Pre-feasibility Report

Enhancement of Production Capacity of Sponge Iron Unit (4.95 Lac TPA to 6.50 Lac TPA)

HIRA
GROWING STRONGER TOGETHER

GODAWARI POWER AND ISPAT LIMITED

Regd. Office & Works : Industrial Area, Phase-1, Siltara - 493111, C.G.

Corporate Office : Hira Arcade, Pandri, Raipur - 492004.

May, 2015

Godawari Power & Ispat Limited

Pre-Feasibility-Report

I N D E X

Pre-Feasibility-Report

Chapter - 1

Project Highlights

Name of the Unit	:	**GODAWARI POWER & ISPAT LTD**.
Regd. Office	:	Plot No. 428/2, Phase-I Industrial Area, Siltara, Raipur (Chhattisgarh)
Plant Location	:	Within existing premises of plant at Siltara Industrial Area, Phase-I, Raipur.
Contact person	:	Shri T. Bose
Tel No.	:	0091-771-4082736
Mobile No.	:	09993000739
Fax No.	:	0091-771-4057601
Present Proposal	:	Increase in production capacity of Sponge Iron unit **from 4.95 Lac TPA to 6.50 Lac TPA** (within the other existing facilities of Integrated Steel Plant) **without any modification** in the existing plant and machinery, but only change in the raw material mix.
Land Area	:	Within the existing land of 213.657 Acres
Raw Material Requirement	:	Iron Ore Pellets (Captive Production) 9,42,500 TPA (In lieu of existing Iron Ore Lumps : 7,92,000 TPA) Mix of Indigenous & Imported Coal 6,50,000 TPA (In lieu of Indigenous Stem Coal : 5,94,000 TPA) Dolomite 19,500 TPA

Water Requirement	:	Existing - 2500 KL/day. Proposed - 2900 KL/Day Additional requirement - 400 KL/Day Source : Chhattisgarh Ispat Bhumi Limited
Power Requirement	:	Existing - 5.1 MW Proposed - 6.1 MW Additional requirement - 1 MW Source : Existing Captive generation
Project Cost	:	Total investment of Rs. 569.50 Crores already made in the entire manufacturing activities No additional investment is proposed for modernization & expansion.
IEM No.	:	4114/SIA/IMO/2006 Dated 27/07/2006

Chapter – 2

Introduction of the Project / Background Information

Identification of Project Proponent and the Project

The company was incorporated on 21/09/1999 with the Registrar of Companies, Gwalior (M.P.). The promoters of the company are the Hira Group of Industries, which is one of the largest groups in Central India. Hira Group, integrating its operations by setting up facilities for forward and backward integration and foraying into higher value added projects, has diversified into Sponge Iron, Power, Steel, Rolled Products, Ferro Alloys, Mining, Cement, Crushing, Beneficiation, Pelletization, Renewable Energy, Technology & Real Estate. In 2013-14, the group's turnover is about Rs.2800 crores within which the turnover of Godawari Power & Ispat Ltd is Rs.1750 crores. The Group has emerged as one of the fastest growing entities of Chhattisgarh and also has a pronounced presence in other states. The Group is poised for vertical and horizontal growth and having necessary resources, capital and infrastructure for setting up the projects.

Godawari Power and Ispat Limited (GPIL) is the flagship company of Hira Group of Industries, incorporated in 1999. The company's integrated steel manufacturing unit having a dominant presence in the long products segment of the steel industry, mainly into mild steel wires. Today, GPIL is an end-to-end manufacturer of mild steel wires. In the process, the company manufacturers sponge iron, billets, ferro-alloys, power, wire rods and steel wires.

GPIL has come a long way since it started its operation in Raipur, Chhattisgarh as a sponge iron manufacturer in the year 2001. Over the last 5 years, the company has scaled up its capacity fivefold and is today the fifth largest producer of coal based sponge iron in India and is one of the largest players in the mild steel wires segment. Not only has the company increased its scale during the aforesaid period, it has also moved up the value chain.

Board of Directors

The Board of GPIL comprises following Directors:

1) Mr. Bajrang Lal Agrawal
2) Mr. Dinesh Agrawal
3) Mr. Abhishek Agrawal
4) Mr. Dinesh Kumar Gandhi
5) Mr. Vinod Pillai
6) Mr. Shashi Kumar
7) Mr. B.N. Ojha
8) Mr. Biswajit Choudhuri
9) Mr. Harishankar Khandelwal
10) Ms. Bhavna G. Desai

History of the Company

Name and Address of Project Proponent:

Name of the Unit	:	**Godawari Power & Ispat Limited**
Date of Incorporation	:	21/09/1999
Regd. Office	:	Plot No. 428/2, Phase-I, Industrial Area, Siltara, RAIPUR (Chhattisgarh)
Plant Location	:	Industrial Area, Siltara, Raipur
Contact Person	:	Shri T. Bose
E-mail	:	tonmoy.bose@hiragroup.com
Tel No.	:	91-771-4082000, 4082736
Fax No.	:	91-771-4057601

Godawari Power & Ispat Ltd was originally incorporated as Ispat Godawari Ltd in 1999 with an objective to set up facilities to manufacture sponge iron, billets, and generate captive power.

The commercial operations begin in 2001 at the company's sponge iron plant with an annual capacity of 1,05,000 tonnes.

The initial project to manufacture sponge iron (capacity - 1,05,000 tonnes), billets (1,00,000 tonnes) and generate captive power (18 MW) becomes fully operational in

2003. During the same year, the company also received a prospecting license to mine iron ore in Chhattisgarh.

GPIL undertook the first phase of its expansion plan in 2004 for sponge iron (1,30,000 tonnes), steel billets (1,00,000 tonnes) and captive power generation (10 MW). This also included setting up new facilities to manufacture ferro alloys (16,500 tonnes) and HB wire (60,000 tonnes), the first big step towards moving up the value chain.

The name of the company was changed to Godawari Power and Ispat Limited in 2005. During the year, GPIL was also allotted captive iron ore mines in Chhattisgarh.

After the first phase of GPIL's expansion plant got completed in 2006, the second phase of the expansion was taken up. This phase entails expansion of sponge iron capacity by 2,60,000 tonnes, steel billets 2,00,000 tonnes and captive power generating capacity by 25 MW.

GPIL successfully completed its initial public offering and its shares got listed on the BSE and the NSE in April, 2006. GPIL's first WHRB captive power plant (7 MW) also became the first one in the world to be registered with CDM Executive Board for entitlement of carbon credits under the Kyoto Protocol.

In 2007, the second phase of expansion project culminated, catapulting GPIL into the big league of sponge iron and steel wire manufacturers. Thus the company increased its scale in steel segment.

In 2009, the company went into expansion of its existing plant by installation of Biomass Power Plant, Iron Ore Beneficiation, Rolling Mill & Arc Furnace. Out of these facilities, we have already installed the Biomass Power Plant and the beneficiation plant is yet to be installed.

The company has commissioned the Iron Ore Pelletizing plant of capacity of 2.1 lac TPA (with 2 kilns of 6,00,000 TPA & 15,00,000 TPA) in the year 2010 & 2013 respectively. This is a backward integration for utilization of iron ore fines as pellets in sponge iron kilns, having no effect on the total sponge iron capacity of the plant.

The technique of Grate kiln technology is adopted by Godawari Power & Ispat Limited for 2.1 million TPA pellet project. Pellet is kind of important material for DRI making.

Installed capacities of Godawari Power and Ispat Limited:

(Capacities in TPA)

Sl. No.	Name of the Unit	Capacity of manufacturing facilities in Phase-I	Capacity of manufacturing facilities in Phase-II	Total Capacity	After Approval of this Proposal
1	Sponge Iron	2,35,000	2,60,000	4,95,000	6,50,000
2	Steel Billet	2,00,000	2,00,000	4,00,000	4,00,000
3	Power	28 MW	25 MW	53 MW	53 MW
4	Ferro Alloys	16,500	-	16,500	16,500
5	Pig Iron	33,000	-	33,000	33,000
6	H.B. Wire	1,00,000	-	1,00,000	1,00,000
7	Oxygen Plant		12,00,000 NM^3	12,00,000 NM^3	12,00,000 NM^3
8	Nitrogen Plant		45,00,000 NM^3	45,00,000 NM^3	45,00,000 NM^3
9	Fly Ash Brick Plant		1,65,00,000 Nos.	1,65,00,000 Nos.	1,65,00,000 Nos.
10	Biomass Power			20 MW	20 MW
11	Iron Ore Mining *			14,10,000	14,10,000
12	Iron Ore Crushing			12,00,000	12,00,000
13	Iron Ore Beneficiation	(Under commissioning stage)		10,00,000	10,00,000
14	Iron Ore Pelletization			21,00,000	21,00,000

* The Company is operating two iron ore mines at Ari Dongri, Dist. Kanker, Chhattisgarh and Boria Tibu, Dist. Rajnandgoan, Chhattisgarh having an area of 106.60 hectare & 110 hectare, each with mining capacity of 7.05 lakh TPA, totaling to 14.10 lakh TPA.

The following Environment Clearances were obtained from the Ministry of Environment & Forests, New Delhi for our mining activities :

Sl. No.	**Environment Clearance**	**Activity**
1	MoEF F. No. J-11015/208/2006-IA II(M) Dated 31/01/2007	Iron Ore mining at Village : Boria Tibbu, Tehsil: Mohala, Dist. Rajnandgaon, Chhattisgarh for 7.05 lakh TPA in 110 ha mine lease area
2	MoEF F. No. J-11015/339/2006-IA II(M) Dated 25/06/2007	Iron Ore mining at Ari Dongri Village : Kachche, Tehsil: Bhanupratappur, Dist. Uttar Bastar (Kanker), Chhattisgarh for 7.05 lakh TPA in 106.60 ha mine lease area

Following Environment Clearances were obtained from MoEF for our existing projects at Siltara Industrial Area, Raipur, Chhattisgarh.

Sl. No.	**Environment Clearance**	**Activity**	
1	MoEF F. No. J-11011/326/2005-IA II(I) Dated 02/03/2006	Sponge Iron	4.95 lakh TPA
		Steel Billet	4.00 lakh TPA
		Power	53 MW
		Ferro Alloys	0.16 lakh TPA
		Pig Iron	0.33 lakh TPA
		H.B. Wire	1.00 lakh TPA
		O_2 Generation	12.00 lakh NM^3
		N_2 Generation	45.00 lakh NM^3
		Fly Ash Brick Plant	165.00 lakhs
2	MoEF F. No. J-11011/179/2009-IA II(I) Dated 25/08/2009	Expansion of Steel Plant by installation of -	
		Iron Ore Beneficiation Plant	10,00,000 TPA
		Rolling Mill	3,00,000 TPA
		Arc Furnace	5,000 TPA
		Biomass Based Power Plant	20 MW

The compliance reports for all the existing manufacturing facilities are being submitted to the Regional Office, MoEF, Bhopal and Chhattisgarh Pollution Control Board, Raipur.

The company has entered into signing of a MOU with Government of Chhattisgarh for setting up 2.00 million steel making facilities at Rajnandgaon.

GPIL has become the first company in Chhattisgarh to be awarded the Integrated Management System Certification by Accreditation bodies UKAS of UK and Swiss Accreditation of Switzerland and certified by SGS India Pvt. Ltd., signify excellence in different aspects of business.

- ISO:9001:2008 FOR Quality Management System
- ISO:14001:2004 for Environment Management System
- OHSAS ISO:18001:2007 for Occupational Health & Safety

It is worth noting that Godawari Power and Ispat Limited achieved state level recognition in plantation and stood 2nd in Vriksha Mitra Mahaabhiyan-2008 & 3rd in Open Plantation Award-2009.

Chapter - 3

Proposed expansion of Sponge Iron Plant

The company proposes to increase the production capacity of its Sponge Iron Plant from 4,95000 TPA to 6,50,000 TPA without any modification in the plant and machinery, but only by change in the raw material mix. Instead of using the conventional sized iron ore and indigenous coal, we now propose to feed iron ore pellets and mix of indigenous and imported coal. Earlier, DRI units could work for periods of 270-300 days in a year. Nowadays, the plants are capable of working upto 330 days in a year.

Need for the proposed expansion of Sponge Iron project

The company is having existing Iron Ore Pelletizing facilities of capacity of 2.10 lac TPA. This is the backward integration for utilization of iron ore fines as pellets in sponge iron kilns. Pellet is today an important feed material for DRI making.

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

With the present availability of pellets as in house production, we are in a position to use the pellet in DRI kiln instead of iron ore.

Advantages of using pellet in DRI Kiln are :

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

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

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

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

Project's Importance to the Country/ Region

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

ore fines through various activities such as beneficiation, Pelletization is the need of the hour for use in DRI.

Basis for increase in production capacity from 4.95 lac TPA to 6.50 lac TPA

(A) RAW MATERIAL BASIS

		Current	**Proposed**	**Increase / Decrease**
	Raw Material Consumption	Iron Ore - 1.60 T/T Coal - 1.20 T/T Dolomite - 0.03 T/T Total Feed : 2.83 T/T	Pellet - 1.45 T/T Coal - 1.00 T/T (Indigenous & Imported) Dolomite - 0.03 T/T Total Feed : 2.48 T/T	(-)0.35 T/T
	Reduction in Coal consumption from 1.20 T/T to 1.00 T/T			(-)0.20 MT
1)	Increase in capacity due to reduction in coal use with better ore quality: 0.20 MT			
	Proportionate increase in ore feed : Coal decrease x Density of Coal / Density of Iron Ore 0.20 x 0.8 / 2.2 = 7% 7 (increase in iron ore) x 0.68 (yield) =			**5% (A)**
2)	Decrease in consumption of iron ore = 1.45 / 1.60 =			**10% (B)**
	Overall Increase in capacity = A + B = 5 + 10 =			**15%**
	Revised Capacity of DRI = 1850 TPD x 1.15 x 330 days = 7,02,075 TPA			

(B) GROSS FEED BASIS

Raw Material Burden	**Burden as per Iron Ore**	**Burden as per Pellet**	
	2.83	2.48	(-) 0.35
Difference in burden = 0.35 / 2.83 =			12%
Revised Capacity of DRI = 1850 TPD x 1.12 x 330 days = 6,83,760 TPA			

However, we propose to maintain the maximum capacity at 6,50,000 TPA

Chapter - 4

Brief Description of the Sponge Iron Project

The company is operating the Sponge Iron plant of 4,95,000 TPA capacity with 4 Nos. Rotary Kilns in its premises situated at Industrial Area, Siltara, Dist. Raipur, Chhattisgarh along with other integrated steel manufacturing facilities:

The capacity of the sponge iron kilns are :

Kiln No.	Capacity (TPD)	Existing Annual Capacity as per EC
1 (Phase-I)	350	1,05,000
2 (Phase-I)	500	1,30,000
3 (Phase-II)	500	1,30,000
4 (Phase-II)	500	1,30,000
Total	1850	4,95,000

The capacity of the kilns was maintained depending upon the availability of ore and coal during that time.

Environmental Clearances / Consents of existing projects of GPIL

The company had established the manufacturing facilities in Phase-I vide Permission to Establish letter No. 4900/TS/CECB/2004 dated 29/11/2004 & Consent vide letter No. 1160/TS/CECB/2006 dated 03/03/2006 under Water Act & 1162/TS/CECB/2006 dated 03/03/2006 under Air Act obtained from Chhattisgarh Environment Conservation Board, Raipur.

Subsequently, for expansion of its existing facilities for Phase-II, the company had obtained the Environment Clearance vide letter No. F. No. J-11011/326/2005-1A II (I) dated 02/03/2006 from Ministry of Environment & Forests, New Delhi and Permission to Establish vide letter No. 2330/TS/CECB/2006 dated 04/05/2006 and Consent No. 1811/TS/CECB/ 2007 dated 11/04/2007 under Water Act & 1813/TS/CECB/2007 dated 11/04/2007 under Air Act obtained from CECB, Raipur.

The compliance reports for all the existing manufacturing facilities are being submitted to the Regional Office, MoEF, Bhopal and Chhattisgarh Pollution Control Board, Raipur.

Public Hearing

The Chhattisgarh Environment Conservation Board has conducted Public Hearing on 6th August, 2005 in the premises of District Collectorate, Raipur as per the provisions of Environment Impact Assessment Notification, 1994 (as amended) for this project along with expansion of manufacturing facilities in Phase-II.

Chapter - 5

Location and Site analysis

The terrain of the land is almost plain. The Sponge Iron Plant along with the integrated steel manufacturing facilities of the company are located within the total area of 213.657 Acres of existing land in the plant premises of Godawari Power & Ispat Limited, Siltara Industrial Area, Raipur. The Layout map showing the location of all the manufacturing units of GPIL is enclosed.

Detailed Layout Plan of Godawari Power & Ispat Ltd.

Within the overall area of GPIL, the land area for Sponge Iron Plant is as under :

Area for Sponge Iron Division in Phase-I : 9.990 Acres

Area for Sponge Iron Division in Phase-II : 17.901 Acres

Overall, the land utilization is as under:

Particulars		**Area in Acres**	**No. of trees**
Total Land Area		213.657	-
Total Covered Area		45.078	-
Total Road Area		35.029	-
Total Green Belt Area	Plantation already done	50.666	56000
	Proposed area for Plantation	24.112	35000
Total Open Area		58.772	-

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

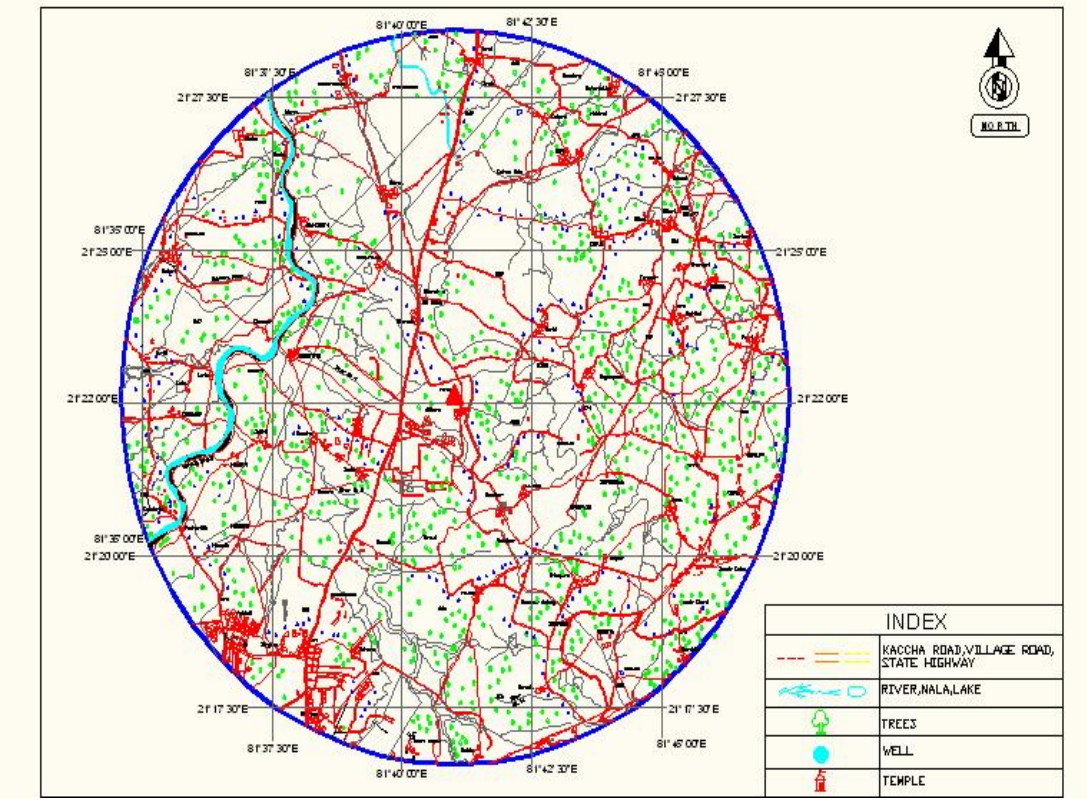
There are no ecologically sensitive places like national park, sanctuary, biosphere reserve, heritage sites, archeological monuments, defense installation, health resorts, scenic beauty etc. around 10 Kms. radius of the site. There is no route of migratory animals within the project site. The site satisfies the criteria stipulated by the Ministry of Environment & Forest, Government of India for setting up of industries.

Toposheet No. : F44/P/11, F44/P/15

Latitude : 21° 22’58.5"N

Longitude : 81°41‘09.0"E

10 Km. Area Map on SOI Toposheet



Google Image of Project Site

List of Villages within 10 Kms. Radius of GPIL

Name of Village	Direction
Siltara	W
Tanda	E
Sarora	S
Charoda – 1	NW
Dharsiwa	NW
Kurud Village	NE
Dhaneli Village	SW
Chhapora village	SSE
Bhanpuri Village	SSW
Kanhera Village	WSW
Kurna Village	NNW
Murathi Village	WNW
Akoli	ESE
Bahesar	WNW
Mandhar	SE
Garh	NE
Mohdi	ENE

List of Industries within 10 Kms Radius of GPIL

Sr. No	Name of the Industry	Type
1	M/s. Sarda Energy & Minerals Ltd.	Pellet, DRI & Power
2	M/s. Jaysawal Neco Ltd	DRI & Power
3	M/s.Mahamaya Sponge Iron (P) Ltd.	Sponge Iron
4	M/s. Mahendra Sponge & Power Ltd.	Sponge Iron
5	M/s. Hira Ferro Alloys Ltd.	Ferro Alloys
6	M/s. Vandana Global Ltd.	DRI & Power
7	M/s. SKS Ispat & Power Ltd.	DRI & Power
8	M/s. Euro Prateek Sponge & Iron Ltd.	DRI & Power

9	M/s/ Jagdamba Power & Alloys Ltd.	Power
10	M/s. Drolia Power & Ispat	DRI & Power
11	M/s. Nakoda Ispat Limited	DRI & Power
12	Aarati Sponge & Power Ltd.	DRI & Power
13	API Ispat & Power Tech Ltd	DRI & Power
14	Drolia Electrosteel (P) Ltd.	DRI
15	S.K. Sarawagi & Company (P) Ltd.	DRI

Connectivity

The company's existing manufacturing facilities are located at about 20 Kms in north from Raipur, the capital of Chhattisgarh State. The project site is along the Raipur-Bilaspur Highway and the facilities are located more than 1 Km away from the Highway. The nearest railway station is Mandhar (around 3 Kms. south east of site) on the Mumbai-Howrah main line. The nearest airport is located at Mana village near Raipur at a distance of about 30 Kms. from the site.

Chapter – 6

Process Description of the Sponge Iron Plant

Raw Materials

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

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

Chemical Composition of Raw Materials :

Sl. No.	Current		Proposed	
1	Iron Ore	Fe : 62.5% to 65%, LOI: 3.5%	Pellet	Fe : 63.5% , LOI: 0.5%
2	Coal	FC : 42%, Ash : 35%	Coal	FC : 50%, Ash : 30%
3	Dolomite	LOI : 50-52%	Dolomite	LOI : 50-52%

Manufacturing Process

The DRI sponge iron is produced in rotary kiln by reducing air or controlled air firing in rotary kiln along with Coal and Iron Ore.

The standard mix of raw materials are fed through raw material handling system and taken to a common belt conveyor through weigh feeders and then fed to the Rotary Kiln via feed tube.

Process Description

In DRI making, a Rotary Kiln is used for direct reduction of ore. The rotary kiln is a refractory lined vessel on which several blowers are mounted. From the blowers, air pipes

go through the shell and refractory, vertically and deliver the required amount of air, required for the process axially. The kiln has conical out let and inlet holds the material in the kiln. The Kiln is placed in a slope from feed end side at a slope of 2 ½%.

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

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

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

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

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

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

Heat Transfer

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

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

Reaction Vessel

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

3 Fe_2O_3	2 Fe_3O_4	6 FeO	6 Fe

The degree of reduction in each step is as follows:

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

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

$$CO_2 + C = 2\ CO$$

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

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

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

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

a **.** Quantity of reductant
b **.** Temperature
c **.** Residence time

a **. Quantity of Reductants :**

From the chemical reactions it is seen that as the % of O2 reduces in the ore, the % of carbon requirement increases. If there is a shortfall of carbon the reaction proceeds in a reverse way i.e. from reduction to oxidation. The reduction reaction is endothermic (absorbs heat) while the oxidation reaction is exothermic. In the absence of reductant the temperature goes up and sinter formation, ball formation and accretion starts.

For safe operating of the kiln about 0.45 to 0.50 MT of fixed carbon is required per ton of total Fe input. Out of this 0.50 MT, 0.27 to 0.29 MT is given from feed end side and rest is given from kiln discharge end side.

b. Temperature

As the coal is mixed with iron ore, it passes from feed end side and air is blown from the blowers into the kiln, the liberated CO reacts with oxide material. This reaction lowers the temperature of the bed due to its endothermic nature. It is necessary to generate sufficient heat before the bed temperature falls. The gases coming out from the bed are the mixture of decomposed and partially oxidized fuels. By adding air to these mixtures of gases, combustion and heat generation takes place and the heat is radiated to the bed, the mechanism of which has already been discussed earlier. As regards the temperature profile, the first 20-25% is preheat zone where the material is heated up to 850 deg. C and then to reduction temperature of about 1000 deg. C to 1050 deg. C. Iron ore once reaches 850 deg. C, the surface gets reduced and generates less fines. So it is required to heat up the ore to 850 deg. C as quick as possible and 70% of the kiln is taken to 1000 to 1050 deg. C for reduction purpose.

c. Residence Time

The total residence time of the material in the kiln is a function of the feed rate and kiln rpm. With each increment in feed rate, the kiln seed is increased to maintain a constant bed loading in the kiln.

Kiln-A Conveyor of Solids

Apart from all the functions it is also a conveyor of solids. Since it is at 2½ % slope from feed end side to discharge end side, the material moves downwards both by gravity and by rotational speed. With each rotation the material goes up the walls and again slide back and moves forward.

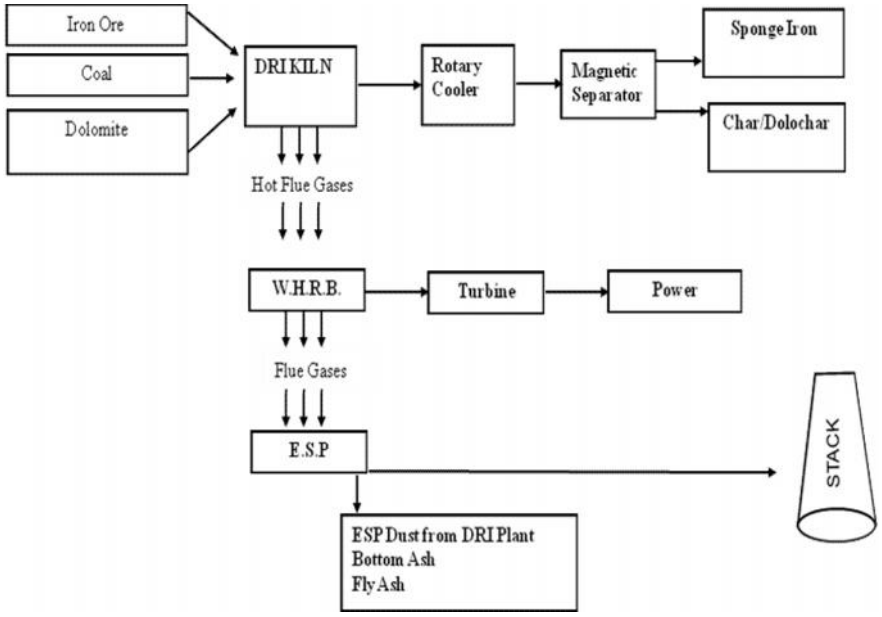
But the interesting part is movement of fines and lumps in the bed. There is shear line close to the top of the bed, a line which theoretically separate lumps moving freely down the surface of the bed from more slowly moving lumps below. The material below the shear line moves slowly because those around it pack in each lump, very little relative motion occurs between lumps. The curved effect of the movement of these lump are induced by the curvature of the kiln. Their speed of travel in the bed is the product of the

kiln angular velocity times the distance from the lumps to the kiln centerline. At 0.5 rpm the velocity is 1.0 meter/sec. When the lumps move across the shear line at the shoulder of the bed, they become free to roll down (not cascade down) the surface. They come to and repeat the cycle. When the lumps are in lower zones, they are in fixed bed state.

Since the fines are lighter than the lumps, they segregate and remain in "kidney fashion" at the top of the bed and moves in a mass like lumps. Since the fines remain at the top its metallization is much better than the lumps.

One of the added advantages in the process of sponge iron is the utilization of waste heat to generate power.

Process Flow Diagram of DRI Kiln



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

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

Chapter – 7

Plant, Machinery & Equipments of Sponge Iron Plant

Raw Material Handling including Kiln Feed

- Vibratory Feeder for Coal
- Vibratory Feeder for Iron Ore
- Double Deck Vibrating Screen for Coal
- Double Deck Vibrating Screen for Iron Ore
- Coal Crusher - Impactor Type
- Iron Ore Primary Jaw Crusher
- Iron Ore Secondary Cone Crusher
- Bucket Elevator for Coal
- Bucket Elevator for Feed
- Belt Conveyors Structures with all mechanicals for Belt Conveyor including belt
- Weigh Feeders for Lump Ore / Feed Coal / Coarse Coal / Fine Coal / Dolomite
- Circular motion Double deck Vibrating Screen
- Bucket Elevator for product separation
- Magnetic Separator - Single Stage Separator for coarse particles
- Magnetic Separator - Double Stage Separator for coarse particles
- Rotary Kiln
- Shell
- Kiln Tyres
- Support Rollers & Shaft
- Kiln Girth Gear
- Kiln Pinion with Shaft
- Support Roller Bearing Housing
- Kiln Thrust Roller with Housing
- Tyre Chairs
- Base Frames for Support Rollers
- Sealing Segments for Kiln Inlet & Outlet

- Kiln Inlet Hood & Discharge Hood including transfer chute
- Tip casting for Kiln inlet & outlet with bolts
- Main DC Motor
- Base Frames for main gear box, motor pinions & Aux. drive
- Shell Air Fan - Centrifugal type
- CB Fan - Centrifugal type
- Nose Ring Cooling Fan
- ABC Fan - Centrifugal type
- Gear Boxes for Kiln main, Kiln Auxiliary, Cooler Main with Couplings & Clutches
- Dedusting system for material transfer points
- Feed tube material
- Root Blower with pipe valves & fittings
- S.S. Pipe, Radiation Protection Tube, Flange, Pipe and Plates
- Air Injection Tubes
- Pneumatic Cylinder
- Lubrication System
- Cooler & Shells
- Tyres & Support Rollers
- Girth Gear and pinion with shaft
- Bearing Housing for Cooler & Support Roller with Covers etc
- Thrust Roller Assembly
- Bearing Block for Cooler Pinion
- Cooler Discharge Hood
- Base Frame for Gear Box, Support rollers, pinion, thruster
- Cooler Chair Plates
- Main Motor AC
- Water Spray & collecting system with trough pipe line valves
- Sealing Segments for Cooler
- Heat Resistance Segments
- Gas Cleaning System - Pipes & pipe fittings and pollution control system
- Emergency Stack

- ABC & DSC
- Wet Scrapper with trough
- Rotary Air lock feeder with Gear box drive
- Low heat castable
- Piping for compressor air line
- Cooling Towers
- Pumps & Indirect cooling pump
- Cooling tower pump, service pump, injection water pump etc.
- Pipe & pipe fittings with valves for DRI cooling system
- Water & Lube oil return piping with valves
- Power System - Sub Station Electrical equipment & inst.
- HT Cable & LT copper control cables
- HT power cables
- PLC system & MCC Panel
- UPS
- Accessories for Panel
- Cable Trays & Rake for overhead cables
- Copper slip rings complete with trolley & carbon brush holders
- AC Motors (For conveyors & other equipments)
- Circuit Breakers

Chapter – 8

Utilities

Raw Materials and Material Balance

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

Input Raw Materials	Quantity (Ton)	Total Quantity (TPA)	Output from Kiln	Quantity (Ton)	Total Quantity (TPA)
Iron Ore	1.60	7,92,000	Sponge Iron	1.00	4,95,000
Coal	1.20	5,94,000	Char & Dolochar	0.28	1,38,600
Dolomite	0.03	14,850	Dust from Settling Chamber	0.10	49,500
			ESP Dust	0.10	49,500
			Carbon & Oxide Losses to Atmosphere	1.35	6,68,250
	2.83	**14,00,850**		**2.83**	**14,00,850**

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

Input Raw Materials	Quantity (Ton)		Output from Kiln	Quantity (Ton)	Total Quantity (TPA)
Pellet	1.45	9,42,500	Sponge Iron	1.00	6,50,000
Coal	1.00	6,50,000	Char & Dolochar	0.20	1,30,000
Dolomite	0.03	19,500	Dust from Settling Chamber	0.07	45,500
			ESP Dust	0.07	45,500
			Carbon & Oxide Losses to Atmosphere	1.14	7,41,000
	2.48	**16,12,000**		**2.48**	**16,12,000**

Source of raw materials for proposed expansion :

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

ii) Coal : The mix of Indigenous & Imported coal will be utilized in the proposed expansion.

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

Water requirement & Water Balance of Sponge Iron Plant

Current :

Sl. No.	Purpose of Water Consumed	Water Balance			
		Phase-I		Phase-II	
		Water Consumption (KL/Day)	Effluent Generation (KL/Day)	Water Consumption (KL/Day)	Effluent Generation (KL/Day)
A	**Process**				
B	**Boiler**	Nil	Nil	Nil	Nil
C	**Cooling**				
	a. Rotary Cooler	1015	50	1120	55
	b. ABC	18	Nil	22	Nil
	c. DSC	18	Nil	22	Nil
D	**Others**				
	a. Pugmills at Silo/Bins	25	Nil	25	Nil
	b. Water Sprinkling *****	120	Nil	115	Nil
E	Domestic use	12	2	20	4
F	Total (A + B + C + D)	1196	50	1304	55
G	Water (Phase-I & II) Consumption	**2500 KL/Day**			
H	Total Effluent(Operation)	**105 KL/Day**			
	Utilization	Utilized for continuous water sprinkling on roads and yards			
I	Effluent (Domestic)	**6 KL**			
	Utilization	Soakpit overflows used in horticulture activities			

***** Note : The total effluent of 105 KLD generated from the operations is utilized for water sprinkling and the same is included in the quantity of water 120 + 115 = 235 KLD used for sprinkling.

Proposed :

Sl. No.	Purpose of Water Consumed	Water Balance			
		Phase-I		Phase-II	
		Water Consumption (KL/Day)	Effluent Generation (KL/Day)	Water Consumption (KL/Day)	Effluent Generation (KL/Day)
A	**Process**				
B	**Boiler**	Nil	Nil	Nil	Nil
C	**Cooling**				
	b. Rotary Cooler	1155	60	1375	70
	b. ABC	18	Nil	22	Nil
	c. DSC	18	Nil	22	Nil
D	**Others**				
	a. Pugmills at Silo/Bins	25	Nil	25	Nil
	b. Water Sprinkling	120	Nil	120	Nil
E	Domestic use	15	3	20	4
F	Total (A + B + C + D)	1336	60	1564	70
G	Water (Phase-I & II) Consumption	**2900 KL/Day**			
H	Total Effluent(Operation)	**130 KL/Day**			
	Utilization	Utilized for continuous water sprinkling on roads and yards			
I	Effluent (Domestic)	**7 KL**			
	Utilization	Soakpit overflows used in horticulture activities			

***** Note : The total effluent of 130 KLD generated from the operations is utilized for water sprinkling and the same is included in the quantity of water 120 + 120 = 240 KLD used for sprinkling.

Availability of water

The company has already existing reservoir and water is sourced from Chhattisgarh Ispat Bhoomi Limited, the nodal agency for supply of water to the industrial areas. The company had entered into an agreement for 7800 KL/day water by Chhattisgarh Ispat Bhoomi Limited for industrial use.

Power

Existing	@ 75 Kwh x 68 tons/hour = 5100 Kwh = 5.1 MW
Proposed requirement	@ 75 Kwh x 82 tons/hour 6150 Kwh = 6.1 MW

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

Other Utilities

Due to a number of moving equipments, lubricants are required at various stages of the process.

Chapter – 9

Environmental Considerations of the Sponge Iron Plant

Environment Management

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

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

Pollution control

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

Pollution control measures

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

Following pollution control equipments / measures are installed:

- At all the points, Dust Collectors are installed.
- Water spraying on coal hip, coal yard and raw material is being done to control the fugitive emissions.
- The Waste Gases fed in the Waste Heat Recovery Boiler wherein Electro Static Precipitators are installed.
- For handling of Ash - Ash Handling System is installed & the ash is being used for fly ash brick manufacturing and land leveling.
- Continuous water sprinkling on the internal roads

Solid Waste Management

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

Solid Waste generation	**Current Quantity (TPA)**	**Proposed Quantity (TPA)**	**Method of Disposal**
Char & Dolochar	1,38,600	1,30,000	Used in captive power plant (AFBC)
Dust from Settling Chamber	49,500	45,500	Used for brick manufacturing and land filling
ESP Dust	49,500	45,500	

Effluent generation :

The effluent generation from the plant operations is used for continuous water sprinkling on roads and yards and effluent from domestic water is utilized for horticulture activities after treatment. GPIL maintains a policy of Zero Discharge, and will continue to do so in future.

Pollution monitoring

GPIL is carrying out continuous monitoring within and outside the Plant premises on regular basis.

The latest Ambient Air & Stack Emission Monitoring Report is as under :

HIRA

GODAWARI POWER & ISPAT

GPIL/EMS/F/20

AMBIENT AIR & STACK EMISSION MONITORING REPORT

FOR THE MONTH OF – **APRIL-2015**

I. AMBIENT AIR MONITORING RESULTS

PARAMETER MONITORED	PARAMETER/CONCENTRATION in µg/m³ (Prescribed Limit as per CECB; PM_{10}-100.00; SO_2 & NOx-80.00µg/m³)																Sampler & Model
	Guest House (EAST)					Siltara Boundary (WEST)					Tada Boundary (NORTH)					Brick Unit (SOUTH)					
	06/04	13/04	20/04	27/04		06/04	13/04	20/04	27/04		06/04	13/04	20/04	27/04		06/04	13/04	20/04	27/04		
PM_{10}	60.2	64.4	67.7	48.5		62.3	68.5	70.9	54.7		58.3	70.3	66.9	62.2		58.3	70.3	66.9	62.2		APM-550
$PM_{2.5}$	27.3	28.8	32.4	23.7		30.8	29.3	24.9	30.8		24.5	34.5	29.4	26.6		27.1	32.1	31.3	32.2		
SO_2	11.1	10.3	12.1	9.3		12.5	11.5	12.0	10.1		10.8	12.0	11.8	10.0		13.0	12.8	13.9	11.2		
NO_x	18.4	16.4	17.0	16.3		20.5	19.0	19.6	18.6		18.0	20.1	20.6	15.9		12.4	18.3	22.5	17.0		

II. STACK EMISSION MONITORING RESULTS

DATE OF MONITORING	STACK CONNECTED WITH	STACK NO.	EMISSION CONCENTRATION (Norms as per CECB PM-50.00 mg/Nm³)	Sampler & Model No.	
				Name	Serial No.
13.04.2015	Kiln No. 01 & AFBC (70*tph* Boiler)	1	39.8	VSS-I	444 DTB 08
06.04.2015	Kiln No. 02 & Biomass (100*tph* Boiler)	2	38.5	VSS-I	444 DTB 08
10.04.2015	Kiln No. 03 & 04	3	43.8	VSS-I	444 DTB 08
20.04.2015	Pellet Plant	4	25.0	VSS-I	444 DTB 08
17.04.2015	Ferro Alloy	5	28.7	VSS-I	444 DTB 08
27.03.2015	SMS (BF)	6	26.9	VSS-I	444 DTB 08
21.04.2015	Pellet (1.5 MTPA)	7	21.7	VSS-I	444 DTB 08

Chemist Asst. Manager Head of the Department (Environment Management System)

Environmental Management Cell

An environmental monitoring and control is established. An environmental manager is post graduate in environmental engineering. He directly reports to the Plant Head.

The cell is responsible for monitoring ambient air quality, stack emission, ambient noise in the plant and vicinity, wastewater quality and discharge, quality of water bodies receiving effluent, workplace air quality, occupational safety and health, and maintenance of analytical instruments. Additional responsibilities of the cell include the following:

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

Environmental Laboratory

To deal with environmental issues, a well-equipped laboratory has been established in GPIL where various environmental samples have been analyzed by qualified Analysts. The Laboratory has all the facilities required by today's hard and fast analysis results related to Physical, Chemical and Biological investigations. EMS laboratory has a facility of instruments which makes the analysis and interpretation easier, these includes Spectrophotometers, Digesters, Ovens, Sterilizers, Distillation units, HVS, RDS, Stack Monitors, On-line dust/gas measurements, etc.

Pollution Control Equipments & Stack details

Stack No.	Units	Air Pollution Control Device
1 -.	Kiln 1 (350 TPD), WHRB-1 & AFBC-70 TPH	ESP-1 & 2, Bag Filter - 80,000 m^3/hr, 60,000 m^3/hr & 10,000 m^3/hr x 2
2 -.	Kiln 2 (500 TPD). WHRB-2 & AFBC Biomass 100 TPH	
3 -.	Kiln 3 & 4 (500 TPD x 2) & WHRB-3 & 4	ESP-3 & 4 Bag Filter - 10,000 m^3/hr, 20,000 m^3/hr, 60,000 m^3/hr x 2 & 1.25 lac m^3/hr

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

Details of Existing & Proposed Pollution Load :

Sl. No.	Source of Emission	Production per hour	Stack Height (in Mtr.)	Average discharge flue gas (Existing Stack)		Total Permitted SPM	Production per hour	Average discharge flue gas (Post-Capacity increase)		Total Average SPM discharge (Post-capacity increase)
				SPM (mg/NM^3)	Flue Gas (m3/hr)	milligram		SPM (mg/NM^3)	Flue Gas (m3/hr)	milligram
1	Kiln No. 1 (350 TPD)	14.5 ton x 4000 m3	74 Mtr.	50	58000	9790	15 ton x 4000 m3	50	60000	9890
	AFBC (70 tph Boiler)				137800				137800	
2	Kiln No. 2 (500 TPD)	20.8 ton x 4000 m3	74 Mtr.	50	83200	13538	22 ton x 4000 m3	50	88000	13778
	Biomass (100 tph Boiler)				187560			.	187560	
3	Kiln No. 3 (500 TPD)	20.8 ton x 4000 m3	74 Mtr.	50	83200	8320	22 ton x 4000 m3	50	88000	8800
	Kiln No. 4 (500 TPD)	20.8 ton x 4000 m3			83200		22 ton x 4000 m3		88000	
	Total					**31648**				**32468**

Total average SPM discharge (existing)	**31648**	**miligrams**
Total average SPM discharge post-capacity increase	**32468**	**miligrams**
Increase in SPM discharge	**820**	**miligrams**
Pollution load increase (%)	**2.59%**	

Plantation & Green belt

Adequate green belt is provided all around the plant premises. Locally available types of trees as specified by the Chhattisgarh Environment Conservation Board have been planted, which are resistant to pollutants are planted. The total area brought under the greenbelt in the existing industrial complex of GPIL is 50.66 Acres. GPIL has already planted 56000 numbers of trees in the premises and proposed to plant around 35000 plants.

Every year tree plantation is undertaken in a planned manner on a massive scale. Most of them including species having capability of pollution control and some of them are capable to survive in high saline conditions & low fertile soil. Soil management is also the part of us for better use of soil within the plant premises and out-sides as well. Extensive Plantation & grassing has been carried out to check the erosion from various plant activities. We have planted over 20,000 saplings out-side the plant premises by doing activities such as Vriksh-Mitra Abhiyan & Hariyar-Chhattisgarh.

Photographs of Existing Plantation at GPIL

Chapter - 10

Occupational Health

GPIL is following guidelines provided by the Directorate of Industrial Health and Safety and Labour Ministry of State which is amended time to time as directed by the authority.

GPIL has functional 24 x 7 Occupational health centre with full time factory medical officer. Three Clinic Attendants who work in shift duties and a ward boy.

Functions of the Health Centre is :

- All the employees are examined by factory medical officer for occupational diseases every year.

- GPIL Ensures Medical fitness of all the new employees through (Form 32) Pre Employment Medical Examination by factory medical officer as directed by Directorate of Industrial Health and Safety.

- GPIL maintain Health register Form 21 of all the employees working in our company with periodical medical check-up every year.

- GPIL takes specialists services for conducting ophthalmological examination and Pure Tone Audiometry of our employees every year. In the year 2014 ophthalmological examination of approx. 350 employees was conducted and 172 were found to have refractive errors which was corrected by giving glasses to the employees. Similarly pure tone audiometry of 40 employees was done and 3 were found to have NIHL report of the same was sent to directorate and further treatment of the employees was done.

- Every 3 year X-Ray of the employees is been done. In the year 2013 X-Ray examination of 800 employees was done and in year 2014 X-Ray examination of 1000 employees was done.

- Spirometric examination (Pulmonary function test) is done every year. In the year 2013 pulmonary function test of 232 employees was done. In the year 2014 spirometric examination of 328 employees has been done.

Facilities available at Health Centre are -

- GPIL have facility for conducting pulmonary function test , Blood sugar monitoring and ECG for cardiac evaluation of employees at our occupational health center.

- GPIL have one medium size autoclave machine for sterilization of surgical equipments and other consumables.

- GPIL have all kind of Primary medications available in our occupational health center like Antibiotics, Anti-inflammatory, Antacids Anti pyretic, Anti cold and others .

- GPIL have all kind of life saving medications available in our occupational health center including anti snake venom for any such emergency.

- All kinds of Splints and Traumatic Aids are available to give primary treatment to trauma patients.

- GPIL have all kind of surgical equipment required for wound repair and minor incision and drainage surgeries.

- GPIL have Two Nos. of ambulances with first aid box and 6 oxygen cylinder in each for prompt transport to a tertiary health center as and when required.

- We have 88 First aid boxes allocated inside the plant with all the basic medication and dressings as per the factory act.

Chapter - 11

Socio-Economic Development

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

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

Godawari Power & Ispat Ltd. is already executing various CSR activities in following fields.

Education

a) Developing various government schools by building them further according to need.
b) Rewarding meritorious students of Government schools to boost their morale.
c) Sponsoring the education of a lot of needy children.
d) Encouraging under privileged girls from rural communities around its operational areas to study.
e) Organizing seminars and workshops for imparting technical education involving soft skills especially for the people of remote regions.
f) Sponsoring salaries of the teachers teaching in rural areas in order to keep them motivated to impart quality learning skills.
g) Providing various facilities to the schools such as furniture and computers in rural areas.

Health

a) Health Camps organized at GPIL for worker and employees- Blood donation camp, Eye Check Camp, Hemoglobin & General Check-up, BDM Test (Osteoporosis), Diabetes Detection Camp, Lung Function Test by Spirometer.
b) Organizing pulse polio camps in the communities near its areas of operation.
c) Provision of free medicines for the people of rural areas.
d) Providing financial aid to the patients who cannot afford the treatment for their chronic diseases.
e) Financial assistance to Gram Panchayat, Siltara for purchasing Ambulance.
f) 5 Tri-cycle donated to for the Handicapped to CG Pichhda Varg Parishad.
g) Financial assistance to MIKKI Memorial Trust for MGM Eye Institute.
h) Sponsorship of Mobile Medical Unit(MMU Van) for Helpage India. Weekly deployment of MMU Van with Doctor and Free Medicines in nearby villages of GPIL.

Infrastructural Development

a) Maintenance of rural roads and arrangement of safe drinking water.
b) Construction of bore wells to deal with water crisis.
c) Financial aid to rural communities for their social and cultural enhancement.
d) Provision of sewing machines, clothes, chairs and ceiling fans to the needy people.
e) Community enrichment activities such as construction of approach roads and supporting the cultural activities by building stages etc.

Environment Conservation

- 45000 plantations done under "VRIKSHA MITRA MAHAABHIYAN-2008"
- 5 kms. Plantation done near Radiant Public School, Champaran Road, Raipur.
- Plantations done in 2009-10 inside & outside the premise of GPIL, and nearby villages of Tada & Siltara.
- 1500 plantations done at Yogshala, Siltara.
- 200 plantations at Sai Kripa Hospital, Siltara.
- 250 plantations at ITI Hathbandh.
- GPIL got 3rd position in Open Plantation Award, 2009, given by Urla Industrial Association.
- Further plantation is being done as per directives of State Government.

Sports

- Sponsored to Mr. Satya Prakash Masih (D.F.O.), Raigarh for participation in Asian Weight Lifting Championship held at Tashkent, Ujbekistan he won GOLD & SILVER medal.
- Sponsored Ms. Sangeeta Rajgopalan for participation in World Badminton Championship 2009 through C.G. Van Khel Kalyan Samiti.
- Sponsored Inter Distt. Sports Competition organized by J.L.H.S. School Siltara.
- Sponsored Cricket tournament at Dharsiva & Bojiya
- One of the sponsors for innumerable sports events in the remote rural areas as a form of recreation for the people and develop their skills.
- Financial assistance for Chhattisgarh State Cricket Sangh & Sports Associations.

The expenditure on various CSR activities by the company for the last five years is :

Year	**Expenses (In Lac)**
FY:2010-11	139.89
FY:2011-12	168.11
FY: 2012-13	80.81
FY: 2013-14	147.61
FY: 2014-15	155.56

Chapter - 12

Organization and Man power

GPIL is providing direct employment to more than 1000 workers. The local persons have been given preference in employment as per the qualification and technical competencies. Necessary training has been given to the unemployed youths of the nearby villages. Indirect employment opportunities have been created in the periphery of the plant automatically as the project started operation in the region. The manpower covers the top management, middle and junior level executives and other supporting staff including workforce.

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

Chapter - 13

Capital Cost

Sponge Iron Plant is a running unit. However, the total investment made in the entire manufacturing activities of Phase-I & II of the company as on 31st March, 2014 is Rs.569.50 Crores. No additional investment is proposed is proposed for this modernization & expansion.

Photographs of various Divisions of Godawari Power & Ispat Limited