mould. When the metal level in the mould reaches about 100-150 mm from its top, the drive of the mould oscillating mechanism and withdrawal and straightening unit will be switched on.

The withdrawal of dummy bar begins at the minimum speed and gradually increased to normal casting speed within a few minutes. The lubrication of mould walls will be done by adding mould lubricating oil in the moulds.

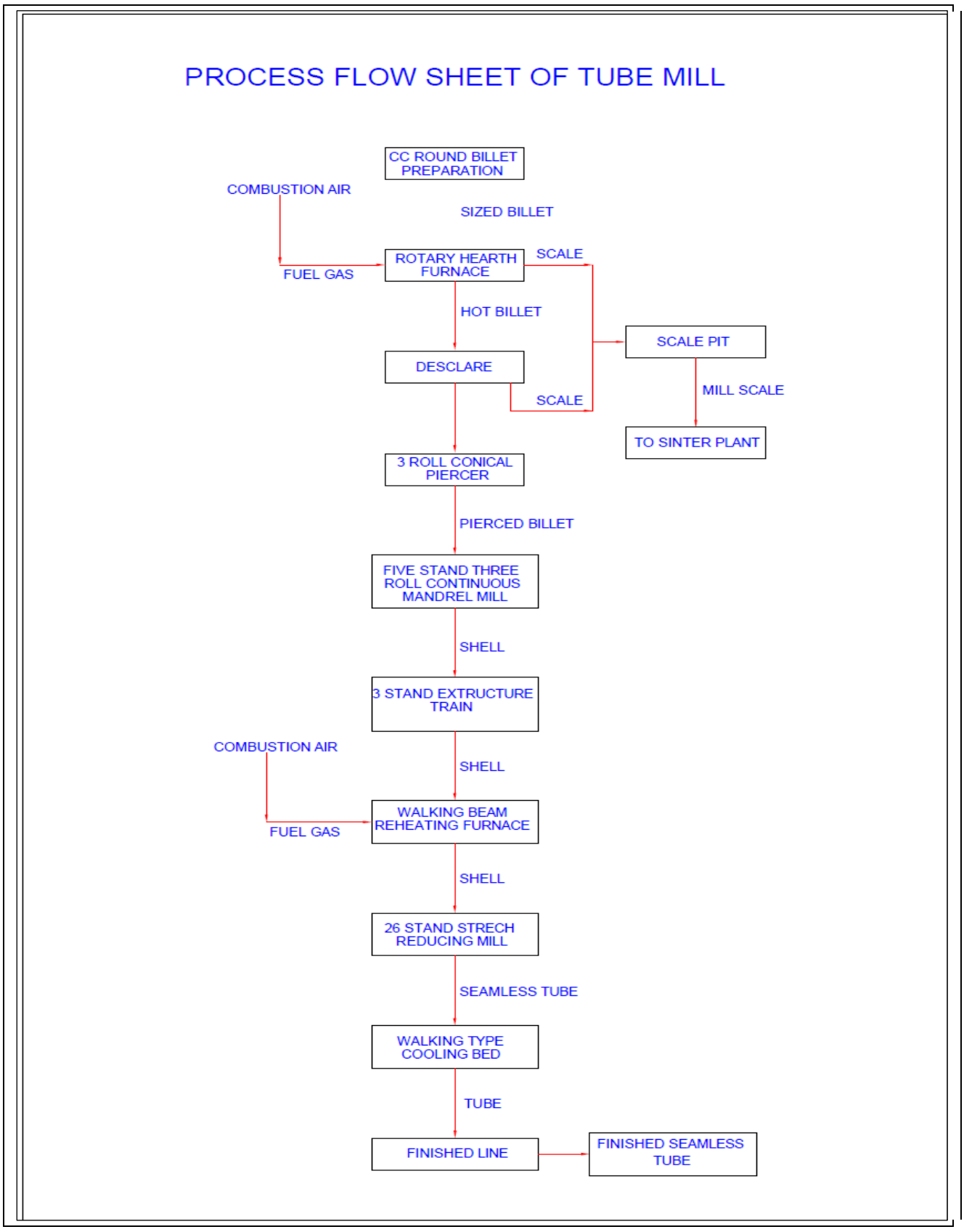
During casting operation, the metal level in the mould will be maintained within predetermined limit by automatic mould level controller.

The partially solidified strand after leaving the mould will pass through strand guide roller segment where intensive but controlled cooling of the strand will be effected by direct water sprays cooling. The solidified strand will be guided through strand guide system and withdrawal and straightening unit before entering the cutting zone.

The dummy bar will be separated from the strand at the withdrawal and straightening / strand guides system and will be stored in the dummy bar storage device.

The rounds will be cut to predetermined length by oxy-propane torch cutting machines. Cut rounds will be transported through run out roller tables to cross transfer and walking beam cooling bed and marked for identification by automatic marking machine. Rounds will be sent to Seamless Tube Mill as per requirement.

3.5.5 SEAMLESS TUBE MILL & PROCESS FLOW CHART:



Process description of Seamless Tube Mill :

The basic principle of Seamless Tube Production has been represented by a pictorial presentation in the following pages.

The figure shows that round billet is the input material for Seamless Tube production. The continuous cast rounds from steel melt shop will be transferred by trailer truck to Seamless Tube mill's billet preparation bay where round billets will be cut to size as per requirement of the final product. The billets are also dressed in this bay if required.

The sized and dressed billets are then charged into a rotary hearth furnace for re-heating the cold billets to 900^0C – 1250^0C depending on grades of steel. Subsequently reheated billets are taken out from the furnace from its discharge door and put on to a roller table.

The billet is then travelled to a descaling unit located on the roller table before entering into the three roll conical pierced mill. In this mill the solid billet gets pierced by a desired size mandrel head which moves in the opposite direction of the rolling and the billet gets rolled by three rolls of the mill. In this process the hollow shell gets formed and the billet length also gets elongated to some extent.

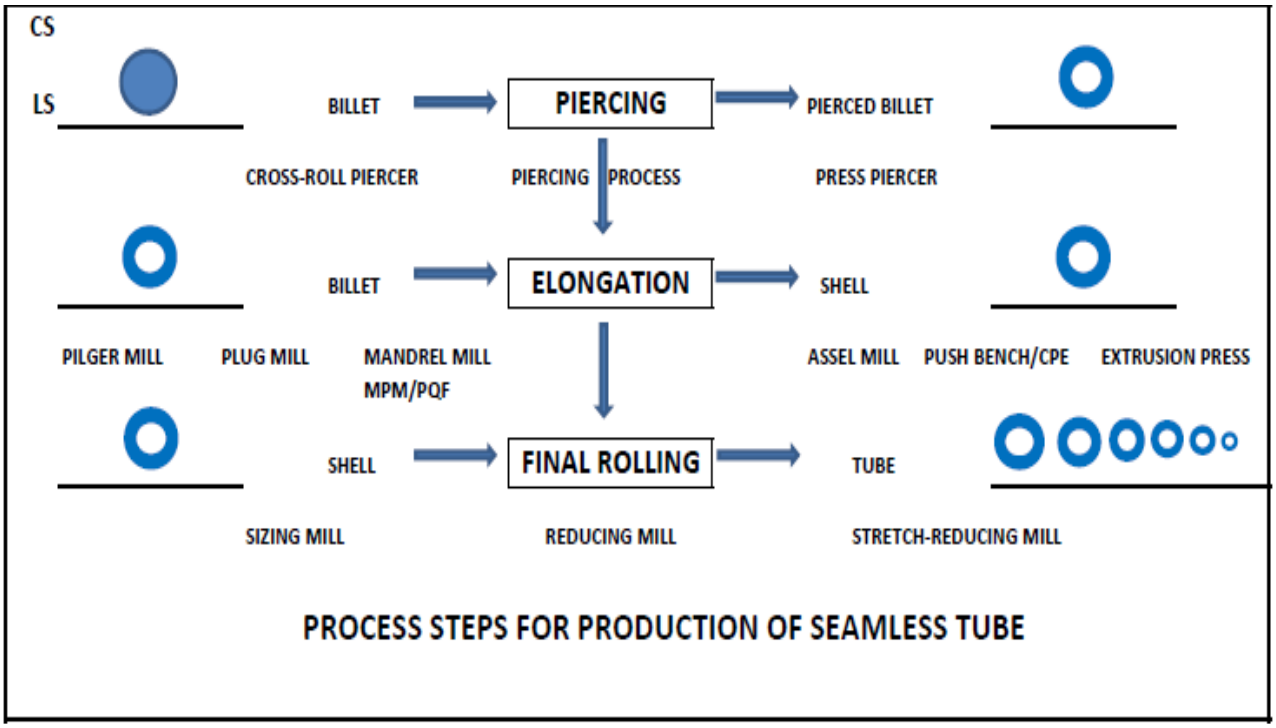
Subsequently, the hollow gets transferred to the rolling line of 5 strands continuous rolling line by a cradle type manipulator.

In this case also a suitable sized mandrel enters into the hollow from the same side of the rolling direction from a mandrel handling station and enters into the first stand of the 5-stand tandem mill and rolling process starts. This is basically the process of elongation of shell where the tube gets formed almost to its diameter, thickness and length. The retained mandrel technique has been adopted where mandrel gets retained in the mill and gets back to the mandrel preparation and feed station. The elongated tube gets extracted from the mill by

a three stand extractor and subsequently enters into a walking beam reheating furnace.

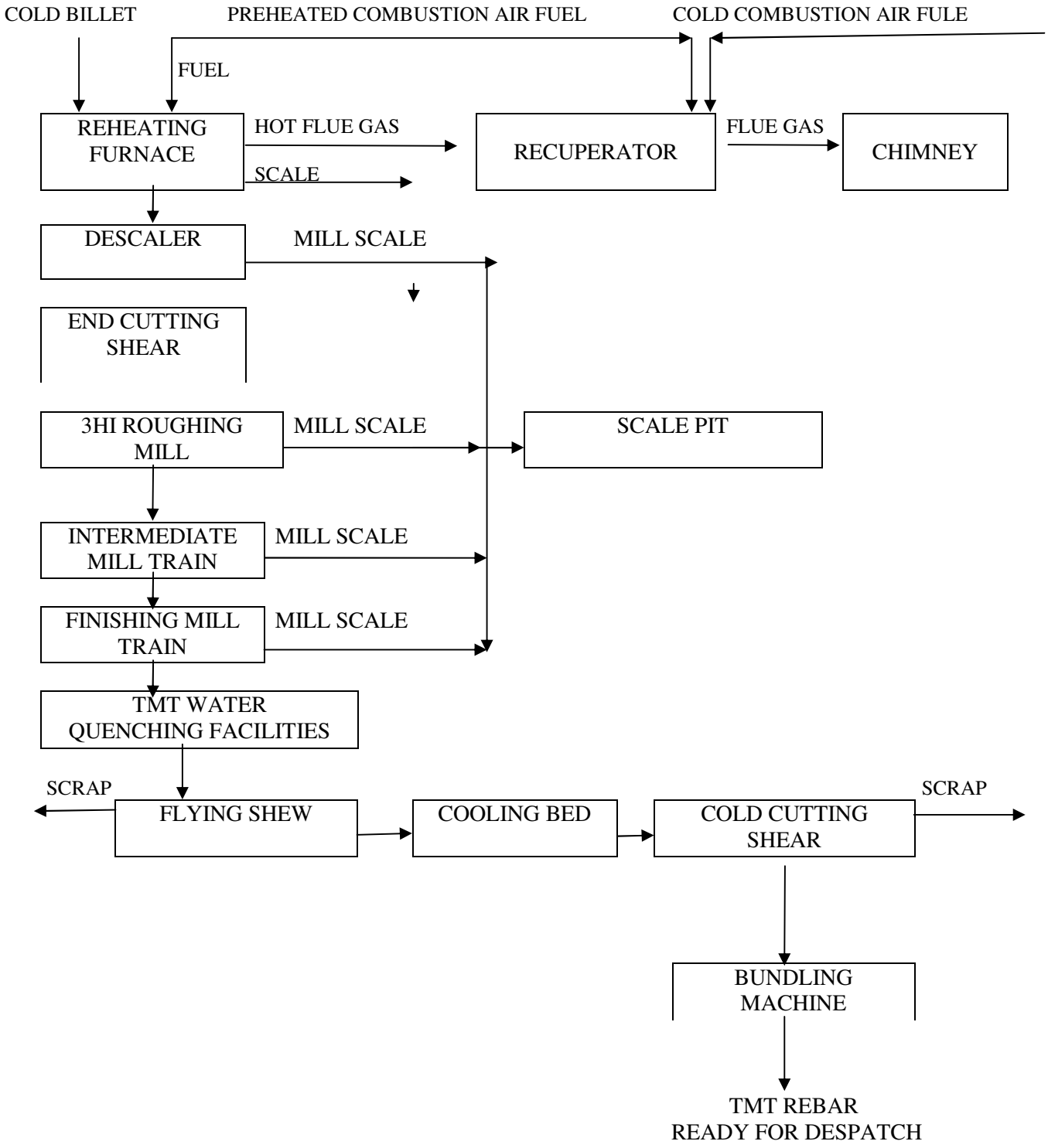
The reheated elongated shell gets ejected from the furnace and enters into a 26-stand stretch reducing mill where the final diameter, thickness and length of the tube is obtained. The tube then travels to a 70m long walking beam type cooling bed and gets naturally cooled.

The cold tube then travels to the finishing section of the mill where pipe batch saws, straightners, dust blowing device, magnetic leakage detecting machine, champering machines, hydrotesters, length and weight measuring machine, marking machine and coating machine are located in series to produce the final product.



PROCESS STEPS FOR PRODUCTION OF SEAMLESS TUBE

3.5.6 TMT BARS AND ROD MILL & PROCESS FLOW SHEET :



TMT BARS AND ROD MILL :

The production process is the Bar and Rod mill to produce 240,000 tpy TMT rebars in the size range of 8.0 – 32.0mm dia is described below:

Reheating Furnace

A 40 **t/h** pusher type furnace has been envisaged for the heating of billets. The furnace will be end charging and end discharging. It will be single row as well as double row charging facility. The following size shall be fed to furnace:

130 x 130 x 4000 mm

The furnace will be either heated with combination of Mixed Gas (BF+LD) and pulverized coal injection firing.

The furnace combustion system will comprise of air blowers, PCI system and other associated facilities. The product of combustion will leave the furnace at charging end and exhausted through underground flue tunnel and passed through a metallic tubular recuperator before finally let off to a self supporting steel chimney of sufficient height. A set of instrument will be used for smooth operation of furnace.

TMT Rebar Mill

A cross country type mill has been envisaged for the plant. The stands rave been grouped into roughing, intermediate and finishing groups. Roughing group will have 2 stands, intermediate group will have six stands and finishing mill will have six stands. Roughing group of stands be driven by one motor. Two nos. stands (in 3 groups) will be driven one DC motor. Six nos. 2-hi finishing stands shall be driven by individual DC motor positioned by

continuous fashion. Necessary guides and troughs will be provided at entry and exit of mill stands.

Automated tilting, drop type tilter and feeding arrangement have been provided in roughing group of stands. Repeators have been provided in intermediate stands

The rebars discharged from the mill will pass through a water cooling system comprising cooling pipes with high pressure water nozzles for rapid water quenching. At the cooling pipes the bar still remains hot. This entrapped heat tempers the bar, This thermo-mechanical treatment the bars increases tensile strength without adversely effecting weldability and elongation properties.This process eliminates requirement of cold twisting of bars for production of rebars.

A dividing shear, to cut the products to cooling bed length, will be located immediately after the water cooling system. This shear will divide all products to cooling bed length. Rake type cooling bed have been envisaged to receive the roller product. High speed delivery system will be provided to receive the rolled products. One cold shear has been provided to cut the bars coming out of cooling bed into despatch length of 3 — 12 m. The bar products will be formed into bundles and will be strapped by strapping machine.

The finished product will be removed by overhead EOT crane and stored in the storage area.

Auxiliary Facilities

Required auxiliary facilities such as oil lubrication systems, grease lubrication systems, hydraulic systems, etc. have also been envisaged.

Roll and Repair Shop

A roll & repair shop have been envisaged where grooving of new rolls as well as redressing of used rolls, dismantling, assembly of bearings Preparation of templates, grinding of tools, etc. as well as minor repair job will be carried out. This shop will be located in main mill building.

3.5.7 NON-RECOVERY PUSHER TYPE COKE OVEN :

The proposed non-recovery coke ovens have been specially developed based on both the imported as well as indigenous coking coal with volatile matter content in the range of 20%-26%. Moisture control of coal is important as it has direct bearing on the carbonization rate & bulk density of coal.

Non-recovery coke ovens are capable of producing coke of large size, strong dense and abrasion resistant. The coarse mosaic micro-structure, low porosity during carbonization and development of minor crack result in low reactivity, strength in high temperature, stability and superior post reaction strength.

The ovens are unique in that, no external heat source is required. All the energy in carbonization is supplied by burning the gaseous volatile products released from the coal charge during carbonization. The required air is drawn into each oven through various inlets provided at various stages located in both above the arch and sole levels.

The heat, generated during the process of combustion of the volatile matter, produces high temperature zone in the free space above the coal charge. The heat radiates back into the coal charge and comes down ward, and carbonization starts in the coal mass. The volatile products after carbonization are drawn through the various ports in the oven arch and subsequently pass

through side wall off takes flues and through which it goes into a series of sole flues located below the oven floor.

As the hot gases after combustion passes through the sole flues, they liberate some portion of the total heat upwards which has resulted in continuance of the process of carbonization of the coal mass in the oven. The gas enters into the sole flues through connecting ducts and passes along the individual waste gas tunnel and common main waste heat tunnel and discharges waste gas through stack.

Hence carbonization of coal mass takes place by the application of heat from above, side flues and sole flues below the charge. Temperatures at the point where burning gases are drawn into the side off take ports are of the order of 1200 ^{0}C to 1250 ^{0}C. Temperature at the base of the sole flues is around 1100 ^{0}C to 1150 ^{0}C. The available temperature at the chimney base will be around 1000 ^{0}C to 1100 ^{0}C and above baffle wall of the main stack has been observed at 800 ^{0}C to 900 ^{0}C. To maintain the above gradients of temperature at various locations, it will be essential to operate the total set of ovens within the stipulated cycle time of 46 to 48 hrs.

Advantages of Non-Recovery Type Coke Oven.

- Low capital cost
- Low revenue cost in regard to operating & maintenance of oven
- Low cost per tone of coke-conversion
- High coke yield
- Any oven in a battery may be isolated and cooled down for repair any time during running condition without any considerable effect on oven life

- No effluent, only emission being fully burnt clean fuel gas resulting to minimal environmental impact
- Ovens of non-recovery type are being operated under suction to avoid any explosion during operation & to prevent pollution
- Extensive fuel system ensuring complete combustion of all hydrocarbons leaving a clean stack gas within permissible limit.
- The sensible heat in the flue gas can be utilized for power generation using Waste Heat Recovery Boiler for generating required steam to drive the turbine.

Manufacturing Process

Raw coal is crushed with the help of crusher into powdered (85% - 3mm) from and charged in the oven as Coal cake after stamping for the purpose of carbonization. In this process the volatile matter in the raw coal gets released in the form of gas and is burnt in the oven as well as in the flues and after the completion of the carbonization process, within the duration of 46 to 48 hours, the raw coal gets converted in the form of coke. The coke is ready for dispatch. The duration of coking depends up to the quality & quantity of raw coal fed into the oven, charge height and thermal condition of the oven. A proper thermal routine will therefore have to be maintained for optimum result and consistency in the charging cycle time. Coking coal is stacked, either manually or by the pay loader required for the ground bunker and is reclaimed from the bottom of the bunker by a belt conveyor for feeding the crusher. The provision of an electro magnet has been proposed to remove tramp iron from the raw coal. Crushed coal from crusher is fed into a belt conveyor to carry coal up to the overhead bunker which acts as overhead storage to feed charging car as & when required. Charging car carried the crushed coal over the oven to be charged and coal is

discharged into the oven through the charging hole. After charging, charged coal is leveled & then oven lids are closed. The carbonization starts in the oven at the temperature of 1200 ^{0}C to 1350 ^{0}C. Leveling is required as the cycle time for carbonization depends upon the charge height of the coal mass to the great extent. During the cycle time, ovens are checked time to time
to determine the completion of the generation of gas. Thus coke mass is ready for withdrawal from oven for quenching. The doors of the ready oven are then lifted and hot coke mass is pushed out by the pusher car and water is sprayed on the hot coke for quenching. Quenched coke is then stacked and dispatched.
The hot quenching water is continuously collected into a setting tank & the coke particles are also being carried out up to the settling tank with water. These particles are allowed to be settled below the settling tank and then the water almost free from suspended particles is allowed to be again used for the purposes of quenching of hot coke mass. Time to time the settled particles are reclaimed and these have the large demand in mini cement plants, briquette plants etc.

To get the desired level of production 2 Nos of Coke Oven batteries have been envisaged with 50 Nos of Oven each. The size of each oven is 11.0M x 1.84 M with a charging height of 1.2M. About 650 tons of Coke will be produced per day
.

3.5.8 OXYGEN PLANT :

In order to meet the above requirement of oxygen, nitrogen and argon, 1 (one) air separation unit of 350 t/d capacity will be installed. Argon requirement will be met from argon produced from the oxygen plant as envisaged for the proposed project.

Purity Requirement of various gasses

Sl.No.	Product	Purity,%
	Gaseous oxygen	99.6
	Gaseous nitrogen	99.995
	Argon	99.995

Oxygen, nitrogen and argon will be produced by air separation process based on low pressure cryogenic cycle and double column rectification system. The unit will be able to produce gaseous as well as liquid products.

Gaseous products from the oxygen plant will be distributed through pipeline network system consisting of pressure regulating and metering station to various consumers.

3.6 RAW MATERIAL REQUIRED – THEIR SOURCES & QUANTITY:

The base raw material required for the project / plant will be iron ore fines high & low grade, non-coking Coal, Coking Coal, Pig Iron, Ferro Alloy products. Besides, many other materials such as Limestone, Quarts, Bentonite and Dolomite etc. are used as consumables.

Estimated quantity of raw materials & major consumables required per annum along with their sources are given in the table given below:-

Raw Materials – Sources – Quantity - Transport

Sl No.	Materials Name	Intended Product	Estimated Quantity (LTPA)	Sources	Mode of Transportation
1	Iron Ore Fines	Pellet Plant	16.12	Sundergarh/Keonjhar Dist, Odisha	By Road & Rail
2	Coking Coal	Coke Oven	1.92	Imported	By Ship & Road
3	Non Coking Coal	CPP/ DRI	4.32	MCL/SECL & Imported	By Ship & Rail
4	Coke Breeze	Blast Furnace	0.18	Dhanbad, Jharkhand	By Road
5	Bentonite	Pellet	0.06	Bhuj/Gujrat/ Chhattisgarh	By Road
6	Lime Stone	Blast Furnace	0.77	Odisha/MP/ Chhattisgarh	By Rail
7	Dolomite	Blast Furnace	0.52	Local Market	By Road
8	Anthracite Coal	PCI of Pellet Plant	0.04	Imported	By Ship & Road
9	Fe-Alloys	SMS	0.07	Meghalaya Chhattisgrah	By Road
10	Calcinied Lime	SMS	0.25	Local Market	By Road
11	Calcinied Dolomite	SMS	0.09	Local Market	By Road

Details of Material Balance showing Process Flow including quantum of captive consumption and saleable finished products are schematically presented in **ANNEXURE – E.**

Saleable finished products and their quantity produced per annum including marketing areas are stated in the table below:-

FINISHED PRODUCTS – MARKET

Sl.No.	Product	Qty (Mt)	Marketing area
1.	Sponge Iron	360000	Odisha/Chhattisgarh./W.B./Northern Resion
2.	Pellet	733560	Odisha & neighbouring states / Export
3.	Seamless Pipe	400000	Domestic / Export
4.	TMT Bar	240000	Odisha.
5.	Pig Iron	30160	Odisha / Neighbouring State.

Seamless Tube & TMT Bars /Rods will be sold entirely. A part from above two products all other products such as Sponge Iron, Pellet, Pig Iron and Billet etc will be captively consumed and the surplus quantity will be for sale.

3.7 RESOURCE OPTIMISATION/ RECYCLING & REUSE:

The project is equipped with suitable process and technology for optimum utilization of the sam and even for reutilization of some by- products & wastes without being let out/disposed off. Such reusable resources are coal, B.F.Gas. and water and brief description of fthe process of reuse, their quantum and their beneficial impacts are enumerated bellow.

COAL :

Coal fines generated are used in the existing DRI unit as injection coal. Besides there are various technologies installed for maximum utilization of the same.

Installation of Coal injection system in DRI Pre-heater.

At present the waste gas from the DRI kiln passes through a pre-heater kiln through which raw materials gets charged into DRI kiln. The cold raw materials come in contact with the counter current flow of the hot waste gas and get pre-heated before charging into the kiln. The coal charged into the DRI kiln serves tow purposes namely, as reductant and also as fuel to bring the raw materials to the desired temperature of reaction.

The specific consumption of coal at present is 1.5 MT Per MT of DRI which comprises of 50% imported and 50% indigenous coal. By installing PCI in preheater the total requirement of fuel in main DRI kiln will become almost negligible and imported coal requirement will be totally replaced by additional 0.5 ton of indigenous coal including the coal requirement for PCI. Thus the total specific consumption of coal in DRI kiln will become 2.0 MT Per MT of DRI.

Although the specific consumption of the coal in DRI process will increase but because of less cost of indigenous coal, there will be an over all savings in raw materials cost.

Installation of coal injection system in existing Blast Furnace:

The Coal Injection system is designed for 150kg/ton hot metal. An intermediate speed vertical roller grinder and primary bag filter process has been adopted for this purpose.

The raw coal with granularity of ≤40mm after iron removal will be sent to raw coal bunker located at main workshop through belt conveyor. The coal inside raw coal bunker will enter into coal grinder through electronic belt scale coal feeder. One set of 8t/h intermediate speed vertical roller coal grinder has been envisaged for grinding anthracite coal to 200 mesh 95% passing.

The qualified pulverized coal discharged from coal grinder will be mixed with hot gas from hot gas generator and then enter into bag filter equipped with anti static cloth and anti explosion device. The pulverized coal will be collected into dust bin and the separated tail gas with dust content of less than 50mg/Nm3 will be discharged into the atmosphere through main exhaust fan. The pulverized coal in the dust bin will fall into screw conveyor through saw dust separator, and then will be sent to the pulverized coal bin of the Coal Injection system. Subsequently pulverized coal will be discharged to two pressurized vessel, working in tandem, below the coal bin and pulverized coal will be transported pneumatically using a dense phase conveying system to a distributor located in the blast furnace cast house. The distributor distributes pulverized coal to 12 nos of tuyers equally via lancing arrangement to be provided in the blow pipe of each tuyer into blast furnace.

Coal Injection system is also provided with automatic Nitrogen quenching arrangement to prevent any fire hazard. The entire PCI system is provided with extensive automation and instrumentation system for monitoring, control and protection.

Installation of Coal Gassifier plant for existing & Proposed Pellet plant:

In pellet plant, furnace oil is generally used as fuel to achieve temperature of 1300oC. Other source of energy includes – Gas, Imported low ash Coal, Indigenous low ash Coal etc. Coal Gasifier is one of the most cost effective solutions of heating sources for Pellet plants and the Company, MSPPL has decided to install Coal Gasifier plant at their proposed pellet plant section as a part of conservation of energy drive. Based on present market prices, the cost of furnace oil is approx Rs 45 per litre and 15 litres are required per tonne of production of pellet ,resulting in an

approx cost of Rs 675 per tonne. If coal gas is used, approx 100 kg of coal shall be required per tonne of production at a rate of Rs 3.50 per kg resulting in a cost of approx Rs 300 per tonne. Thus, the company shall save approx Rs 300 per tonne by using coal gas instead of furnace oil.

Bagfilter in Pellet /Sinter plants are re-fed into process as raw material and this cycle is repeated.

B.F. gas is taped and are brought down to pellet unit by suitable duct to fuel the Pellet plant Kiln.

Fuel balance chart furnished in the table hereunder is reflective of our attempt for optimization of resources.

MSPML – FUEL BALANCE FOR PROPOSED UNITS

Sl No.	Name of Shop / Unit	Product	Annual output Tons	Annual hours of Operation	Sp. Fuel gas generation Nm^3/Ton	Calorific Value kCal/Nm^3	Heat generation / Consumption GCal/Ton	Hourly fuel supply / consumption, GCal/hr			
								Total	BF Gas	LD Gas	Producer Gas
A	GENERATION										
1	Balast Furnace	Hot Metal	336000	7920	1990	700	1.51	59.09	59.09		
2	Steel Making Shop	Liquid Steel	462000	7920	80	2000	0.16	9.33		9.33	

MSPML – FUEL BALANCE FOR PROPOSED UNITS

Sl No.	Name of Shop / Unit	Product	Annual output Tons	Annual hours of Operation	Sp. Fuel gas generation Nm^3/Ton	Calorific Value kCal/ Nm^3	Heat generation / Consumption GCal/Ton	Hourly fuel supply / consumption, GCal/hr			
								Total	BF Gas	LD Gas	Producer Gas
3	Anthracite Coal					6500/ Kg		34			34
	Total Generation							102.42	59.09	9.33	34
B	CONSUMPTION										
1	Sinter Plant	Sinter	460000	7920		2000	0.02	1.16		1.16	
2	Blast Furnace a) Stove, LRS, PCI, PCM etc	Hot Metal	336000	7920		700	0.687	29.14	29.147		
3	Steel Making Shop a) BOF b) Continuous Casting Shop	Liquid Steel Rounds	462000 448000	7920 7920		2000 2000	0.056 0.014	3.26 0.80		3.26 0.80	
4	Seamless Tube Mill reheating furnace	Tubes	600000	6000		1220 800	0.425	42.5	26.06	2.28	14
5	Bar & rod Mill	Re=-bars	240000	6000		1220 6500/Kg	0.40	16.0	2.53	1.83	12
6	Pelletizing Plant	Pellet	600000	7920		6500/Kg	0.109	8.20			08
7	Lossess a) BF Gas- 2%						0.020	1.36	1.36		
	Total Consumption							**102.42**	**59.09**	**9.33**	**34**

Energy Conservation:

For power the project is partly dependent on its own generation. Balance requirement of power to be sourced from the public supply source of WESCO. The project is equipped with the system for drawing power upto 50 MVA., which is more than our total requirement. For effective utilization of power through the system/process of conservation, the Project Proponent will adopt following measures as the same has important contribution towards economization of its operations. The technology & process adopted in this regard are described hereunder:

ENERGY CONSERVATION & FUEL SAVING SCHEMES :

In excises of the power conferred by Clause (g) and (n) of the of the Section 14 of the EC Act, 2001, The Central Government in consultation with Bureau of Energy Efficiency, hereby specified the Energy Consumption Norms and Standard in relation to current level of energy consumption i.e baseline energy consumption norms and standard established under the energy conservation (Energy Consumption Norms & Standard etc) Rule 2012 for Designated Consumers of the following sectors

Sl. No.	Sector	Sl. No.	Sector
01	Aluminum	02	Chlor – Alkali
03	Textile	04	Pulps & Paper
05	Iron & Steel	06	Fertilizer
07	Cement	08	Thermal Power Plant

The company understands that it is necessary to focus on process technologies and waste heat recovery to achieve further reduction in specific energy consumption.

Energy Conservation Measures Implementation

- Replacement of 1000 W HPMV lamps by 400 W HPSV
- Renovation of illumination of stacking area of ore handling plant
- Replacement of HPMV with HPSV lamps in Plant
- Replacement of existing motors with energy efficient motors
- Optimization of speed control by providing VVVF drives for controlling motors.
- Replacement of existing cable with low loss high efficiency cu. Cables.
- Installation of VFD in DRI Kiln and CPP to reduce power consumption
- Installation 8 No. PCI system in existing DRI Kiln Pre- heater to produce more heat by using cheaper indigenous coal and reduce coal consumption in DRI
- installation of additional capacitor to improve the plant power factor.
- Implementation of microprocessor based control system for automatic monitoring of the process system.

Energy efficiency

Some of the process areas where improvements will be realized are as follows:

Power factor correction

The power factor is the relationship (phase) of current and voltage in an AC electrical system. Under ideal conditions, current and voltage are "in phase" and the power factor is 100%. If inductive loads are present, power factor of less than 100% will occur. One of the common methods of correcting power factors is by installing capacitor banks on the primary or secondary side of the plant power transformer. If electric bill penalties are the only concern, the total capacitor requirement can be installed in one bank on the load side of the metering equipment. The system requires elaborate switching devices to prevent leading power factors during low loads. Capacitors can be installed at load centers,

usually motor control centers and switched according to the loads. This method increases the load capabilities of the plant electrical distribution system. The

power factor is corrected at the load center and back through the distribution system. Better voltage regulation is obtained for the system's transformers. Engineering is simplified and costs of installation are reasonable. Capacitors can be connected directly across the terminals of larger motors thereby eliminating the cost of separate switches. This method requires more capacitor units and generally higher installation costs. The power factor is corrected at the motor and back through the distribution system.

Motor drives optimization

Motor drive systems may consume as much as 50 to 60% or even more of the total electricity used by the industry. Any conservation program, therefore, for controlling electrical energy cost should consider replacing existing standard motors with more energy efficient models. The size of the motor should match its load. Using of variable speed drives (VVF Drives) for better process optimization and as well as saving of considerable amount of energy in the form of electricity.

3.8 WATER & POWER REQUIREMENT – THEIR SOURCES :

3.8.1 Water Requirement and its sources:

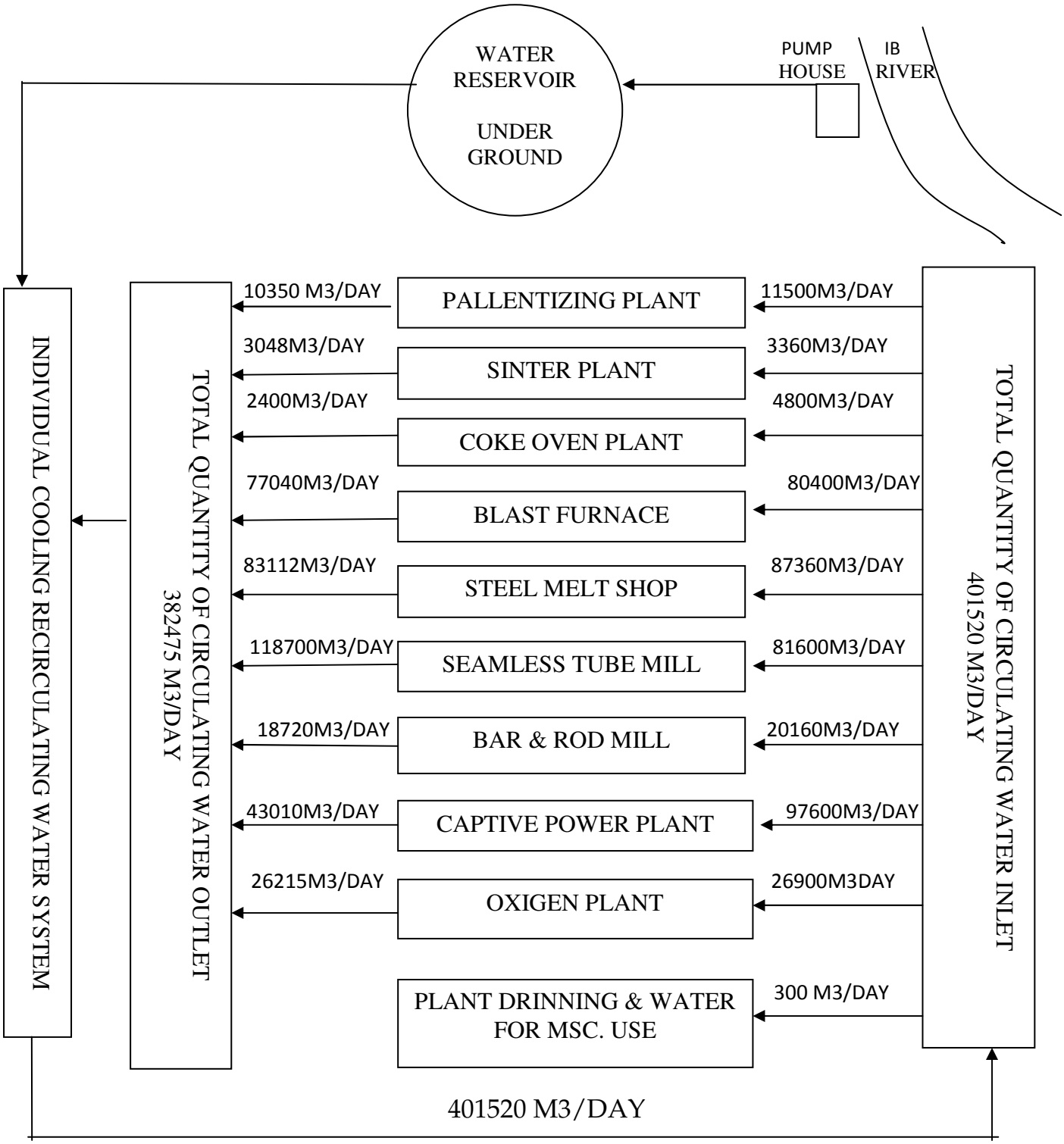
No additional water will be required for the present proposal. Permitted sources and quantum will remain the same and will be adequate to meet the present and future requirement because of the impact of surrendered facilities and use of process / technology for recycling of process wastes.

MSPML –WATER BALANCE FOR PROPOSED UNITS

Process/Plant Facilities	**Water needed in process (Circulating water) (M3/day)**	**Make up water needed (M3/day)**	**Type of waste water/effluent generate**	**Source of effluent generation**	**Mitigation measures**
Pelletizing Plant	11,500.00	1,150.00	Nil	Nil	NR
Sinter Plant	3,360.00	312.00	Nil	Nil	NR
Coke Oven	4,800.00	2400.00	Nil	Nil	NR
Blast Furnace	80,400.00	3,360.00	Nil	Nil	NR
SMS	87,360.00	4,248.00	Nil	Nil	NR
Seamless Tube	1,22,400.00	3,700.00	Nil	Nil	NR
Rod Mill	20,160.00	1,440.00	Nil	Nil	NR
Bar & Rod Mill	20,160.00	1,440.00	Nil	Nil	NR
Power Plant	44,340.00	1,330.00	Nil	Nil	NR
Oxygen Plant	26,900.00	685.00	Nil	Nil	NR
Plant drinking water	-	120.00	Nil	Nil	NR
Miscellaneous	300	300.00	Nil	Nil	NR
TOTAL	**401,520.00**	**19,045.00**			

NR - Not Required.

PROCESS WATER RE-UTILISATION CHART



Zero – discharge of effluent is maintained.

3.8.2 Electrical energy requirement and source.

Power requirement for the entire project is around 39 MW as shown in the Table bellow:-

ENECTRICAL ENERGY BALANCE

Plant	No. of Units (Kwh / ton)	Annual Production (Ton)	Total Unit Required (Kwh)	Total Requirement (MW)
Coke Oven	18.0	214,000	38,67,600	0.50
Sinter Plant	45.0	460,000	207,00,000	2.69
Pellet Plant	65.0	6,00,000	384,00,000	5.00
Blast Furnace	120.0	3,36,000	403,20,000	5.10
SMS (BOF)	40.0	448,000	179,20,000	2.26
Seamless Tube Mill	180.0	400,000	720,00,000	12.0
Bar and Rod Mill	100.0	240,000	240,00,000	4.0
CPP	8% of Generation capacity		209,08,000	2.64
Oxygen Plant	0.8 Kwh/Cum	475,20,000 Cum	380,16,000	4.8
			3639,32,400	38.99

SOURCE OF POWER:

1) Captive Generation: (W HRB) 24 MW
2) Out source form public supply (WESCO): 15 MW

Total Power requirement: 39MW

3.9 WASTES GENERATION (SOLID & LIQUID) & THEIR MANAGEMENT :

Proper care will be taken for handling, disposal/ management of Solid & Liquid wastes as per the norms of MoEF/SPCB. Stress has been given reutilization of wastes in to process or further utilizable product. Details of waste generatinand reuse / disposal is stated in the tables below :

SOLID WASTE UTILIZATION AND DISPOSAL PLAN FOR PROPOSED UNITS

Sl. No.	Source Unit	Type of Waste	Quantity Generated (MT/Day)	Disposal Practice Mt/Day		
				Qty. for Dump at site	Qty. Re-Usable	Qty. Saleable
1	Pellet	ESP/ Bag Filter Dust	85.00	NIL	85.00 (Sinter Plant)	NIL
2	Sinter	Bag Filter/Multi cyclone day	15.00	NIL	15.00 (Sinter Plant)	NIL
3	BF	Slag	419.50	NIL	NIL	419.50
		Flue dust	20.00	NIL	20.00 (Sinter plant)	NIL
4.	SMS	Bag Filter Dust	21.00	-	21.00 (Sinter Plant)	NIL
		Mill Scale	1.00	-	1.00 (Sinter Plant)	NIL
		Slag	140.00	90.0	50.00 (Sinter Plant)	NIL
5.	Seamless Tube Mill	Mill Scale	7.00	NIL	7.00 (Sinter Plant)	NIL

AIR POLLUTION SOURCES AND ITS CONTROL/MANAGEMENT

Sl. No.	Source of Pollution	Pollutants	Air Pollution Control Measures	Emission Norms
1	Pelletizing Plant	Fugitive dust emission and SSP	Bag Filters, ESP and dust suppression system	≤50mg / Nm^3
2	Sinter Plant	Dust (surrendered, solid particles, fugitive dust and sinter fines	Bag filters, multi cyclone and dust suppression system	≤50mg / Nm^3
3	Coke Oven	Fugitive dust emission	Bag Filter	≤50mg / Nm^3
4	Blast Furnace	Fugitive dust and SSP	Bag filter, dust suppression system and Gas cleaning plant (dry type)	≤10mg / Nm^3
5	SMS	Fugitive dust and SSP	Integrated dust Extraction system using Bag filter	≤50mg / Nm^3
6	Seamless Tube Mill	Not air pollution as clean gaseous fuel to be used in Reheating furnace	NA	NA

TECHNICAL PARAMETERS OF POLLUTION CONTROL EQUIPMENT

Stack Name	Hight (M)	Diameter (M)	Temp (^0C)	Exit Volume (cum /hr)	Exit Velocity (m /s)	Emission Rate (gm / sec)		
						SPM	SO_2	NO_X
COCK OVEN (WHRB)	30.0	1.90	120	104000	11.0	0.17	0.65	1.3
SINTER PLANT								
a. MACHINE PROPER	50.0	2.30	117	260450	16.0	7.2	2.7	NIL
b. PROPERTIONING BIN BUILDING	30.0	2.50	AMBIENT	210000	10.0	5.5	NIL	NIL
BLAST FURNACE								
a. CAST HOUSE	30.0	3.2	50	365000	11.0	3.0	NIL	NIL
b. STOCK HOUSE	30.0	2.5	AMIBENT	210000	10.0	5.5	NIL	NIL
c. HOT BLAST STOVE	45.0	1.9	150	70000	11.0	3.0	NIL	0.06
PELLET PLANT	50.0	2.0	117	330000	16	9.16	1.3	NIL
CFBC	70.0	1.8	162	61200	12	1.7	3.2	NIL
SEAMLESS TUBE MILL (Reheating Furnace)	60.0	2.0	160	42000	5.0	1.7	0.5	NIL
Bar & Rod Mill (Reheat 3ing Furnace)	35.0	1.60	160	20000	5.0	1.7	0.5	NIL

CHAPTER – 04

SITE ANALYSIS

4.0 SITE ANALYSIS:

4.1 Connectivity :

Plant is well connected with existing Rail and Road network. New internal roads will be constructed for vehicular movement inside the premises. In the areas pertaining to additional plant facilities. Most of the raw materials will be transported by rail upto the nearest railway station and shifting from there will be by road to the plant. There will not be any significant impact due to the present proposal because of captive consumption / revision of Steel Billets and surrender proposition of a substantial portion.

4.2 Land forms & use :

The project area is composed of sandy morum type soil with almost flat surface. The present use of the site is Industrial Land for the project was acquired through Industrial Devt. Corporation of Orissa Ltd., Bhubaneswar for industrial use.

4.3 Topography :

The topography of the land is more or less flat without undulations.

4.4 Existing land use pattern :

Present land use is industrial. There will not be any change in land use due to the present proposal as the same is in existing premises and there is no involvement of any additional land for the project.

4.5 Existing infrastructures :

All required infrastructures are available in our existing plant which is in operation since April 2009 to support the proposed project.

4.6 Soil classification :

Jharsuguda district situated in the north western part of Orissa state, India, can be marked into two natural physiographic divisions: Northern Jharusuguda Plateau and Eastern Kuchinda Plain. Based on the earlier system of soil classification, its soils are classified into two groups: laterite and lateritic soils; and alluvial soils. The characteristics of the soils on different landforms (hillslope, gently and very sloping uplands, and very gently sloping valleys).

4.7 Climatic data from secondary sources :

Jharsuguda is located at 21.85°N 84.03°E.[1] It has an average elevation of 218 metres (715 ft). Jharsuguda is situated at the western end of Orissa state. it is 515 km from Kolkata and 616 km from Nagpur. State highway 10 and National highway 47 pass through Jharsuguda. The IB River flows along the Western side of Jharsuguda town and the river Vheden flows in the south. The area of the town is 70.47 km^2. and population of 579,499 (as per 2001 Census).

The town situated at 21.82° north longitude and 84.1° latitude at a height of 700–750 feet above mean sea level. The highest temperature recorded in summer is 48.0°C and it has an average rain fall of 1527 mm.

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CHAPTER – 05

PLANNING BRIEF

5.0 PLANNING BRIEF :

5.1 Planning Concept :

MSP Mettalics Limited is proposed to expand the existing steel plant by installing sinter facility, Pelletisation, Induction Furnaces, Seamless Tube plant, Hot Rolling Mill in phased manner in the existing plant premises located at Village & Post Marakuta, District Jharsugda, Odisha. Implementation of expansion of Sinter & Pellet would enable us to produce the substitute of caliberated iron ore from the wastes or low grade iron ore making them suitable as BF & DRI feed. It also greatly helps in conservation of minerals.

5.2 Population Projection :

In 2011, Jharsuguda had population of 579,499 of which male and female were 297,014 and 282,485 respectively. In 2001 census, Jharsuguda had a population of 509,716 of which males were 261,941 and remaining 247,775 were females. Jharsuguda District population constituted 1.38 percent of total Maharashtra population. In 2001 census, this figure for Jharsuguda District was at 1.38 percent of Maharashtra population.

There was change of 13.69 percent in the population compared to population as per 2001. In the previous census of India 2001, Jharsuguda District recorded increase of 15.25 percent to its population compared to 1991.

The initial provisional data released by census India 2011, shows that density of Jharsuguda district for 2011 is 274 people per sq. km. In 2001, Jharsuguda district density was at 244 people per sq. km. Jharsuguda district administers 2,114 square kilometers of areas.

Average literacy rate of Jharsuguda in 2011 were 78.36 compared to 70.55 of 2001. If things are looked out at gender wise, male and female literacy were 86.27 and 70.05 respectively. For 2001 census, same figures stood at 82.08 and 58.36 in Jharsuguda District. Total literate in Jharsuguda District were 405,652 of which male and female were 228,715 and 176,937 respectively. In 2001, Jharsuguda District had 312,880 in its district.

With regards to Sex Ratio in Jharsuguda, it stood at 951 per 1000 male compared to 2001 census figure of 946. The average national sex ratio in India is 940 as per latest reports of Census 2011 Directorate. In 2011 census, child sex ratio is 938 girls per 1000 boys compared to figure of 949 girls per 1000 boys of 2001 census data.

5.3 LAND USE PLANNING

The proposed additional facilities will be implemented in the existing premises only and no additional land will be required . The following is the Land use planning of the 250 acres of land

ITEM	EXTENT OF LAND (ACRES)
Built up area	50
Internal roads	15
Storage yard	30
Greenbelt	87
Open land	70
Total land	**250**

5.4 ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL) :

Infrastructure reuired for the proposed plant facilities will be mobilised from the existing set up.

Proposals for any infrastructures having social importance is being taken up as per the need raised by the Gram Panchayat / District Administration. The Project Proponent is responsive to such need too.

5.5 AMENITIES / FACILITIES

Facilities like canteen, rest room, First-Aid Station etc. have already been provided in the existing plant. Similar facilities will be provided after the implementation of the present proposal also.

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CHAPTER – 06

PROPOSED INFRASTRUCTURE

6.0 PROPOSED INFRASTRUCTURE

6.1 Industrial Area (Process Area)

All required infrastructures are available at the existing site. Only the infrastructures for proposed projects are required to be set up. New infrastructure will be for producing Seamless Tube, TMT Bars & Oxygen Gas. Besides, added infrastructure will be there to produce enhanced quantum of Sinter & Pellet.

Plant and Machineries required for setting up of manufacturing infrastructures for intended products in the pre-existing industrial area/premises are enumerated below along with their quantity/numbers and estimated costs for procuring them.

6.1.1 LIST OF PLANT & MACHINERY FOR 6.00 LTPA TPY PELLET PROJECT :

No.	Equipment Name and parameter	Unit	Qty	Amount in (Crs.)
I	**Burdening (MT0701.02)**			
1	Sending device for Bentonite	set	1	4.50
2	Type wheel feeder with weighting	set	2	
3	Disk feeder and bushΦ2000, PZ20-1-B-Mn	set	4	
4	Electronic belt weight feeder B=800	set	4	
5	1# Rubber belt conveyor Q=150t/h, B=800	set	1	
6	Rubber belt conveyor for feeding B=800	set	1	
7	Librate motor TZD31-4CA	set	8	

8	Electric hoist $CD_1$3-18	set	1	
9	Brake valve with manual SLVd-0.6	set	2	
10	Type wheel feeder	set	2	
11	Dust collection for bentonite bin	set	1	
12	Type pough discharger	set	3	
II	**Drying (MT0701.03)**			
1	Type φ3.0×20m drum drier φ3.0×20m, thα=4	Set	1	
2	Combustion-supporting fan for drying oven	Set	1	
3	Burner for drying oven	Set	1	
4	Exhaust fan for drum drier	Set	1	
5	2# Rubber belt conveyor B=800	Set	1	2.50
6	3# Rubber belt conveyor B=800	Set	1	
7	Valve and compensator for burning gas pipe	Set	1	
8	4# Rubber belt conveyor B=800	set	1	
9	Dry oven	set	1	
10	electric hoist $CD_1$3-18 2t	set	1	
III	**Granulating (MT0701.05)**			
1	Disk feeder and bush Φ1600, n=6.3rpm, Q=0-55t/h, N=7.5Kw	set	4	
2	6#Rubber belt conveyor Q=150t/h, B=800, L=---m, v=1.25m/s, N=7.5Kw	set	1	

3	7#Rubber belt conveyor Q=150t/h, B=800, L=---m, v=1.25m/s, N=7.5Kw	set	1	
4	8#Feeding belt B=650, L =7.1m, Q=100t/h	set	4	
5	Typeφ6000disk granulator φ6000 Q=40-55t/h, n=7-8.5rpm	set	4	
6	Type pough discharger with electric-hydrulic drive	set	3	
7	9#Rubber belt conveyor B=800, L=---m, v=1.25m/s, N=7.5Kw	set	1	
8	10T electric single-beam hoist LD10-8.5-30 10T LD10-8.5-30	set	1	
9	Type CD1-18D electric hoist 2t CD1-18D 2t	set	1	9.75
10	Type CD1-9D electric hoist 2t CD1-9D 2t	set	1	
11	Type HS-2Amanual hoist HS-2A	set	1	
IV	**Roll screen (MT0701.06)**			
1	Swing belt B=800, Q=120t/h, L=12m, v=1.25m/s, N=3Kw	set	1	
2	Round roll screen with 25 rolls Φ120×2800, N=0.75Kw	set	1	
3	Type B3200 wide belt B=2800mm, L=3m, =120t/h, v=1.25m/s, N=7.5	set	1	2.55
4	Round roll screen with 42 rolls Φ120×2800, N=0.75Kw	set	1	

5	No.1 return belt	set	1	
6	Type B2800 wide belt B=2800mm, L=5.8m, Q=120t/h, v=1.25m/s, N=11Kw	set	1	
7	Main return belt	set	1	
8	Return belt on the top of bin B=650mm, L=22.35m, Q=50t/h, v=1.25m/s, N=3Kw		1	
9	Type CD2-18Delectric hoist	set	1	
V	**Returning material (MT0701.09)**			
1	Conveyor B=650, L=35.35m, N=4Kw	set	1	
2	Scraper conveyer B=320, L=8595	set	1	
3	Inclined Scraper conveyer B=320, L=13737	set	1	
4	Rubber belt conveyor Q=0-10t/h, B=650, L=81.433m, v=1.25m/s, N=5.5Kw	set	1	1.25
5	Scraper conveyer B=320, L=5238	set	1	
6	Type PL350-A bucket elevator Q=10t/h, H=19.4m	set	1	
VI	**Ventilating and dust collecting (MT0701.10**			
1	125m^2 electrostatic precipitator Q=44000 m^3/h Q=440,000m3/h, gas disposed temperature : ≤300^0 dust concentration at inlet : ≤44.6 g/Nm^3	set	1	

	dust concentration at out ：≤100 mg/Nm^3			
2	High efficency multi-tube dust collector Q=12,000m^3/h gas disposed temperature ：200～550^0 resistance loss ：800～1100Pa efficiency for dust collecting ：85～90% type QT high temperature and high efficiency alloy (double) screw precipitator	set	2	15.10
3	Cooler to grate heat fan Q=159,000m3/h, P=3,00Pa, T=500	set	1	
4	High efficency multi-tube dust collector Q=160,000m^3/h gas disposed temperature ：200～550^0 resistance loss ：800～1100Pa efficiency for dust collecting ：85～90% type QT high temperature and high efficiency alloy (double) screw precipitator QT	set	1	
5	grate reheat fan Q=120,000m3/h, P=6,00Pa,T=450^0	set	2	
VII	**Grate**			
1	Grate 2.8×42m width of grate bed ：2.8 m effective length ：42 m effective area ：117.6 m2 thickness of material layer ：160～180 mm material disosed ：green ball （gravity ：2.0～2.2 t/ m3; particle size ：8～16 mm） disposing capacity ：90 t/h operating time per year ：≥7920hours	set	1	14.23

	holding time for material ：18～24 min speed：1.5 m/min range of speed regulating ：0.57～2.9 m/min normal operation ：1.5～2.0 m/min； double drive ； variable frequency speed regulation			
2	Type PL450-Ahigh temperature bucket elevator Q=20t/h, T=700˚C,H=20.7m	set	2	
3	Type CD3-24D electric hoist	set	1	
4	Type WA3manual single-rail trolley	set	1	
VIII	**Rotary kiln**			
1	Size ：Φ4.0×30m capacity ： ·80 t/h obliqueness ：3.5%（sin） speed of revolution ：0.47～1.4 r/min stopping wheel device driving unit ：single drive sealing mode ：fish scale seal at end and head cooling mode at the end and head ：air cooling rotating direction of the kiln ：clockwise from the head looking filling rate ：7～8% roasting time ：30～35min	set	1	12.86
2	Type 4-72No.8C cooling fan at the kiln head Q=18,721m3/h, P=777Pa, n=1000rpm, N=7.5Kw	Set	1	
IX	**Loop cooler**			
1	Effective cooling area ：50m^2	Set	1	

	capacity : normal : 80t/h ; max : 100t/h middle dia. : Φ12.5m number of trolley : 28 wide of trolley : 1800mm temperature of feeding : 1150^0 temperature of discharging : ～150^0 effective cooling time : 30～78min thickness of material : 760mm pellet density : 2.2t/m3 number of wind box : 9 number of discharging valve : 9			
2	Rubber belt conveyor for product Q=150t/h, B=650, L=---m, v=1.25m/s, N=3Kw	Set	1	
3	Rubber belt conveyor for product Q=150t/h, B=650, L=---m, v=1.25m/s, N=5.5Kw	Set	1	11.85
4	fan for water cooling girder 9-19No11.2D, Q=12,978m3/h, P= 2860Pa,N=22Kw	Set	1	
5	1#fan Q=80,000m3/h, P=6,000Pa, N=---Kw	Set	1	
6	2#,3#fan Q=80,000m3/h, P=5,500Pa, N=---Kw	Set	2	
X	**FUEL SYSTEM**			
	FO Storage handling and firing system PCI System BF gas distribution system			35.03

	DRY IRON ORE GRINDING SYSTEM				
A	**DRYING**	**Unit**	**Qty.**	**Amount in (Crs.)**	
1	Iron Ore Rotary Drier Complete with Internals Size:4.4mm x 28m long, Capacity:160tph, Speed:2.8 rpm (max.), feed moisture:14% max., product moisture:2% max, slope:4%	Lot	1	9.75	
2	Process fans with motors Cylindrical valves			9.42	
3	Dryer Internals MS Spiral & Straight lifters, welded construction all along the length of the dryer	Set	1		
4	Drive Gear Box with coupling for dryer for 350kW /1000rpm HT/SCI Motor	Set	1		
5	Inlet Seal Spring type	Set	1		
6	Outlet Seal Spring type	Set	1		
7	Flap Damper at dryer inlet Size:800x800mm	Set	1		
8	Flap damper at the dryer discharge	Set	1		
9	Engineering & fabrication drawing of Multi cyclone Size:2x3.5m dia	Set	1		
10	HT/SCI 350kW/1000 rpm Motor for Dryer	No.	1	0.18	
11	High efficiency Multi cyclone Size:2x3.5m dia	Set	1	0.35	
12	Hot Gas Generator Complete Capacity:26.50M kcal/hr, 750 Degree	Set	1	3.45	

	DRYING	Unit	Qty.	Amount in (Crs.)	
13	Belt Conveyor for conveying material from Cyclone and bag filter Capacity:180 tph, Size:800mm W	Set	1	0.55	
14	Pulse jet Bag type dust collector 180000m3/hr	Set	1	1.25	
15	Exhaust fan with Motor & Accessories Capacity:200000m3/hr & 425mm WG Motor Rating 350kW/980 rpm	Set	1	0.25	
16	Motor Rating 350kW/980 rpm for the above exhaust fan	No.	1	0.18	
17	Bleed air damper to regulate the gas temperature at inlet of Bag filter	Set	1	0.10	
18	Chimney/Stack capacity	Set	1	0.45	
19	MS Fabricated ducts, chutes, expansion joints, walkways, ladders etc.	Set	1	0.50	
B	**GRINDING**				
1	Open Circuit iron Ore Ball Mill Size : 4.40 M Dia X 12 M length No. of Components; 2 Mill Speed : 14.80 RPM Feed Size : 85% passing on 200 mesh Feed Moisture : 2% Type of Liner : High Chrome Type of Drive: Dual, Gear & pinion Type	Lot	1		
2	Gear Box for Main Drive 2350kW Motor Capacity: 2350 kW Ratio: 960:124	No.	2		

	GRINDING				
3	Coupling for Main drive, between Motor & GB Type: Flexible Capacity: 2350 KW Speed: 960 RPM	No.	2		
4	Gear Box for 44kW Motor Capacity: 44 KW Speed: 960 RPM	No.	1		
5	Coupling for Aux. Motor & Gear Box Type: Flexible Capacity: 44 KW Speed 960 RPM	No.	1		
6	Coupling for aux. Gear Box & Main Gear Box Type: Clutch Type Capacity: 44 KW Speed: 960RPM	No.	1		
7	Force Lubrication System 30LPM/brg Pressure 3kgs/cm2	Set	1		
8	Prejacking arrangement 1 LPM, Pressure 300 kg/cm2	Set	1		
9	Girth Gear Spray lubrication arrangement	Set	1	19.50	
10	Flap gate at the mill discharge 800x800mm	Set	1		
11	Engineering & fabrication drawing of Multicyclone Size:1x2500mm dia	Set	1		
12	MS Fabricated Hopper for Iron ore, coke,lime stone,esp dust & Bentonite	Set	1	0.75	
13	Rod gate under Iron ore Hopper	No.	9	0.01	
14	Weigh feeder for feeding Iron Ore, Flux & Bentonite	Set	1	0.10	
15	Main drive for Iron Ore Mill HT / Sci 2350kW , 960 rpm Motor	No.	2	1.26	

	GRINDING				
16	Auxiliary drive for Iron ore Mill LT/SCI 44kW, 960 rpm Motor	No.	1	0.025	
17	Grinding media of various sizes	Mt.	150	1.80	
18	Conveyor Belt 800mmX75M Long for feeding mixer complete with drive	Set	1	0.65	
19	Cyclone dust collector with hopper & Rotary air lock at the discharge1 x 2500 mm	Set	1	0.93	
20	Pulse jet Bag type dust collector for dedusting mill & bag filter 45000m3/hr	Set	1	0.40	
21	Exhaust fan with Motorized damper 48000m3/hr, 400mm wg	Set	1	0.50	
22	Motor for the above fan 90kW, 960 rpm	No.	1	0.30	
23	Ground iron ore dust transporter Belt conveyor feeding to mixer 32000mmcapacity 180 tph Belt Width: 800 mm	Set	1	0.25	
24	Belt weigher for the above	Set	1	0.2	
25	MS Fabricated stack	Lot	1	0.25	
26	MS fabricated ducts, chutes,bed-plates etc.	Lot	1	0.75	
C	**MIXING**				
1	Mixer Size: 1.60 M dia X 4 M Length Designed Capcaity: 320 TPH Operating Capacity: 160 TPH Mixer including shaft & paddles	Lot	1		

	MIXING			2.05	
2	Mixer Internals including shaft and paddles	Set	1		
3	Fluid Coupling 300kW Rating	No.	1		
4	Gear Box for 300kW, 1440 rpm Motor	No.	1		
5	Exhaust Fan with Motor backward curved Capacity 17000m3/hr 200mm WG	Set	1	0.30	
6	Drive Motor for Mixer 300kW, 1440 rpm	No.	1	0.5	
7	Short Stack	Lot	1	0.15	
8	Instruments for Mixer	Lot	1	0.15	
		Total		**166.875**	

6.1.2 LIST OF PLANT AND MACHINERY FOR 40 Sq.m SINTER PLANT

Sl. No.	Particulars	Qty.	Amount (Crs.)
1.00	**Material Proportioning System**		5.25
1.01	4 PG 900 x 700 four roll crusher	1 no	
1.02	KR 16 disc proportioning device	8 nos	
1.03	B 650 belt conveyor (L 1= 60M)	1 no	
1.04	B 650 belt conveyor (L 1= 30M)	1 no	
1.05	Proportioning screwer	1 no	

Sl. No.	Particulars	Qty.	Amount (Crs.)
2.00	**Mixing System**		
2.01	2.8 x 7 M barrel mixer	1 no	6.75
	2.8 x 10 M barrel mixer	1 no	
2.02	Primary mixing rubber belt conveyor B=650	1 no each	
	(L1= 20M, L2= 30 M)		
2.03	Secondary mixing rubber belt conveyor B=650 (L=10 M)	1 no	
2.04	Distrbuting belt B=650 (L= 13 M)	1 no	
2.05	Structures	20 Tons	
3.00	**Sintering and Cooling Section**		
3.01	40 sqm Sinter machine	1 no	19.45
3.02	40 sqm on strand cooler	1 no	
3.03	F1100 x 1860 Single Roll Breaker	1 no	
3.04	Hot sinter vibrating screen SZR 1845	1 no	
3.05	10 T single beam manual hoist	2 no	
3.06	Water seal chain machine	1 no	
3.07	Ignition furnace	1 no	
3.08	Sinter discharge trough	2 no	
3.09	Disc machine for hot returns	1 no	
3.10	Grease lubricating station	1 no	

Sl. No.	Particulars	Qty.	Amount (Crs.)
3.11	Gas booster and pipeline	Lot	
3.12	Booster blower	1 no	
4.00	**Finish Sinter Transportation**		
4.01	Rubber belt conveyor B=650	1 no each	2.75
	(L1=27M, L2=18M & L3=47M)		
4.02	Electronic conveyor scale	1 no	
4.03	Transit bin (steel structures)	1 no	
5.00	**Suction System**		
5.01	Centrifugal high pressure suction fan (SJ2300)	1 no	4.50
5.02	G x 300 = 20 M screw discharger	4 nos	
5.03	Duct for suction fan	8 tons	
6.00	**Dedusting System**		
6.01	Multicyclones and Bag filter	1 lot	5.75
6.02	Dedusting duct and pipe network	40 Tons	
6.03	Various valves	6 nos	

MISCELLANEOUS ITEMS			
1	Electrical substation including power distribution system		11.23
2	Water system		
3	Compressed air system		
4	Fuel oil distribution system		
5	Miscellaneous tools & tackles		
6	Fire fighting equipment		
7	Mechanical handling equipment like dumper, payloader, etc.		
	(including stacker and re-claimer)		
8	Instrumentation & automation		
		Total	55.68

6.1.3 **LIST 0F PLANT AND MACHINERIES FOR SMS SHOP WITH VDF & LRF**

SN	Equipment name	Qty (set)	Amount (Crs.)
1.	30t converter	1	30
2.	Movable hood lifting device	1	.25
3	Oxygen lance hoisting and shifting device	1	.20
4	Converter front block fire door	1	.15
5	Ferroalloy rotating charging hopper	1	.37
6	Steel ladle	10	.35
7	Hot metal ladle	4	.1
8	Mouth cleaner	2	.06
9	Steel ladle car	1	.50
10	Cross bay car	1	.25
11	Slag pan car	1	.25
12	Converter bottom car	1	.37
13	Converter repair car	1	.23
14	Steel scrap trough	3	.65
15	8m3 slag pan	12	.76
16	Bulk material discharging system	1	.74
17	Converter side fire damper	1	.34
18	Slag stopper below converter	1	.22

SN	Equipment name	Qty (set)	Amount (Crs.)
19	Dust suction hood before converter	1	.24
20	Oxygen lance	4	.34
21	Lime & ferro alloys storage & charging system including vibro feeders, weigh hoppers Belt Conveyors.	1 lot	.75
22	Steel ladle online heater	1	.77
23	Steel ladle offline heater	6	.23
24	Steel ladle horizontal heater	1	.34
25	75/20 casting elevated crane	1	3.5
26	10t grab bucket	1	.25
27	5t maintenance electrical hoist	2	.20
28	10t electrical single beam crane	3	7.00
29	3t maintenance electrical hoist	2	5
30	110/30t casting overhead crane	1	4.25
31	110/20t casting overhead crane	1	.27
32	（16+16）t overhead crane	1	.10
33	10t maintenance electrical hoist	5	.75
34	20t electromagnetic overhead crane	2	1.0

SN	Equipment name	Qty (set)	Amount (Crs.)
35	110/20t casting overhead crane	1	4.25
36	75/20t lifting hook overhead crane	2	7.00
37	10t maintenance electrical hoist	4	.15
38	Direct-reading spectrometer (metal analyser)	1	.35
39	Infrared carbon sulphur detector	1	.20
40	Spectrum sample dedusting cutting machine	1	.40
41	Spectrum sample dedusting grinding machine	2	.80
42	Desulfuration station	1	.72
43	600t mixer	1	.75
44	LF refining furnace	1	8.00
45	VD refining furnace	1	10.00
46	3 machine 3 strand round billet continuous casting machine with Arc radius:9m, strand distance:1300mm, billet sectionφ180mm, fixed size：6-12m including steel ladle turret, tundish, tundish cover, emergency ladle, ladle car & heating device, closed custing facility, mould	1	25.00

SN	Equipment name	Qty (set)	Amount (Crs.)
	oscillation , EMS, Secendary cooling , dummy bar system, pinch roll, tension Leveller,		
47	Roller Table	1 lot	2.00
48	Automatic Flame Cutter	1	.60
49	Delivery roller table	1	1
50	Turn over cooling bed	2	.50
51	10+ 10 T "C" Hook Crane	2	2.0
52	Water system including scalepit, cooling tower, pump house, valves, piping system.	1 lot	1.0
53	Compressed air & other utility system	1 lot	1
54	Electrical , automation & Instrumentation system	1 lot	2.5
		Total	129.00

6.1.4 LIST OF PLANT & MACHINERY FOR 1X 400,000 TPY SEAMLESS TUBE MILL

SL No.	Item Description	Qty.	Amount (USD)
1	Disc Cutting saw for pipe billet	3 Nos.	**USD 9750000**
2	Rotary hearth heating furnace with medium diameter 25m	1 No.	
3	Cone-shape roll piercing mill	1 Set	
4	Five-stand TCM Three-Roll Pipe Mill (with one set of three-roll hollow reducing mill stand)	1 Set	
5	Three-stand extractor train	1 Set	
6	Walking type reheating furnace (spare)	1 No.	
7	Electric induction heater	1 No.	
8	26-stand reducing mill train (including 6 stands for spare)	1 Set	
9	70m walking type cooling bed	1 Set	
10	Pipe batch saw (including two sets for spare)	4 Sets	
11	Straightener	2 Sets	
12	Dust blowing device	2 sets	
13	Magnetic leakage detecting machine	2 Sets	
14	Chamfering machine	2 Sets	
15	Hydrotester		
16	Chamfering machine	2 Sets	
17	Length and weight measuring machine, marking machine	2 Sets	
18	Coating machine	2 Sets	
	Dollar Conversion Rate @ 56 INR		**546 Cr.**

6.1.5 LIST OF PLANT & MACHINERY FOR 240,000 TPY BAR & ROD MILL

Sl.No.	Description of Equipment	Quantity	Amount in (Crs.)
4.0	360 mm ALT. (2 HIGH) MILL OF 03 STANDS		
4.1	FLY WHEEL ASSEMBLY – 6 MT	01 No.	1.29
4.2	GEARED COUPLINGS	03 Sets.	0.474
4.3	REDUCTION GEAR	01 No.	2.938
4.4	BASE PLATE FOR REDUCTION GEAR	01 No.	0.4963
4.5	EXTERNAL LUBRICATION SYSTEM – 200 L.P.M	01 No.	0.5135
4.6	PINION STAND	01 No.	2.85
4.7	BASE PLATE FOR ABOVE PINION STAND	02 Nos.	0.316
4.8	UNIVERSAL SPINDLE & COUPLING	03 Sets.	0.474
4.9	C. I. COUPLING	11 Nos.	0.1092
4.10	CENTRE SUPPORT	01 Set.	0.237
4.11	4 WAY STEEL SPINDLE - SHORT	03 Nos.	0.29
4.12	4 WAY STEEL SPINDLE - LONG	01 No.	0.16
4.13	ONE SET OF ROLLS	06 Nos.	1.896
4.14	360 MM MILL STANDS	03 Stands	7.11

Sl.No.	Description of Equipment	Quantity	Amount in (Crs.)
5.0	310 mm ALT. (2 HIGH) INTERMEDIATE MILL OF 04 STANDS		
5. 1	FLY WHEEL ASSEMBLY – 3 MT	01 No.	0.80
5. 2	FLY WHEEL ASSEMBLY – 1.5 MT	01 No.	0.632
5. 3	GEARED COUPLINGS	06 Sets.	0.38
5. 4	REDUCTION GEAR	02 Nos.	2.53
5.5	BASE PLATE FOR ABOVE REDUCTION GEAR	02 Nos.	0.632
5. 6	EXTERNAL LUBRICATION SYSTEM – 150 L.P.M.	02 Nos.	0.64
5.7	PINION STAND	02 Nos.	1.58
5.8	BASE PLATE FOR ABOVE PINION STAND	04 Nos.	0.24
5.9	WOBBLER HEAD	06 Nos.	0.1422
5. 10	CROSS JOINT TYPE UNIVERSAL SPINDLE & COUPLING	08 Sets.	0.5923
5. 11	ONE SET OF ROLLS	08 Nos.	0.91
5. 12	310 MM MILL STANDS	04 Stands	3.5

Sl.No.	Description of Equipment	Quantity	Amount in (Crs.)
6.0	260 mm (2 HIGH) CONTINUOUS MILL OF 06 STANDS - (FINISHING MILL)		
6.1	GEARED COUPLINGS	12 Sets.	0.57
6.2	REDUCTION GEAR	06 Nos.	4.74
6.3	COMMON BASE PLATE FOR REDUCTION GEAR BOX & PINION STAND	06 Nos.	1.9
6.4	EXTERNAL LUBRICATION SYSTEM – 80 L.P.M.	03 Nos.	0.95
6.5	PINION STAND	06 Nos.	4.74
6.6	UNIVERSAL CROSS JOINT SPINDLE & COUPLING	12 Nos.	1.52
6.7	ONE SET OF ROLLS	12 Nos.	1.33
6.8	260 MM MILL STANDS	06 Stands	4.74

Sl.No.	Description of Equipment	Quantity	Amount in (Crs.)
7.0	AUXILIARY		
7.1	**ROLLER TABLE –** 8 m long, fitted at 380mm Mill Stand & Re-heating furnace.	01 No.	1.3
7.2	PUSHER - HYDRALIC	01 No.	1.027
7.3	EJECTOR – MECHNICAL	01 No.	0.948
7.4	Y – TABLE	01 No.	1.422
7.5	REPEATER	07 Nos.	1.66

7.6	**SNAP SHEAR**	**06 Nos.**	**0.237**
7.7	**ROTARY SHEAR – 400mm – FIXED TYPE**	**02 Nos.**	**0.995**
7.8	**PINCH ROLL**	**05 Nos.**	**2.765**
7.9	**ROTARY SHEAR – 350mm – SWIVEL TYPE**	**01 No.**	**0.6715**
7.10	**COLD SHEAR**	**01 No.**	**0.95**
7.11	**HOT BAR CONVEYING CHANNELS & FUNNELS**	**01 Set.**	**0.553**
7.12	**FOUNDATION BOLTS & NUTS**	**01 Lot.**	**0.711**
7.13	**ROLLER GUIDE BOX & TWIST PIPES**	**01 Lot.**	**0.79**
7.14	**MOTOR BASE PLATE**	**14 Nos.**	**0.553**
7.15	**TMT UNIT WITH FLYING SHEAR**	**01 Unit**	**12.64**

ELECTRICALS

Sl. No.	Part No.	Description of Item		Quantity	Amount (Crs.)
8.0		**ELECTRICALS**			
	(a)	**MAIN MOTORS**		**04 Nos.**	**2.0**
	(i)	**1500 H.P. -- 720 R.P.M.**	**01 No.**		
	(ii)	**1250 H.P. -- 720 R.P.M.**	**01 No.**		
	(iii)	**500 H.P. -- 720 R.P.M.**	**02 No.**		
		Specification of above Motor			
		Suitable for 440 Volts, 3 phase, 50 cys, AC slip ring type			

		SP/DP having insulation class 'F' rolling mill duty.			
	(b)	**WATER LIQUID STARTER**		**04 Nos.**	
	(i)	**Water liquid Starter for 1500 H.P. Motor**	**01 No.**		**0.75**
	(ii)	**Water liquid Starter for 1250 H.P. Motor**	**01 No.**		
	(iii)	**Water liquid Starter for 500 H.P. Motor**	**02 No.**		
	(c)	**D.C. MOTORS**		**04 Nos.**	**1.25**
		250 KW -- 1000 - 1500 R.P.M With D.C. Drive	**06 Nos.**		**2.7**
	(d)	**AUXILIARY EQUIPMENT MOTORS**		**23 Nos.**	**0.5**
	(i)	**10 H.P -- 960 R.P.M. Slip ring Motor S_4 Crane Duty**	**01 No.**		
	(ii)	**10 H.P -- 960 R.P.M. S_4 Crane Duty**	**05 Nos.**		
	(iii)	**7.5 H.P -- 960 R.P.M. S_4 Crane Duty**	**03 Nos.**		
	(iv)	**10 H.P -- 960 R.P.M. $S1_1$ Duty**	**10 Nos.**		
	(v)	**15 H.P -- 1000 – 1500 R.P.M. D.C. Motor**	**03 Nos.**		
	(vi)	**20 H.P -- 960 R.P.M. S_1 Duty**	**01 Nos.**		

Sl. No.	Part No.	Description of Item	Quantity	Amount (Crs.)
9.0		WORKSHOP MACHINERY		
	(a)	LATHE MACHINE – 16	02 Nos.	1.37
	(b)	LATHE MACHINE – 12´	02 Nos.	
	(c)	LATHE MACHINE – 8´	01 No.	
	(d)	SHAPING MACHINE – 30"	01 No.	
	(e)	RADIAL DRILL – 1.5" Capacity	01 No.	
	(f)	BENCH GRINDER – 10"	01 No.	
	(g)	WELDING MACHINE – 350 Amps.	02 Nos.	
	(h)	HAND TOOLS & CUTTING TOOLS	01 Set.	
10.0		EOT Cranes 15/2T Capacity	2 Nos.	0.45
11.0		Water system including pumps, cooling tower, scale pit, valves and piping system	1 lot	0.45
			Total	88.915

6.1.6 List of Plant & Machinery of Oxygen Gas Plant

Sl No	Equipment name	Equipment Parameter	Qty (Set)	Amount (Crs.)
1	Centrifugal air compressor	35000m³ / h, 0.52 MPa	1	19.37
2	Self-cleaning air filter	7000m³ /h	1	
3	Cooling water pump	7000m³ /h	2	
4	Freezing water pump	7000m³ /h	2	
5	Cooling water machine unit	7000m³ /h	2	
6	Air cooling tower	7000m³ /h	1	
7	Water cooling tower	7000m³ /h	1	
8	Molecular sieve absorber	7000m³ /h	2	
9	Electric heater	7000m³ /h	2	
10	Emptying Silencer	Inner part	1	
11	Booster turbine expander	Inner part	2	
12	Back cooler	Inner part	2	
13	Heat insulation box	Inner part	1	
14	Piston type middle pressure nitrogen compressor	3000m³ / h, 2.5 MPa	2	

Sl No	Equipment name	Equipment Parameter	Qty (Set)	Amount (Crs.)
15	Centrifugal low pressure nitrogen compressor	9000m^3 / h, 1.0 MPa	1	
16	Turbine oxygen compressor	6000m^3 / h, 2.5 MPa	1	
17	Liquid oxygen storage	200m^3	1	5.75
18	Liquid nitrogen storage	200m^3	1	
19	Liquid argon vacuum storage tank	100m^3	1	
20	Liquid oxygen water bath vaporizer	6000m^3 / h, 2.5 MPa	1	
21	Liquid nitrogen water bath vaporizer	6000m^3 / h, 2.5 MPa	1	
22	Liquid argon vaporizer	3000m^3 / h, 2.5 MPa	1	
23	Liquid oxygen frequency controlled pump	6000m^3 / h, 2.5 MPa	2	0.83
24	Liquid nitrogen frequency controlled pump	6000m^3 / h, 2.5 MPa	2	
25	Liquid argon frequency controlled pump	100m^3 / h, 3.0 MPa	2	
26	Oxygen spheric tank	300m^3, 2.5 MPa	1	1.59
27	Nitrogen spheric tank	300m^3, 2.5 MPa	1	
Sl No	Equipment name	Equipment Parameter	Qty	Amount

.			(Set)	(Crs.)
28	Argon tank	10m^3, 3.0 MPa	1	
29	Oxygen pressure regulating valve unit	10m^3, 3.0 MPa	1	4.39
30	Nitrogen, argon regulating valve unit	10m^3, 3.0 MPa	1	
31	Oxygen compressor sound hood	10m^3, 3.0 MPa	1	
32	Bridge crane	20 / 5t, span: 19.5, rail face elevation 12.5	1	0.45
33	Water supply and drainage equipment		1 Lot	6.32
34	Power supply and distribution equipment		1 Lot	11.67
35	Instrument equipment		1 Lot	5.25
	Automation equipment		1 Lot	
				55.62

6.2 RESIDENTIAL AREA (NON PROCESSING AREA)

The existing unit has required residential complexes to accommodate manpower during construction period. Additional residential complex will be constructed of operational staffs of proposed projects.

6.3 GREEN BELT DEVELOPMENT :

Green belt development work is taken up in phased manner. Plants of various species have been planted. Survival rate is more than 80% Green belt will be developed as per the norms of CPCB.

6.4 SOCIAL INFRASTRUCTURE :

Social infrastructure has an already been developed and will be continued through need based assessment in the Villages.

6.5 CONNECTIVITY (RAIL / ROAD) :

Plant is well connected with existing Rail and Road network. New internal roads will be constructed for vehicular movement inside the premises. In the areas pertaining to additional plant facilities. Most of the raw materials will be transported by rail upto the nearest railway station and shifting from there will be by road to the plant. There will not be any significant impact due to the present proposal because of captive consumption / revision of Steel Billets and surrender proposition of a substantial portion.

6.6 DRINKING WATER MANAGEMENT :

The workers at the plant during construction shall be provided with water for their requirement and for the construction activities. The construction labour will be provided with sufficient and suitable toilet facilities to allow

proper standards of hygiene. Drinking water required for the workers will be met from ground water resources.

6.7 SEWERAGE SYSTEM :

Domestic wastewater generated will be treated in septic tank followed by soak pit with in the project premises.

6.8 INDUSTRIAL WASTE MANAGEMENT :

No wastewater will be generated, as closed circuit cooling system will be adopted for recycling of process discharge / wastes back to process. For details please refer to chap. 3.9

6.9 SOLID WASTE MANAGEMENT

Suitable mechanism and systems will be followed / adopted for handling and reuse of substantial part of solid waste for details please refer to chapter 3.9

6.10 POWER REQUIREMENT AND SUPPLY / SOURCE

Power requirement for the entire project is around 39 MW as shown in the Table bellow:-

ENECTRICAL ENERGY BALANCE

Plant	No. of Units (Kwh / ton)	Annual Production (Ton)	Total Unit Required (Kwh)	Total Requirement (MW)
Coke Oven	18.0	214,000	38,67,600	0.50
Sinter Plant	45.0	460,000	207,00,000	2.69
Pellet Plant	65.0	6,00,000	384,00,000	5.00
Blast Furnace	120.0	3,36,000	403,20,000	5.10
SMS (BOF)	40.0	448,000	179,20,000	2.26
Seamless Tube Mill	180.0	400,000	720,00,000	12.0

Plant	No. of Units (Kwh / ton)	Annual Production (Ton)	Total Unit Required (Kwh)	Total Requirement (MW)
Bar and Rod Mill	100.0	240,000	240,00,000	4.0
CPP	8% of Generation capacity		209,08,000	2.64
Oxygen Plant	0.8 Kwh/Cum	475,20,000 Cum	380,16,000	4.8
			3639,32,400	38.99

Source of Power:

1) Captive Generation: 24 MW
2) Out source form public supply (WESCO): 15 MW

Total Power requirement: 39MW

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CHAPTER – 07

IMPLEMENTATION OF R & R POLICY

7.0 POLICY FOR PROJECT AFFECTED FAMILIES/PERSONS :

7.1 IMPLEMENTATION OF R & R POLICY OF STATE:

The Project Proponent has paid due care to the R&R Policy of the State of Odisha(i.e. one job to one Land oustees family, Khasra wise & to provide Resettlement & rehabilitation infrastructure to the home oustees. In the present case, no rehabilitation or resettlement exercise has taken place as there is no instance of any displacement for the project in existence, which is in operation since 2009. The unit has complied with the norms of employment facility to all land oustees. There are many instances where more than one person are employed in the project. In addition to the land oustees a good number of project affect persons are also accommodated in employment and same are associated as ancilliary business activities of the organization.

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CHAPTER – 08

PROJECT SCHEDULE & COST ESTIMATES

8.0 PROJECT SCHEDULE & COST ESTIMATES

8.1 PROJECT SCHEDULE:

Implementation of project work is expected to start in January 2013 and is targeted to be completed in 25 months from the start. Graphical presentation of the implementation schedule of the proposed project is placed at **ANNEXURE – F.**

8.2.0 ESTIMATED PROJECT COST:

Details of estimated project cost is shown in the Table below:

(Rs. In Crs.)

SL. NO	PARTICULARS	PELLET	SINTER	SMS	SEAMLESS TUBE MILL	ROD & BAR MILL	OXYGEN PLANT	TOTAL
1	CIVIL & FACTORY BUILDINGS	22.00	3.40	8.00	15.00	6.00	3.50	**57.90**
2	PLANT AND MACHINERY	166.875	55.68	129.00	546.00	88.915	55.62	**1042.09**
3	CONTINGENCIES & PRE OPERATIVE EXPENSES	21.00	3.00	10.00	76.50	4.00	1.50	**116.00**
4	MARGIN MONEY FOR WORKING CAPITAL	15.00	5.00	10.00	22.00	8.00	3.00	**63.00**
	TOTAL	**224.875**	**67.08**	**157.00**	**659.50**	**106.915**	**63.62**	**1278.99**

R/O. 1279.00

MEANS OF FINANCE :

Sl. No.	Source	Amount (in Crs.)
1.	Bank Term loan	850.00
2.	Promoter's Contribution	429.00
	TOTAL	**1279.00**

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CHAPTER – 09

ANALYSIS OF PROPOSAL

9.0 ANALYSIS OF PROPOSAL

(a) The proposed project would bring any additional impact on land/water/environment.

(b) The project is equipped with the technologies to use Fines/Wastes of Iron Ore/Coal minerals to produce high-end value added steel product.

(c) Use/processing of mineral wastes/low grade minerals will help in conservation of minerals, a finite natural resources.

(d) Such industrial infrastructure will create additional employment opportunities for rural people.

(e) The asset & wealth to be created under the proposed project would enrich the state ex-chequere.

(f) Growth of such project would facilitate the growth of ancillary industries in the local area like Road transport, Hotels & Restaurants, work shops, supply of consumables/spares.

(g) The proposed project would strengthen the economics & competitive edge of its operation.

(h) Besides being the development of economic activities participation of such industrial project in CSR activities helps to create and develop various social infrastructure and upgrade the lifestyle.

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PRE FEASIBILITY REPORT

M/s. MSP METALLICS LIMITED

INTEGRATED STEEL PROJECT

AT- VILLAGE & POST -MARAKUTA,

DISTRICT : JHARSUGUDA – 768202, ODISHA

Corp Office : 16/S, Block 'A', New Alipore, Kolkata – 700053 (WB)

APPENDIX – I

(See paragraph – 6)

FORM – 1

S.No	Wantings	Basic Information
(I)		
1	Name of the project	**M/s. M S P Metallics Limited**
2	S.No. in the schedule	**3 (a),**
3	Proposed capacity / area / length / tonnage to be handled / command area / lease area / number of wells to be drilled	**Public Hearing has been held on 07.11.2008 as per the provisions of EIA Notification, 2006 and Environmental Clearance has been accorded by the Ministry of Environment & Forests, New Delhi vide letter No. F. No. J-11011/494/2007 IA- (II) I dated 13.07.2009 covering the existing land . Copy of the same is enclosed as Annexure-1 for your kind reference. The present proposal will be implemented within the same 260 acres of land only and no additional land will be required.**
4	New / Expansion / Modernization	**Now production capacities of certain products are proposed to be reduced and production capacities of certain products are proposed to be added.**
5	Existing capacity/Area etc.	**Now production capacities of certain products are proposed to be reduced and production capacities of certain products are proposed to be added. The total product profile including reduction and addition of capacities along with permitted production capacities are shown as Annexure-2 for your kind reference.**
6	Category of project i.e. 'A' or 'B'.	**A**
7	Does it attract the general condition? If yes, please specify.	**NO**
8	Does it attract the specific condition? If yes, please specify.	**NO**

9	Location	
	Plot/Survey/Khasra No.	**Please find the extract of Marakuta Mouza map showing Project Site with boundary of existing unit where expansion project is proposed (Annexure-3)**
	Village	**Marakuta**
	Tehsil	**Jharsuguda**
	District	**Jharsuguda**
	State	**Odisha**
10	Nearest railway station/airport along with distance in kms.	**Nearest Railway Station - Jharsuguda (4 Kms.)** **Nearest Civilian Air port – Bhubaneshwar (385 Kms.)**
11	Nearest Town, city, District Headquarters along with distance in kms	**Nearest Town: Jharsuguda (4 Kms.)** **District Head Quarter: Jharsuguda (4 Kms.)**
12	Village Panchayats, Zilla Parishad, Municipal corporation, Local body(complete postal addresses with telephone no.s to be given)	**Village Panchayat : Marakuta,** **Zilla Parishad: Jharsuguda,** **District : Jharsuguda** **Odisha**
13	Name of the applicant	**Mr. P.K. Dey – Director**
14	Registered Address	**MSP Metallics Limited** **16/S, Block 'A', New Alipore** **Kolkata-700053** **Ph: +91 33 24570038/3940** **Fax: +91 33 24582239**
15.	Address for correspondence:	**MSP Metallics Limited** **16/S, Block 'A', New Alipore** **Kolkata-700053** **Ph: +91 33 24570038/3940** **Fax: +91 33 24582239**
	Name	**Mr. P.K. Dey**
	Designation(owner / partner /CEO)	**Director**
	Address	**16/S, Block 'A', New Alipore** **Kolkata**
	Pin code	**700053**
	E-Mail	Pk.dey@mspsteel.com
	Telephone No.	**+91 33 24570038/3940**
	Fax No.	**+91 33 24582239**
16.	Details of Alternative sites examined, if any. Location these sites should be shown on a topo	**NOT APPLICABLE as the present proposal is reduction of capacities of certain products and addition of capacities of certain products which will be**

	sheet	**implemented in the existing plant premises for which Environmental Clearance has already been accorded by The Ministry of Environment & Forests, New Delhi.**
17.	Interlinked Projects	**NO**
18.	Whether separate application of interlinked project has been submitted?	**NO**
19.	If yes, date of submission	**Not Applicable**
20.	If no, reason	**Not Applicable**
21.	Whether the proposal involves approval/clearance under; if yes, details of the same and their status to be given. (a) The Forest (conservation)Act, 1980 (b) The Wildlife (protection) Act, 1972 (c) The C.R.Z Notification, 1991?	**Not Applicable**
22.	Whether there is any a government order/policy relevant/relating to the site?	**Not Applicable**
23.	Forest land involved(hectares)	**Not Applicable**
24.	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up? (a)Name of the court (b)Case No. (c) Orders/directions of the court, if any and its relevance with the proposed project.	**Not Applicable**

(II) ACTIVITY

1. **CONSTRUCTION, OPERATION OR DECOMMISSIONING OF THE PROJECT INVOLVING ACTIONS, WHICH WILL CAUSE PHYSICAL CHANGES IN THE LOCALITY (TOPOGRAPHY, LAND USE, CHANGES IN WATER BODIES, ETC.)**

SL. NO.	INFORMATION/CHECKLIST CONFIRMATION	YES/ NO	DETAILS THEREOF (WITH APPROXIMATE QUANTITIES /RATES, WHEREVER POSSIBLE) WITH SOURCE OF INFORMATION DATA
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	**NO**	**Present use of land is Industrial as the present proposal involves reduction capacities of certain products & addition of capacities of certain products which will be implemented in the existing plant premises only for which Environmental clearance has already been obtained. Topographical changes will occur due to construction activities. However there will not be any significant impact due to the change in land use pattern due to the present proposal as the present land use is also industrial.**
1.2	Clearance of existing land, vegetation and buildings?	**NO**	**As additional units are proposed to be established in vacant areas which are devoid of any vegetation. Hence no clearance of vegetation or buildings will be required for the present proposal.**
1.3	Creation of new land uses?	**NO**	**No new land use, as it is already industrial land.**
1.4	Pre-construction investigations e.g. bore houses, soil testing?	**YES**	**Soil tests have been conducted. Soil at the site is sandy, morum and suitable for heavy construction. Bore well water is in accordance with BIS : 10500 specifications and is suitable for potable purpose.**
1.5	Construction work ? Construction of project under Phase – I is under way on the existing land.	**NO**	**No construction work in respect of present proposal will be taken-up without obtaining the prior Environmental clearance & Consent to Establish from OSPCB.**

SL. NO.	INFORMATION/CHECKLIST CONFIRMATION	YES / NO	DETAILS THEREOF (WITH APPROXIMATE QUANTITIES /RATES, WHEREVER POSSIBLE) WITH SOURCE OF INFORMATION DATA
1.6	Demolition works?	**NO**	**No demolition work will be involved as part of the present proposal.**
1.7	Temporary sites used for construction works or housing of construction workers?	**YES**	**After commencement of construction work, temporary housing/tents will be provided to the construction workers**
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	**YES**	**Most of the structures required for the project will be above the ground. However excavations will be involved for civil foundations only. Excess cut will be filled in low lying areas.**
1.9	Underground works including mining or tunneling?	**NO**	**No mining and tunneling will be involved in the proposed activity.**
1.10	Reclamation works?	**NO**	**No reclamation works are essential / proposed.**
1.11	Dredging?	**NO**	**No dredging activity will be involved.**
1.12	Offshore structures?	**NO**	**No offshore structures are envisaged in the present proposal**
1.13	Production and manufacturing processes?	**YES**	**Manufacturing process of each of the units proposed in the present proposal is described in detail along with Process flow diagram in the Pre Feasibility report attached.**
1.14	Facilities for storage of goods or materials?	**YES**	**Raw materials will be stored in storage yard as per norms.**
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	**YES**	**There will be no effluent generation in the proposed additional units as closed circuit cooling water system is proposed.**
1.16	Facilities for long term housing of operational workers?	**NO**	**No housing colony or township is proposed within the plant premises.**

SL. NO.	INFORMATION/CHECKLIST CONFIRMATION	YES/ NO	DETAILS THEREOF (WITH APPROXIMATE QUANTITIES /RATES, WHEREVER POSSIBLE) WITH SOURCE OF INFORMATION DATA
1.17	New road, rail or sea traffic during construction or operation?	**NO**	**Plant is well connected with existing Rail Road network. New internal roads will be constructed for vehicular movement inside the premises in the areas pertaining to additional units. Most of the raw materials will be transported by rail upto the nearest railway station and form there by road inside the plant. There will not be any significant impact on road, rail, sea traffic due to the present proposal.**
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	**NO**	**No new road/rail/air transport infrastructure is proposed for the present proposal .**
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	**NO**	**No closure or diversion of existing transport routes is envisaged.**
1.20	New or diverted transmission lines or pipelines?	**YES**	**(i) Water required for the present proposal will be sourced from existing sources and existing water pipeline laid from IB river to the plant for transporting / drawing water. No additional water will be required.** **(ii) One EHT 132 KV Transmission line plying across the eastern side of the plant premises will be diverted along the boundary of the premises.**
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	**NO**	**No culverting, realignment are envisaged. There will not be any changes to the hydrology of watercourses or aquifers due to the present proposal.**
1.22	Stream crossings?	**NO**	**No stream crossing is involved**

SL. NO.	INFORMATION/CHECKLIST CONFIRMATION	YES/ NO	DETAILS THEREOF (WITH APPROXIMATE QUANTITIES /RATES, WHEREVER POSSIBLE) WITH SOURCE OF INFORMATION DATA
1.23	Abstraction or transfers of water form ground or surface waters?	**YES**	**No additional water will be required for the proposed units and will be sourced from IB river situated at 2 Kms. from the plant.**
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	**NO**	**No changes in water bodies, drainage and land surface are anticipated as the site is more or less flat without many undulations.**
1.25	Transport of personnel or materials for construction, operation or decommissioning?	**YES**	**A few vehicles will be provided for transport of personnel during construction & operation of the additional units proposed. Most of the raw materials will be transported by rail upto the nearest railway siding and from there by road in covered trucks.**
1.26	Long-term dismantling or decommissioning or restoration works?	**NO**	**No such works are envisaged**
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	**NO**	**No such works are envisaged**
1.28	Influx of people to the area either temporarily or permanently?	**NO**	**There will be temporary involvement of people at project site but they all are associated with the project construction. When the project will be on the verge of completion, operation personnel will be employed and the personnel for such operational activity will be of permanent nature. Construction people will quit the site once the construction is over. During operation of the expansion project, preference will be given to the local people in employment.**
1.29	Introduction of alien species?	**NO**	**No such activity is envisaged**
1.30	Loss of native species or genetic diversity?	**NO**	**As a part of greenbelt development plan native species that are suitable to that soil condition will be developed in addition to the existing greenbelt in consultation with the local DFO .**
1.31	Any other actions?	**NO**	**Nil**

2. USE OF NATURAL RESOURCES FOR CONSTRUCTION OR OPERATION OF THE PROJECT (SUCH AS LAND, WATER, MATERIALS OR ENERGY, ESPECIALLY ANY RESOURCES WHICH ARE NON-RENEWABLE OR IN SHORT SUPPLY):

Sl. No.	Information/checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	**YES**	**260 acres of land is for industrial use of the unit after its acquisition. The present proposal will be taken up in the existing plant premises only.**
2.2	Water (expected source & competing users) unit: KLD	**YES**	**No additional water will be required due to the present proposal. Permitted/existing water permission will be adequate after the present proposal. Infact water requirement is reduced with the present proposal as compared to the earlier Environmental Clearance.**
2.3	Minerals (MT)	**YES**	**Raw material requirement is shown in the Annexure- 5**
2.4	Construction material – sstone, aggregates, sand / soil (expected source – MT)	**YES**	**The construction materials such as Stone, aggregate, sand , etc. will be sourced from local areas only.**
2.5	Forests and timber (source – MT)	**NO**	**Not applicable**
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	**NO**	**Power required will be sourced captively.**
2.7	Any other natural resources (use appropriate standard units)	**NO**	**Not applicable**

3. USE, STORAGE, TRANSPORT, HANDLING OR PRODUCTION OF SUBSTANCES OR MATERIALS, WHICH COULD BE HARMFUL TO HUMAN HEALTH OR THE ENVIRONMENT OR RAISE CONCERNS ABOUT ACTUAL OR PERCEIVED RISKS TO HUMAN HEALTH.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	**YES**	**FO/LDO will be used as fuels. The storage of this will be in M.S. tank with dyke wall. LDO will also be used for operation of standby DG Sets. However all the OISD guidelines will be followed.**
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	**NO**	**Not Applicable**
3.3	Affect the welfare of people e.g. by changing living conditions?	**NO**	**Not Applicable as the present proposal will create more employment opportunities in the area and thereby a improvement in the socio-economic status of local people**
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	**NO**	**All required emission control systems such as ESPs, Bagfilters, dust suppression systems, etc. will be installed and operated to comply with the MOEF/OPCB norms. Since production capacities of some products are proposed to be reduced and production capacities of certain units are proposed to be added, the overall emission load will reduce after the present proposal.** **Hence there will not be any adverse impact due to the present proposal .**
3.5	Any other causes	**NO**	**Not Applicable**

4. PRODUCTION OF SOLID WASTES DURING CONSTRUCTION OR OPERATION OR DECOMMISSIONING (MT/MONTH)

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	**YES**	**The dug soil during excavation & civil foundation will be used for filling of low-lying areas and there will be no surplus soil.**
4.2	Municipal waste (domestic and or commercial wastes)	**YES**	**MSW will be disposed as per MSW norms.**
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	**NO**	**Sludge from FO/LDO storage tank will be stored in covered HDPE drums and will be given to OPCB approved vendors.**
4.4	Other industrial process wastes Coal char/ESP blast/Fly ash/	**YES**	**All solid wastes will be reused/disposed as per MOEF/CPCB/OPCB norms.**
4.5	Surplus product	**NO**	**Not Applicable**
4.6	Sewage sludge or other sludge from effluent treatment	**NO**	**Not applicable**
4.7	Construction or demolition wastes	**YES**	**Construction wastes will be disposed off as per norms.**
4.8	Redundant machinery or equipment	**NO**	**No redundant machinery will be kept in the premises.**
4.9	Contaminated soils or other materials	**NO**	**No contamination of soils is expected**
4.10	Agricultural wastes	**NO**	**No such generation**
4.11	**Other solid wastes**	**YES**	**All wastes disposal will be in accordance with the norms.**

5. RELEASE OF POLLUTANTS OR ANY HAZARDOUS, TOXIC OR NOXIOUS SUBSTANCES TO AIR (KG/HR)

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	**Emissions from combustion of fossil fuels from stationary or mobile sources**	**YES**	**Emissions of concern from the present proposal will be PM, SO_2 & NOx. Air emission control systems like ESPs, bagfilters, scrubbers will be installed and operated to comply with the norms. Adequate stack will be provided as per CPCB norms for effective dispersion of SO_2 emissions. The overall emission load will decrease with the present proposal as capacities of certain products are proposed to be reduced and some are increased.**
5.2	**Emissions from production processes**	**YES**	**Emissions of concern from the present proposal will be PM, SO_2 & NOx. Air emission control systems like ESPs, bagfilters, scrubbers will be installed and operated to comply with the norms. Adequate stack will be provided as per CPCB norms for effective dispersion of SO_2 emissions.**
5.3	Emissions from materials handling including storage or transport	**YES**	**Dust suppression system will be provided in unloading areas. Dust extraction systems with Bagfilters will be provided at all other dust emanating areas,**
5.4	Emissions from construction activities including plant and equipment	**YES**	**Fugitive dust emissions are generated during vehicular movement at construction place. Dust curtains will be provided all round the construction work area to prevent the dust emissions. Water spraying will be done to prevent the dust emanation due to vehicular movement.**
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	**NO**	**Not applicable**

Sl. No.	**Information/Checklist confirmation**	**Yes/ No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
5.6	Emissions from incineration of waste	**NO**	**Not applicable**
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	**NO**	**All such wastes will be disposed along with municipal solid waste as per MSW norms.**
5.8	Emissions from any other sources	**NO**	**Nil**

6. GENERATION OF NOISE AND VIBRATION AND EMISSIONS OF LIGHT AND HEAT:

Sl. No.	**Information/Checklist confirmation**	**Yes/ No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data**
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	**YES**	**All machineries will be manufactured as per OSHA/MOEF guidelines. Earplugs will be provided to workers working in the noise prone areas. Ambient noise levels will be in accordance with MOEF notification i.e. noise levels will be < 75 dBA during daytime and < 70 dBA during nighttime.**
6.2	From industrial or similar processes	**YES**	**All machineries will be manufactured as per OSHA/MOEF guidelines. Earplugs will be provided to workers working in the noise prone areas. Ambient noise levels will be in accordance with MOEF notification i.e. noise levels will be < 75 dBA during daytime and < 70 dBA during nighttime.**
6.3	From construction or demolition	**YES**	**Construction equipment will cause some noise. Ear plugs will be provided to construction workers who work near the noise generating equipment.**
6.4	From blasting or piling	**NO**	**No such operations are involved.**

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.5	From construction or operational traffic	**YES**	**Vehicles used by construction staff are minimal. The noise levels will be within the permissible norms of MOEF.**
6.6	From lighting or cooling systems	**NO**	**Not applicable**
6.7	From any other sources	**NO**	**Not applicable**

7. RISKS OF CONTAMINATION OF LAND OR WATER FROM RELEASES OF POLLUTANTS INTO THE GROUND OR INTO SEWERS, SURFACE WATERS, GROUNDWATER, COASTAL WATERS OR THE SEA:

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	**YES**	**FO/LDO & sludge from FO/LDO storage tank will be stored in covered HDPE drums in a designated area and will be given to OPCB approved vendors. Hence there will not be any spillage which will affect the environment.**
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	**NO**	**No waste water generation from the additional units proposed now as part of the present proposal as closed circuit cooling water system is proposed to be used . Sanitary waste water will be treated in septic tank followed by soak pit. Hence there will not be any adverse impact on environment due to the discharge of effluent from the present proposal.**
7.3	By deposition of pollutants emitted to air into the land or into water	**NO**	**All required emission control systems will be installed and operated to comply with he norms. Hence there will not be any deposition of pollutants into the air/land/water.**

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.4	From any other sources	**NO**	**Not applicable**
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	**NO**	**Not applicable**

8. RISK OF ACCIDENTS DURING CONSTRUCTION OR OPERATION OF THE PROJECT, WHICH COULD AFFECT HUMAN HEALTH OR THE ENVIRONMENT

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	**YES**	**FO/LDO will be stored in MS tanks with Dyke wall arrangement. All the OISD guidelines will be followed. Hence there will not be any thermal impact on outside population due to the present proposal.**
8.2	From any other causes	**NO**	**Not applicable**
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	**NO**	**There is no flood history in the area and the area is not falling under any earthquake prone area too.**

9. FACTORS WHICH SHOULD BE CONSIDERED (SUCH AS CONSEQUENTIAL DEVELOPMENT) WHICH COULD LEAD TO ENVIRONMENTAL EFFECTS OR THE POTENTIAL FOR CUMULATIVE IMPACTS WITH OTHER EXISTING OR PLANNED ACTIVITIES IN THE LOCALITY

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever Possible) with source of information data
9.1	Lead to development of supporting. lities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other	**NO**	**No such activities are envisaged.**
9.2	Lead to after-use of the site, which could have an impact on the environment	**NO**	**Not applicable**
9.3	Set a precedent for later developments	**YES**	**With the improvement in the socio-economic status of the people in the area, later developments are expected.**
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	**Yes**	**There are some industrial units within the study area. Cumulative impacts will be considered during preparation of EIA Report.**

(I) ENVIRONMENTAL SENSITIVITY

Sl. No	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	**NO**	**Not applicable**

Sl. No	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	**YES**	**IB River – 2 Kms** **Forests - few RF/PFs exist with in the stuady area.**
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	**NO**	**Not applicable**
4	Inland, coastal, marine or underground waters	**YES**	**Ground water is available at the plant.**
5	State, National boundaries	**NO**	**Not applicable**
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	**NO**	**Not applicable**
7	Defence installations	**NO**	**Not applicable**
8	Densely populated or built-up area	**NO**	**No densely populated areas as no major cities exist in the study area**
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	**YES**	**Nearest Hospital is in Marakuta village at 1.0 Km. from the plant and the nearest school is in Marakuta village**
10	Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	**NO**	**Not applicable**

Sl. No	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
11	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	**NO**	**Not applicable**
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	**NO**	**Based on the historical data, the site is not prone to earthquakes, floods, etc.**

IV) PROPOSED TERMS OF REFERENCE FOR EIA STUDIES

I. BASELINE DATA COLLECTION :

A. AMBIENT AIR QUALITY

- Baseline data will be collected for the proposed project.
- A study area of 10 Km. radius will be chosen.
- 8 nos. of sampling stations will be chosen based on predominant wind direction, upwind direction, cross wind direction, rural area representation and urban area representation.
- Parameters will be monitored are $PM_{2.5}$, PM_{10}, SO_2, NO_X. (As per revised NAAQS standards). Chemical characterization of PM_{10}.
- Frequency of monitoring 2 days a week for 3 months.

B. WATER QUALITY

- Ground water quality will be monitored at 10 locations within the study area.
- Ground water quality will be monitored for parameters as per IS : 10500
- Surface water quality will be monitored at one location and analyzed for various parameters

C. NOISE LEVELS

- Noise levels will be monitored (day time & night time) at 10 locations within the study area.

D. MICRO METEOROLOGICAL DATA

- Wind direction, wind speed, temperature, relative humidity and rainfall fall, cloud cover will be monitored on hourly basis for one season.

E. SOCIO-ECONOMIC DETAILS

- Socio economic details of people in the study area will be collected.

F. FLORA & FAUNA

- List of flora & fauna in the study area will be collected.

II. PREDICTION OF IMPACTS

- Prediction of GLC's of PM, SO_2 & NOx using Air quality model.
- Emissions from other industries in the study area will be considered to assess the cumulative impact due to the present proposal.
- Finding out the net resultant GLC's by superimposing predicted incremental rise in concentrations over the baseline concentrations and comparing them with National Ambient Air Quality Standards.
- Prediction of impacts on Water environment, Land environment, Noise environment, Flora & Fauna, Socio-economic environment, Traffic etc.

III. ENVIRONMENTAL IMPACT STATEMENT

- Preparation Environmental Impact Statement comprising of Air Environment, Water Environment, Land Environment, Noise Environment, Flora & Fauna, Socio-economic Environment.

IV. ENVIRONMENTAL MANAGEMENT PLAN

- Air emission management including the control of secondary fugitive emissions
- Effluent treatment & disposal
- Solid waste generation, storage & disposal
- Greenbelt development plan
- Rain water harvesting
- Post project environmental monitoring.

V. RISK ANALYSIS & DISASTER MANAGEMENT PLAN

- Identification of risks
- Analysis of risks
- Preparation of Disaster Management Plan

VI. Preparation of Draft REIA Report as per Generic structure of EIA Notification dated 14th September, 2006.

"I hereby given undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be revoked at our risk and cost.

Date: 24.09.2012

Place: Kolkata

for **MSP Metallics Limited**

P.K. Dey
Director

MSP METALLICS LIMITED

Integrated Steel Plant at MarAkuta

I N D E X

CHAPTER	DESCRIPTION	PAGE
1.0	**EXECUTIVE SUMMARY**	1
2.0	**INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION**	
2.1	IDENTIFICATION OF PROJECT AND PROJECT PROPONENT.	2
2.1.1	Combined Manufacturing facility of the Group.	2
2.1.2	Background information (MSP Group & The Company)	3
2.1.3	Promoter's Background	4
2.2	BRIEF DESCRIPTION & NATURE OF THE PROJECT.	6
2.3	NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY OR REGION.	7
2.3.1	Importance & rational for proposed product.	11
2.4	DEMAND-SUPPLY TREND.	13
2.5	IMPORTS VS. INDIGENOUS PRODUCTION.	15
2.6	EXPORT POSSIBILITY, DOMESTIC / EXPORT MARKETS.	15
2.7	EMPLOYMENT GENERATION (DIRECT AND INDIRECT).	17
3.0	**PROJECT DESCRIPTION**	
3.1	TYPE OF PROJECT & OPERATIONAL INTEGRATION	18
3.2	LOCATION MAP (GENERAL/SPECIFIC WITH COORDINATES) AND SITE LAYOUT.	19
3.3	CONSIDERATION OF ALTERNATE SITES.	19

CHAPTER	DESCRIPTION	PAGE
3.4	SIZE OR MAGNITUDE OF OPERATION (PROJECT PROFILE).	19
3.5	PROJECT DESCRIPTION WITH PROCESS DETAILS AND FLOW CHART.	20
3.5.1	Iron Ore Pellet Plant.	21
3.5.2	Iron Ore Sinter Plant.	34
3.5.3	Blast Furnace Plant.	42
3.5.4	Steel Melting with Continuous Casting Shop & Process Flow Chart.	54
3.5.5	Seamless Tube Mill & Process Flow Chart.	66
3.5.6	TMT Bars / Rod Mill & Process Flow Chart.	69
3.5.7	Non-recovery Pusher Type Coke Oven Plant and Process Flow Chart.	72
3.5.8	Oxygen Gas Plant.	75
3.6	RAW MATERIALS - QUANTITY, LIKELY SOURCE & FINISHED PRODUCTS – MARKET.	76
3.7	RESOURCE OPTIMIZATION / RECYCLING AND REUSE.	78
3.8	WATER & POWER REQUIREMENT & THEIR SOURCES.	85
3.8.1	Water requirement and its sources.	85
3.8.2	Energy/Power requirement its sources.	88
3.9	WASTES GENERATION (LIQUID AND SOLID) AND MANAGEMENT.	89
4.0	**SITE ANALYSIS**	
4.1	CONNECTIVITY.	91
4.2	LAND FORMS & LAND USE.	91
4.3	TOPOGRAPHY (ALONG WITH MAP).	91
4.4	EXISTING LAND USE PATTERN.	91

CHAPTER	DESCRIPTION	PAGE
4.5	EXISTING INFRASTRUCTURES.	91
4.6	SOIL CLASSIFICATION	92
4.7	CLIMATIC DATA FROM SECONDARY SOURCES.	92
5.0	**PLANNING BRIEF**	
5.1	PLANNING CONCEPT	93
5.2	POPULATION PROJECTION	93
5.3	LAND USE PLANNING	94
5.4	ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL).	95
5.5	AMENITIES / FACILITIES.	95
6.0	**PROPOSED INFRASTRUCTURE**	
6.1	INDUSTRIAL AREA (PROCESSING AREA).	96
6.1.1	List of Plant & Machinery and the Cost of Pellet Plant.	96
6.1.2	List of Plant & Machinery and the Cost of Sinter Plant.	108
6.1.3	List of Plant & Machinery and the Cost of SMS including LRF & VDF.	112
6.1.4	List of Plant & Machinery and the Cost of Tube Mill.	116
6.1.5	List of Plant & Machinery and the Cost of Hot-Rolling Mill.	117
6.1.6	List of Plant & Machinery and the Cost of Oxygen Gas Plant.	123
6.2	RESIDENTIAL AREA (NON PROCESSING AREA).	126

CHAPTER	DESCRIPTION	PAGE
6.3	GREEN BELT DEVELOPMENT.	126
6.4	SOCIAL INFRASTRUCTURE.	126
6.5	CONNECTIVITY (TRAFFIC AND TRANSPORTATION ROAD / RAIL).	126
6.6	DRINKING WATER MANAGEMENT (SOURCE & SUPPLY OF WATER).	126
6.7	SEWERAGE SYSTEM.	127
6.8	INDUSTRIAL WASTE MANAGEMENT.	127
6.9	SOLID WASTE MANAGEMENT.	127
6.10	POWER REQUIREMENT & SUPPLY / SOURCE.	128
7.0	**REHABILITATION AND RESETTLEMENT (R & R) PLAN**	
7.1	POLICY FOR PROJECT AFFECTED PERSONS / FAMILIES.	129
8.0	**PROJECT SCHEDULE & COST ESTIMATES**	
8.1	PROJECT IMPLEMENTATION SCHEDULE	130
8.2	ESTIMATED PROJECT COST.	130
9.0	**ANALYSIS OF PROPOSAL**	
9.1	FINANCIAL AND SOCIAL BENEFITS.	132

LIST OF ANNEXURES OF FORM- I

SL. NO.	DESCRIPTION	ANNEXURE
1.	True copy of EC dated 13.07.2009	I
2.	Project Size / Profile	II
3.	Project site on Cadastral map of Marakuta Village	III

LIST OF ANNEXURES OF P F R

SL. NO.	DESCRIPTION	CHAPTER	ANNEXURE
1.	Project Size / Profile	01	A
2.	Project Cost Break up & Means of Finance	01	B
3.	Project Location Map	3.2	C
4.	Project Site Layout	3.2	D
5.	Raw material Balance with Flow sheet	3.6	E
6.	Project Implementation Schedule	09	F

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