Application for Environmental Clearance (EC)

PRE-FEASIBILITY REPORT

for

IRON ORE BENEFICATION PLANT
Location: Village-Gidhali, Tehsil : Dondi, Dist. Balod, Chhattisgarh

Submitted to

MINISTRY OF ENVIRONMENT & FORESTS (MoEF), NEW DELHI

PROJECT PROPOONENT

GODAWARI POWER & ISPAT LIMITED
Hira Arcade, Near Bus Stand, Pandri, Raipur - 492001, Chhattisgarh
Phone No. 0771 - 4082000, Fax No. 4057601

ENVIRONMENT CONSULTANT

POLLUTION AND ECOLOGY CONTROL SERVICES (PECS),
Dhantoli, Nagpur
Phone No. 0712 – 2442363, Fax no. 2459648

June-2015
# GODAWARI POWER AND ISPAT LIMITED

## PRE-FEASIBILITY REPORT

### Iron Ore Beneficiation Plant

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</table>
A. **PROJECT PARAMETERS & DETAILS:**

<table>
<thead>
<tr>
<th>Name of the Unit</th>
<th>GODAWARI POWER &amp; ISPAT LIMITED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Incorporation</td>
<td>21/09/1999</td>
</tr>
<tr>
<td>Regd. Office</td>
<td>Plot No. 428/2, Phase-I</td>
</tr>
<tr>
<td></td>
<td>Industrial Area, Siltara,</td>
</tr>
<tr>
<td></td>
<td>RAIPUR (Chhattisgarh)</td>
</tr>
<tr>
<td>Plant Location</td>
<td>Village : Gidhali,</td>
</tr>
<tr>
<td></td>
<td>Tehsil : Dondi, District: Balod,</td>
</tr>
<tr>
<td></td>
<td>Chhattisgarh</td>
</tr>
<tr>
<td>Contact person</td>
<td>Shri T Bose</td>
</tr>
<tr>
<td>Tel No.</td>
<td>0091-771-4082736 / 4082000</td>
</tr>
<tr>
<td>Mobile No.</td>
<td>09993000739</td>
</tr>
<tr>
<td>Fax No.</td>
<td>0091-771-4057601</td>
</tr>
<tr>
<td>Capacity</td>
<td>Iron Ore Beneficiation – 9,00,000 TPA</td>
</tr>
<tr>
<td>Working days/year</td>
<td>330 days</td>
</tr>
<tr>
<td>Completion Date</td>
<td>6 months from zero date.</td>
</tr>
<tr>
<td>Land Area</td>
<td>0.2479 ha. for proposed Iron Ore Beneficiation Plant out of existing land of 19.550 ha.</td>
</tr>
<tr>
<td>Man-Power</td>
<td>Total - 80 Nos (Existing &amp; Proposed)</td>
</tr>
<tr>
<td>IEM No.</td>
<td>2861/SIA/IMO/2007 dated 05.10.2007</td>
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</tbody>
</table>
### B. PROJECT COST & FINANCING:

(Rs. in Lakhs)

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>PARTICULARS</th>
<th>PROJECT COST</th>
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<tbody>
<tr>
<td></td>
<td><strong>COST OF PROJECT</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LAND &amp; SITE DEVELOPMENT</td>
<td>100.00</td>
</tr>
<tr>
<td>2</td>
<td>FACTORY SHED, BUILDING &amp; CIVIL WORK</td>
<td>500.00</td>
</tr>
<tr>
<td>3</td>
<td>PLANT &amp; MACHINERY</td>
<td>3800.00</td>
</tr>
<tr>
<td>4</td>
<td>PRELIM &amp; PREOP EXP/IDC</td>
<td>100.00</td>
</tr>
<tr>
<td>5</td>
<td>CONTINGENCIES</td>
<td>50.00</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>4550.00</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>MEANS OF FINANCE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PROMOTERS CONTT.</td>
<td>(INTERNAL ACCRUALS/EQUITY)</td>
<td>1350.00</td>
</tr>
<tr>
<td>TERM LOAN</td>
<td></td>
<td>3200.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>4550.00</strong></td>
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</tbody>
</table>
CHAPTER – II
COMPANY / GROUP PROFILE

Godawari Power & Ispat Limited (GPIL) 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. Our group turnover is about Rs. 2800 Crores in FY 2013-14 with gross capital assets of about Rs.3200 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 the 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.

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.

Board of Directors

The Board of GPIL comprises following Directors:

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

**Company at a glance**

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 at Industrial Area, Phase-I, Siltara, Dist. Raipur, Chhattisgarh.

<table>
<thead>
<tr>
<th>Year</th>
<th>Particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Beginning of commercial operations with Sponge Iron Plant of capacity 1,05,000 TPA</td>
</tr>
<tr>
<td>2003</td>
<td>Fully operational - Sponge Iron Plant - 1,05,000 TPA with Steel Billets - 1,00,000 TPA &amp; Captive power generation - 18 MW</td>
</tr>
<tr>
<td>2003</td>
<td>Prospecting License for iron ore mining at Boria Tibbu in Chhattisgarh</td>
</tr>
<tr>
<td>2004</td>
<td>1st Phase expansion - Sponge Iron - 2,35,000 TPA, Steel Billet - 2,00,000 TPA, Captive power generation - 28 MW, Ferro Alloys - 16,500 TPA &amp; HB Wire - 1,00,000 TPA</td>
</tr>
<tr>
<td>2005</td>
<td>Name of the company changed from Ispat Godawari Ltd. to Godawari Power &amp; Ispat Ltd.</td>
</tr>
<tr>
<td>2005</td>
<td>Allotment of captive iron ore mines at Ari Dongri, Dist. Kanker (106.60 ha) &amp; Boria Tibbu, Dist. Rajnandgaon (110.0 ha) in Chhattisgarh</td>
</tr>
<tr>
<td>2006</td>
<td>2nd Phase expansion - Sponge Iron - 2,60,000 TPA, Steel Billets - 2,00,000 TPA, Captive power generation - 25 MW, Oxygen Gas Plant - 12,00,000 Cu.Mtr., Nitrogen Gas Plant - 45,00,000 Cu.Mtr. &amp; Fly Ash Brick Plant - 1,65,00,000 Nos.</td>
</tr>
<tr>
<td>2006</td>
<td>Successfully completed its initial public offering and its shares got listed on the BSE &amp; NSE</td>
</tr>
<tr>
<td>2006</td>
<td>First WHRB captive power plant (7 MW) became the first one in the world to be registered with CDM Executive Board for entitlement of carbon credits under the Kyoto Protocol</td>
</tr>
<tr>
<td>2008</td>
<td>Setting up of Iron Ore Crushing Plant at Gidhali of 12,00,000 TPA capacity</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>2009</td>
<td>Iron Ore mining operations started at Ari Dongri, Dist. Kanker.</td>
</tr>
<tr>
<td>2009</td>
<td>Further expansion for installation of 20 MW Biomass Power Plant, Iron Ore Beneficiation - 10,00,000 TPA, Rolling Mill - 3,00,000 TPA &amp; Arc Furnace - 5,000 TPA</td>
</tr>
<tr>
<td>2010</td>
<td>Commissioning of Iron Ore Pellet Plant of 6,00,000 TPA capacity</td>
</tr>
<tr>
<td>2011</td>
<td>Merger of R.R. Ispat Limited (having a Rolling Mill of capacity of 1,00,000 TPA), a wholly owned subsidiary of the company with Godawari Power &amp; Ispat Ltd. Subsequently, the name of R.R. Ispat Limited has been changed to R.R. Ispat (A Unit of Godawari Power &amp; Ispat Ltd.).</td>
</tr>
<tr>
<td>2013</td>
<td>Commissioning of Iron Ore Pellet Plant of 15,00,000 TPA capacity</td>
</tr>
<tr>
<td>2014</td>
<td>Mining operations started at Boria Tibbu Iron Ore Mines, Dist. Rajnandgaon.</td>
</tr>
<tr>
<td>2014</td>
<td>Expansion of Iron Ore mining from 106.60 ha to 138.96 ha with a total mining capacity of 14.05 lakh TPA at Ari Dongri, Dist. Kanker.</td>
</tr>
</tbody>
</table>

The current installed capacity of Godawari Power and Ispat Limited is -

<table>
<thead>
<tr>
<th>Category</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponge Iron</td>
<td>4,95,000 TPA</td>
</tr>
<tr>
<td>Steel Billets</td>
<td>4,00,000 TPA</td>
</tr>
<tr>
<td>Steel Rolled Products</td>
<td>2,00,000 TPA</td>
</tr>
<tr>
<td>Power (Coal/WHRB/Biomass/Wind)</td>
<td>75 MW</td>
</tr>
<tr>
<td>Ferro Alloys or Pig Iron</td>
<td>15,450 TPA or 33,000 TPA</td>
</tr>
<tr>
<td>Oxygen Gas</td>
<td>12,00,000 M3 per Annum</td>
</tr>
<tr>
<td>Nitrogen Gas</td>
<td>45,00,000 M3 per Annum</td>
</tr>
<tr>
<td>Fly Ash Plant</td>
<td>1,65,00,000 Nos. per Annum</td>
</tr>
<tr>
<td>Iron Ore Mining</td>
<td>21,10,000 TPA</td>
</tr>
<tr>
<td>Iron Ore Pelletizing Plant</td>
<td>21,00,000 TPA</td>
</tr>
<tr>
<td>Iron Ore Crushing</td>
<td>12,00,000 TPA</td>
</tr>
<tr>
<td>Iron Ore Beneficiation</td>
<td>10,00,000 TPA (under Commissioning Stage)</td>
</tr>
<tr>
<td>Rolling Mill</td>
<td>3,00,000 TPA (under implementation)</td>
</tr>
</tbody>
</table>
The following Environment Clearances were obtained from Ministry of Environment & Forests, New Delhi for our current projects at Siltara Industrial Area, Raipur, Chhattisgarh.

1) MoEF F. No. J-11011/326/2005-1A II (I) dated 02/03/2006
5) MoEF F. No. J-11015/384/2012-IA II(M) dated 12/12/2014

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

Consistent with the vision, GPIL, continually endeavors in mastering the techniques for improving the factors affecting their mission with environment, customers, benefits to society, public Image, philosophy & values, profitability & growth; pursuing innovation, Creativity, Diversity, environment excellence and change. We believe in blue ocean technology i.e., a sound strategy model to put technology to use in a commercial way inducting low cost process planning, preparing new technology road map benchmarking of process with world’s best to ensure desired outputs from the inputs.

Our Strategy
- To integrate the operation by setting up facilities for forward and backward value chain and emerge as integrated and leading player in the steel wire segment in organized sector with a complete value chain from Iron Ore to steel wire.
- To achieve economies of scale by setting up sizable manufacturing facilities.
- To gainfully utilize waste generated during the process of manufacturing and maximize the return for shareholders.
- To foray into higher value added products such as alloy and stainless wires with total integrated facility of producing finished wire from Iron ore.
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

Group Companies

**Hira Cements Limited (HCL):**
Hira Cement Ltd. is a Cement Grinding Unit set up in 1988 with a current capacity of 42,500 tonnes per annum. The plant is located in Urla Industrial Area, Raipur and has a good market.

**Hira Ferro Alloys Limited (HFAL):**
HFAL has set up the first unit in India to commercially manufacture Ferro alloys in small electric arc furnaces. Our group was the first in India to break this monopoly and develop in-house technology by own Research and Development to produce Silico Manganese in a small furnace.
The first unit of HFAL came into production from October 1990 for a capacity of Ferro Manganese of 8000 TPA. The plant has gone for expansion and the current capacity is 10,500 MT per annum of Ferro Alloys. The second unit of HFAL has a captive thermal power plant of capacity 20 MW, Biomass power of 8.5 MW, Ferro Alloys of capacity 50,000 TPA and a Fly Ash Brick manufacturing facility of capacity 3,00,000 MT per annum.

**Alok Ferro Alloys Limited (AFAL):**
AFAL is the second Ferro Alloys plant of the group. The plant went into production in March, 1995 manufacturing Ferro chrome & Silico manganese with a capacity of 14,500 MT per annum. AFAL has also set up Captive Power Plant of 8 MW capacity.
**Hira Steels Limited (HSL):**
The group made its first foray into Iron & Steel by setting up a state-of-the-art fully automatic, high speed wire rod mill & wire drawing unit with an installed capacity to produce 42500 MT of Wire rods & 20000 MT of wires. The current capacity of the plant is 1,20,000 MT per annum of Wire Rods & 60,000 MT per annum of HB Wires.

**Jagdamba Power & Alloys Ltd (JPAL):**
JPAL located at Murethi, Siltara Industrial Area, Raipur is having a capacity of 25 MW Thermal Power plant. The unit was commissioned in March, 2007 and is selling all its power to the Electricity Board Grid.

**Ardent Steel Limited**
ASL is the subsidiary of M/s. Godawari Power and Ispat Limited, a company incorporated under the Companies Act in April, 2007. The company has established a 0.6 MTPA Iron Ore Pelletization Plant in Keonjhar District, Orissa, India. This was a step towards value addition to the iron ore mines deposits with some soft ore in the Gandhamardhan and other nearby deposits of Keonjhar district, Odisha.

**Godawari Green Energy Limited**
The company has recently commissioned the First Concentric Solar Power Project of 50 MW capacities under the Jawaharlal Nehru Solar Mission Phase-I at Village Nokh, Tehsil- Pokhran, District Jaisalmer, Rajasthan.
The unit has successfully started injecting power to the National grid on World Environment Day, the 5th June, 2013 and subsequently the commercial operations were started from 19th June, 2013.
CHAPTER – III

PROPOSED PROJECT

The company is operating an Iron Ore Crushing unit of 12,00,000 TPA capacity situated at Village : Gidhali, Near Kusumkasa, Tehsil : Dondi, Dist. Balod, Chhattisgarh.

We now propose to modify the existing iron ore crushing unit into an Iron Ore Beneficiation plant of 9,00,000 TPA capacity in the same location.

Existing Iron Ore Crushing Plant

The iron ore from our captive mines of Ari Dongri Dist. Kanker and Boria Tibbu, Dist. Rajnandgaon is received by dumper / trucks to our Iron Ore Crushing site at Gidhali. The ROM is presently in the size range of 0 to 1000 mm. They are crushed to required size of 5 to 25 mm in the iron ore crushing plant.

Proposed Iron Ore Beneficiation:

The proposed beneficiation plant of 9,00,000 TPA is for beneficiation of rejects of existing crushing plant as also iron ore from our captive mines at
(1) Ari Dongri, Dist. Kanker, Chhattisgarh and
(2) Boria Tibbu, Dist. Rajnandgaon, Chhattisgarh

The rejects received from iron ore mines and crushing plant needs to be concentrated for upgradation of Fe content through the process of beneficiation. This is a physical process to reduce the non-ferrous impurities.

The beneficiated iron ore will be loaded from Kusumkasa common railway siding (3 KMs from Gidhali) to private railway siding Mandhar (5 KMs from GPIL) for further use in our DRI / Pelletizing Plant at our Siltara unit, Raipur.
**Production Program**

The production program of the proposed Iron Ore Beneficiation Plant is 9,00,000 TPA. The annual average production hours considered is 5000 hrs based on two shift basis in 300 days / year of plant operation. The required production rate is 180 tph.

**Location**

The site for the proposed Iron Ore Beneficiation Plant is at Village : Gidhali, District : Balod at the existing crushing facility. Out of existing area of 19.550 ha., an area of 0.2479 ha. will be utilized for setting up the beneficiation plant. No additional land will be required.

Longitude : E 81° 05’ 22.41”
Latitude : N 20° 40’ 18.33”
Topo Sheet No. 64-H/2 of Survey of India

**Rationale for layout**

The general layout of the proposed plant has been developed keeping in the view the following factors :
- Shape and size of the proposed site
- Communication approach to the plant.
- Smooth and uninterrupted flow of materials.
- Optimum lead for transport of material and for services lines.
- Predominant wind direction.
- Logistic approach in location of technological units as well as services facilities.
- Adequate green belt all around the plant.
- Provision for future expansion.
LAYOUT MAP OF PROPOSED IRON ORE BENEFICIATION PLANT AND EXISTING IRON ORE CRUSHING UNIT
CHAPTER – IV

MANUFACTURING PROCESS OF IRON ORE BENEFICIATION

BASIC RAW MATERIALS

Iron ore

India occupies sixth position in the world's Iron-ore reserves and is one of the major Iron-ore producer and exporter due to availability of quality ore and skilled mining personnel. India's Iron ore reserve is around 25,249 million tonnes (MT) apart from Banded Hematite-Quartzite (BHQ) and Banded Hematite Jasper (BHJ). Although India is blessed with large reserves of Iron ore containing average grade around 58% Fe, the performance of blast furnaces has been at lower levels in comparison with the developing countries. This has been mainly due to the presence of high levels of impurities such as silica and Alumina in the raw material contradicting to the blast furnace chemistry.

Iron and steel industry is challenged by ever increasing commodity prices and a consequent need to reduce the capital and operation costs, besides meeting environmental regulations which get more stringent with time. The low grade iron ore has to be beneficiated for further processing.

The need for beneficiation / concentration stages is due to the fact that through simple processes of separation by size one cannot obtain products with high Fe. In general, silica, alumina and other pollutants get liberated with finer fractions. This characteristic permits the crude fraction to generate a final product with a natural segregation of impurities.

Beneficiation is processing the ore to regulate the size and quality of the product thereby removes unwanted constituents to improve Fe. Basically the process involves crushing the rock to a fine-grain size, then mechanically removing the iron minerals from the waste material. Magnetite can be removed from the siliceous waste materials by electromagnets. Hematite requires a more sophisticated process for concentration by physical and chemical separation.
Beneficiation includes selection of effective crushing and grinding technologies, wet and dry beneficiation, and the control of moisture levels in material.

A wet beneficiation plant is for producing high-grade iron ore concentrate requires screens, grinding mills, spirals, hydrosizers / hydrocyclones, magnetic separators, agitators, floatation, filters and thickeners.

**Process of existing Iron Ore Crushing Plant**

The iron ore from our captive mines of Ari Dongri Dist. Kanker and Boria Tibbu, Dist. Rajnandgaon is received by dumper / trucks to our Iron Ore Crushing site at Gidhali. The received ROM is presently in the size range of 0 to 1000 mm. They are crushed to required size in the iron ore crushing plant as per following process:

- The ROM is fed onto the ground hopper, in combination of pay loader and dumpers.
- The Grizzly Feeder fitted below the ground hopper separates the (+) 200 mm lump ore and fed to Super Primary Jaw Crusher.
- In the Super Primary Jaw Crusher, the ROM reduced to (-) 200 mm and will be returned to Grizzly Feeder.
- From Grizzly Feeder (-) 200 mm size ore fed to Double Deck Primary Vibrating Screen where the ore separates to (+) 80 mm and fed to Primary Jaw Crusher. The (-) 80 mm material fed to Secondary Triple Deck Vibrating Screen.
- Further, the Secondary Triple Deck Vibrating Screen separates to 40 to 80 mm and fed to Secondary Jaw Crusher and 25 to 40 mm fed to Cone Crusher and 0 to 25 mm fed to Secondary Double Deck Vibrating Screen.
- Secondary Double Deck Vibrating Screen separates the two product – first product of size 5 to 25 mm is fed separately to belt type magnetic separator & separates high magnetic concentrate which forms product-1 (fe 63%) of crushing & screening circuit. The high magnetic concentrate is dispatched to Siltara plant for use in DRI. The low magnetic concentrate (fe 55%) is fed to ball mill for beneficiation. Similarly, the second size of vibrating Screen 0-5 mm is passed through belt type magnetic separator, which forms product-2 (fe 64%) of crushing & screening circuit. This
Godawari Power & Ispat Limited (Iron Ore Beneficiation Plant)  Pre-feasibility Report

product-2 is dispatched to Siltara plant for use in Pellet Plant. The low magnetic concentrate (fe 53%) is fed to ball mill for beneficiation.

Iron Ore Beneficiation Process & Equipments

The rejects received from iron ore mines and crushing plant needs to be concentrated for up gradation of Fe content through the process of beneficiation. Such an up gradation is done by elimination of unwanted gangue materials mainly Silica (SiO$_2$) and Alumina (Al$_2$O$_3$) and few other trace elements found in the iron ore.

Primarily, the method of beneficiating iron ore fines includes washing out and eliminating the gangue constituents at every stage of the beneficiation process.

The typical steps in the process are as under:

- Feeding of Raw material: Reject Iron ore (0 to 25 mm) size is fed into the Raw material hopper which is further discharged through a slide gate and vibrating feeder to the Desliming Hopper 1 & 2. Hopper-1 is for size 0-5 mm & hopper is for size 5-25 mm. Both hopper feed two desliming screens of two jigs i.e. Fines Jig (for size 0-5 mm) & Lump Jig (size 5-25 mm).

- Desliming Screen: Hopper 1 & 2 feed at desliming screen 1 & 2 removes -1 mm fraction. At desliming screen sizing of ore takes place. +1-5 mm sized ore get transferred into the Jig which further facilitates gravity separation of the material. The (-1mm) shall transferred into the Thickener which may be considered on tailings.

- Jigging: The over sized from desliming screen i.e. +1mm goes to lumps & fines jig from where we get two streams, one is product 1 solid lumps which is used in sponge iron unit and the second is reject 1 which goes to the ball mill for further grinding. Finally we receive Product no. 1 i.e. concentrated with Fe % 62. Similarly the fines 0-5 mm is feed to fines jig & we get Product 2 which is fines of Fe 63.5% & is a
product for pellet plant. The reject 2 is feed to ball mill for further grinding & beneficiation.

- Ball mill : Rejects from both jig unit is transferred into the ball mill for further sizing. Here the material is grinde to size of 140 micron for beneficiation.

- Ball mill Thickener : The thickener & agitator shall be installed for slurry preparation for feed to LIMS.

- Product & Reject Thickener : One Thickener for filter press feed from product of LIMS + MIMS + WHIMS & another for tailings of WHIMS shall be installed. Concentrate shall be agitated in agitator & feed to filter press for dewatering. Similarly tailing shall be feed to other filter press through agitator for dewatering.

- LIMS :- The grinded product of ball mill shall pass through Low Intensity Magnetic Separator where the high magnetic shall be separated. This will be product - 3

- MIMS: The reject material from the LIMS goes to the Medium Intensity Magnetic Separator, where it is separated and the product (4) goes to product thickener.

- WHIMS : The tailing from the MIMS is send to the Wet High Intensity Magnetic separator, where material is again separated into the product (5) which goes to the Product Thickener.

- Wet Screen :- The Ball mill product shall be feed to wet screen for screening at 140 micron, oversize shall be back to ball mill.

- Filter Press : The product from LIMS + MIMS + WHIMS & the tailing from the WHIMS and the underflow from the wet screen goes to the filter press from where the separation of water and sludge takes place. The remaining process water is reclaimed and recycled into the ball-mill.
DESCRIPTION OF JIG

General Design Considerations:

Separating of minerals in jigging machines is based on the fact that particles will stratify in pulsating water. The upward and downward currents fluidize and compact the grains into relatively homogenous layers. Low density pieces stratify on the surface while specifically heavy grains settle to the lower level of the bed. The most precise stratification of particles requires, that the frequency and amplitude of the water pulsation - which may be adjusted during operating - will be optimized according to feed characteristics.

Jigging machines are air-pulsed, because in this way a pulsation of the water may be achieved wear-free and the stroke motion (frequency and amplitude) can be adjusted within wide parameters. The fully automatic discharge control ensures, that the discharge gate only removes clean material from the reserve layer.

The two main criteria for excellent jigging results are the jig bed stratification and the product discharge control. Jigging machines are equipped with a special designed jig body in order to perform an even and smooth water movement across the jig. The laterally pulsed jig guarantees an all time physical stable system with less energy consumption, maintenance and wear. The air-cycle diagram is created by rotary piston slides which can be adjusted according to process requirements of feed material.

After stratification the discharge of the refuse done by a movable bed discharge system. The discharge is controlled by analogue measurement systems which allow simple and exact detection of gravity horizons and its continuous discharge.

Generation of Water Movement

The technology typically utilizes rotary valves to precisely control the inlet and exhausting of air to and from the jig chambers.
Rotary piston valves in air-pulsed jigs serve to admit and discharge the operating air for the generation of the stroke/water movement depending on the operational requirements. In comparison to other control systems the rotary piston affords the advantage of a simple, low maintenance, easily controllable system, with minimal wear.

Rotary piston valves largely render electronic and pneumatic control equipment superfluous without limiting the controllability and possible variations of the operating air cycle diagram. In this context the outstanding accuracy and consistency of operation of the rotary slide must be emphasized.

**Advantages of Jig**
- Air pulsed jig with minimum energy consumption
- Optimized with regards to flow pattern in the hutch
- Computer simulated jigging bed movement
- Jigging stroke control by rotary valves
- Single or multiple stage pulsation
- Fully automatic operation with analogue measurement of bed depth
- Operation parameters adjustable during operation
- Capacities up to 700 tph per unit
- Size range of feed 0.1 to 150 mm
- High efficiency
- Low maintenance
- Large feed size range
- High capacity
- Sharp separation
- Reduced energy and investment costs
- Reliability
- Easy to operate
FILTER PRESS

The plate filter press is solid - liquid separating equipment working on the principle of pressure feeding. The filter press is designed to give maximum filtration efficiency among the all dewatering equipments and least maintenance with longest life. The compact filter presses are designed to de-hydrate sludges to ease transport, storage or valorization.

The filtrate can be directly used as clarified recycle water as all the solid contents are separated out in the form of cake. This reduces the time of clarifying the water and the solves the problem of sludge disposal as the conventional slime ponds which incurs high capital and operating cost and bound to follows pollution control norms. The difficulties of slurry handling and slime disposal are greatly reduced.

Features and Benefits:
- Compact size
- Shorter cycle time
- Increased dry solids
- Reduced filtration time
- Easily replaceable
- Lowest waste disposal cost
- Lower operating cost
- Excellent cake discharge
- Higher quality and valued end product

It consists of a series of filter plates and frames or recessed plates arranged parallely and fitted on conventional cast iron or MS structures. The filter medium is provided in between the plates. A filter pump is applied to feed the mother liquor consisting of solids and liquids through the feed nozzle of the filter press to the chambers formed between the plates and filter medium, leaving the solid trapped inside and the liquid drained out. Compared to the other filtering equipments, the filter press holds more solids and have more filtering area with washing conveniences.
PROCESS FLOW SHEET
CHAPTER – V

UTILITIES

POWER, FUEL, WATER, UTILITIES:

1. Power:
   The unit will consume about 2.0 MW of power. The power will be consumed from the State Electricity Board (CSPDCL).

2. Water:
   The water consumption for our existing Iron Ore Crusher is 62 KL/day
   The plant will require 288 KL of water per day (make-up water) for the proposed Iron Ore Beneficiation Plant.
   The water will be sourced from nearby Keshla (Jhurjhura) Nalla from the sanction of 1.0 MCM for drawl of water. The sanction for withdrawal of water has been obtained from the Water Resources Department, Chhattisgarh vide letter No. 6554/29/14/2000 dated 11/09/2012.

3. Utilities:
   Due to a number of moving equipment, lubricants will be required at various stages of the process.

4. Raw Materials:
   The requirement of iron ore will be met from captive mines Ari Dongri & Boria Tibbu and the same would be transported to the Iron Ore Crushing Unit at Gidhali where the ore would be crushed and screened to 5-25 mm & 0-5 mm and thereafter the sized ore and fines will be beneficiated in the proposed Iron Ore Beneficiation plant for further use in our DRI / Pelletizing Plant at our Siltara unit, Raipur.

*Ari Dongri Iron Ore Mine*

Ari Dongri iron ore mine is located at about 40 km from the proposed Iron Ore Beneficiation Unit, Gidhali. The deposit has been explored in detail and about 3 Mt reserves of iron ore have been proved. In order to meet the requirement of iron ore of the
desired specifications, expansion of mine with mechanization is necessary. The quality of ROM Iron Ore from this deposit is as follows.

Fe : > 65%  
$\text{Al}_2\text{O}_3$ : 1.5 – 2.5%  
$\text{SiO}_2$ : 2.0 – 3.5%  
LOI : 1.8 – 3.0%

*Boria Tibbu Iron Ore Mine*

Boria Tibbu iron ore mine is located at about 30 km from the proposed unit at Gidhali. The deposit has been explored in detail and about 3 Mt reserves of iron ore have been proved. In order to meet the requirement of iron ore of the desired specifications, expansion of mine with mechanization is necessary. The quality of ROM Iron Ore from this deposit is as follows.

Fe : > 64%  
$\text{Al}_2\text{O}_3$ : 2.0 – 2.5%  
$\text{SiO}_2$ : 2.0 – 3.5%  
LOI : 3.0 – 4%

Road Transportation of Ore from Mines to Gidhali by means of Dumpers has been considered for crushing and beneficiation.

**MATERIAL BALANCE:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Qty. (MT)</th>
<th>Material</th>
<th>Qty. (MT)</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Ore</td>
<td>9,00,000</td>
<td>Beneficiated Ore</td>
<td>7,20,000</td>
<td>For Sponge Iron manufacturing</td>
</tr>
<tr>
<td>Rejects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron Ore Fines</td>
<td>1,08,000</td>
<td></td>
<td>1,08,000</td>
<td>For Pellet Plant</td>
</tr>
<tr>
<td>Tailings</td>
<td></td>
<td></td>
<td>72,000</td>
<td>Will be used partially for embankments, road formation filling of low laying areas and partially as additives in cement plans.</td>
</tr>
<tr>
<td>Total</td>
<td>9,00,000</td>
<td>Total</td>
<td>9,00,000</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER - VI

SITE & INFRASTRUCTURE

Location
The site for the proposed Iron Ore Beneficiation is at Village : Gidhali, District : Balod in Chhattisgarh. In the existing area of 19.550 ha., an area of 0.2479 ha. will be utilized for setting up the proposed plant.
Longitude : E 81°05’ 22.41” Latitude : N 20° 40’ 18.33”
Topo Sheet No. 64-H/2 of Survey of India

Terrain and land

The terrain of the land is almost plain. The total land is free hold land and owned by the company.

Land and Site Development

The proposed plant will be set up on the freehold land area. Accordingly the site will be developed. Geographic condition is as the base of foundation design. Detailed soil investigation shall be conducted in construction drawing design stage.

The site is generally leveled. The area is not flood prone. The site terrain is generally plain requiring minimum efforts to grade them. Suitable foundation, based on soil investigation results, will be adopted.

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.
Area Statement:

- Built up Area for existing Iron Ore Crushing Unit: 1.3850 Ha.
- Area for proposed Iron Ore Beneficiation Plant: 0.2479 Ha.
- Green Belt & Plantation (33% of total land area): 6.8425 Ha.
- Uncovered Area: 11.0746 Ha.
- Total Land Area: 19.550 Ha.

Khasra Details

<table>
<thead>
<tr>
<th>Khasra Nos.</th>
<th>Area in Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>1.61</td>
</tr>
<tr>
<td>46</td>
<td>2.62</td>
</tr>
<tr>
<td>47</td>
<td>1.88</td>
</tr>
<tr>
<td>59</td>
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<tr>
<td>58</td>
<td>0.63</td>
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<tr>
<td>61</td>
<td>0.81</td>
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<tr>
<td>62</td>
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<tr>
<td>41</td>
<td>2.17</td>
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<tr>
<td>60</td>
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<tr>
<td>70</td>
<td>0.92</td>
</tr>
<tr>
<td>51</td>
<td>1.13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19.55</strong></td>
</tr>
</tbody>
</table>
CHAPTER - VII
CIVIL & STRUCTURAL WORKS

General

Civil work comprise all plant units, its auxiliaries, site leveling, roads, drainage, sewerage and all other infrastructure within the plant boundary. In general specification / details in respect of type of structures, grade of concrete, materials etc. for all major units have been assumed to be similar to standard practice of civil works.

Raw material handling system

- RCC substructures of hoppers, yard etc.
- RCC foundations for all other structures like day bins, junction houses, conveyor galleries, etc.

Other miscellaneous units

- RCC foundations for A/c and ventilation equipment, electrical equipments.
- Roads and roadside drains, culverts, etc.

Structural work

Structural steel work will cover all steel structures required in buildings, including crane girders, platforms, walkways, stairs, sheeting, etc., conveyor galleries, junction houses, dust catcher, pipelines and their supporting structures, and all other steel structures and sheetings required in different units envisaged for the project.
CHAPTER - VIII

ENVIRONMENT MANAGEMENT

Godawari Power & Ispat Limited has a well defined Environmental policy by which the company is committed to conduct business with strong environmental conscience towards community, customer & employees.

There is no fugitive emission in the beneficiation process since the process is wet process. The waste water generated from the process will be collected in the settling tank and re-circulated in the process through pumps for reuse. ‘Zero’ effluent discharge will be adopted. The low grade tailings from beneficiation process will be used in embankments, road formation, filling of low-lying areas and as additives in cement manufacturing. As such, there is no solid waste.

During Construction Phase :

Following measures will be adopted in order to mitigate the adverse environment impact during the construction phase:
- Regular sprinkling of the water will be done to suppress dust during construction activities.
- Regular preventing maintenance of machinery and transportation of vehicles will be done to reduce noise pollution.
- Provision of silencer, to modulate the noise generated by the machine, if required.
- The domestic sewage generated during the construction activity will be directed to septic tanks followed by soak pit.
- To protect the workers working in noisy area, personal protective equipments like earmuffs / earplugs will be provided.
- Reducing the exposure time of workers to the higher noise level by job rotation.
- Tree plantation will be proposed on the periphery of plant premises and along the roads.
- In the construction phase the direct and indirect manpower will be involved. Thus temporary and permanent employment will be generated during construction phase.

During Operational Phase:
The raw materials required for Iron Ore Beneficiation Plant will be stored in pucca platform with a provision of constructing garland, to ensure that there will be no fugitive dust emission. Closed conveyor belt system will be provided. Dust suppression system like fog type and mist water spray system will be installed in the material handling system and at transfer points to control fugitive emission in the beneficiation plant.

Air Pollution Control Measures
- Since the procedure of operation is based upon wet process, therefore the chance of fugitive emissions will be negligible since the fines have been eliminated in the process of crushing.
- However, the sprinkling of water will be done along the haul roads in the plant premises to control the dust arising due to the movement of vehicular traffic.

Water Pollution Control Measures
- Zero Effluent Discharge shall be adopted for the proposed project activity.
- The process will use rake classifiers for removing the residues and re-circulating the water.
- The waste water generated from the unit the dewatering screen and filter press will be collected in the settling tank and re-circulated in the process through pumps for reuse.

Noise Pollution Control Measures
- Adequate measures will be taken to keep noise pollution under control, as the company would be procuring DG set equipped with acoustic enclosures.
- Silencers and mufflers on construction equipment, wherever required, will be properly fitted and maintained.
- Earmuffs / Earplugs will be provided to the operators working in the high noise areas.
Green Belt Development

Adequate green belt has already been done in and around the existing plant premises. Locally available types of trees of 11000 Nos. which are resistant to pollutants are planted in and around the plant premises. In addition to above, all open spaces available within the premises will also be developed in more than 33% as nursery and other forms of greenery in the total project area. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas.
CHAPTER - IX
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 the nearby villages of Gidhali in the following fields.

In the field of Health:
GPIL always values its workers, employees and the community at large as its core assets and believes that it's their effort that is the driving force behind the success of the Group. Acknowledging their contribution, GPIL is committed towards positively impacting lives of people associated with GPIL in one way or another. We have undertaken various activities to fulfill the health care requirements of the people around.

- In attempt to extend diagnosis and medical treatment facilities to the villagers of Gidhali and nearby villages, GPIL organized Health Camps with following specialised doctors Gynaecologist, Physician, Surgeon and Ophthalmologist & General Practitioner. Following investigations were undertaken: ECG, Eye & Ear Check-up, Blood Test, Urine Test, Malaria Test, Sugar Test, Lung Function Test & X-Ray at various nearby villages of Gidhali.
- Agreement with Jyoti Hospital, Dalhi Rajhara & Medishine Hospital, Raipur for referral cases.
In the field of Education:

GPIL acknowledges education as one of the building blocks of any nation and lays special emphasis on imparting quality education. A number of initiatives have been undertaken in this respect. As part of its social initiatives, GPIL provides active financial support to the meritorious and needy students, deserving students who are unable to pursue their studies due to their financial condition.

- Started Free Computer Training at Gidhali and at Govt. Higher Secondary School of village Sahagaon.
- Running coaching classes for students of Gidhali
- Organised quiz, rangoli & essay writing competition for the students of govt. school of village, Sahagaon & Gainji.
- Formation of Youth Club at village Armurkasa, Killekoda & Agariyapara
- Organised quiz and other competitions for the students of Govt. Schools of village Pathratola, Jharantola, Killekoda, Armurkasa, Chipra, Gujra, Kusumkasa, Bharitola,
Ghurvatola, Danitola, Bhaisbod & Pingal. Prizes were distributed to all the winner students.

In the field of Infrastructure:
GPIL has undertaken the responsibility of infrastructure upgradation in the nearby villages of Gidhali has always endeavoured to take the necessary measures in this direction in order to ensure all conveniences in its areas of operation and in the lives of extended communities.
In the field of Community Development:
GPIL has undertaken the responsibility of community development in Gidhali and its nearby villages. GPIL has always endeavoured to take the necessary measures in this direction in order to ensure all conveniences in its areas of operation and in the lives of extended communities.

- 24 hour Bhandara for the Padyatris during Navratri at Rajnandgaon, Gidhali
- Felicitated Senior Citizen with Shawl, Umbrella & Shreefal of village Gidhali, Suwarbod & Baklitola.
- Shitala Mata Temple at Baklitola and Suwarbod was inaugurated in presence of all the villagers of Baklitola & Gidhali & Suwarbod.
- Inauguration & Bhandara of Shiv Temple at Suwarbod village of Gidhali
- Organised Pravachan by Swami Chandrapal Brahmacari Bhagwat Bhushanj Mahraj (Chhattisgarh Vendanta Sewa Ashram Gidhali) to motivate workers of Gidhali Plant
In the field of Environment Conservation:

An organization can only grow in a competitive environment when it addresses economic, social and environmental concerns with a focused approach. In order to make itself environment friendly at all levels, greenbelt cover in all of its plant locations. Various activities conducted under CSR for implementing environmental protection & environmental awareness projects. Our endeavours towards environment protection are water conservation programmes and extensive tree plantation drives.

- Huge Plantation done inside & outside plant premises of Crushing Plant area
- Deepening & cleaning of Ponds in nearby villages of Gidhali
- Environment Day celebration at GPIL, Gidhali Plant every year
- Plantation programme at Gram Panchayat of Gidhali. Gram Panchayat include Kusumkasa, Pathratola, Armurkasa, Ghurvatola, Suvarbod, Bhaishbod, Danitola, Gujra, Bharitola, Chipra, Ganji, Jatadah, Jharntola, Killaekoda, Pingal & Plant premises. Total 12650 nos of plants were planted during this programme.
In the field of Sports:

The importance of sports in the life of a young student is invaluable. Sports play a pivotal role in the makeup of a young athlete, especially in the middle school to high school years where student athletes are much more mature and mentally developed. GPIL provides active sponsorships & financial assistance for organizing weight lifting tournament to Chhattisgarh weight lifting association, Dalli Rajhara.

The expenditure on various CSR activities at GPIL, Gidhali and its surrounding villages for the last three years is:

<table>
<thead>
<tr>
<th>Year</th>
<th>Expenses (In Lac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY: 2012-13</td>
<td>12.41</td>
</tr>
<tr>
<td>FY: 2013-14</td>
<td>15.86</td>
</tr>
</tbody>
</table>
CHAPTER - X

MAN POWER REQUIREMENT

The company already has an existing set-up of trained manpower in all its divisions headed by professional and highly experienced executives. The company is also having a very efficient project management team.

However, on completion of the above project, the expected rise in employees will be higher from the existing number of 36 Nos employees. Hence, the number of employees are expected to rise up to 80 Nos.

The existing and proposed Manpower is as follow:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Category</th>
<th>Existing</th>
<th>Proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Managerial</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Technical</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Highly skilled</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>Skilled</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Semi- skilled</td>
<td>7</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>Un-skilled</td>
<td>12</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>7</td>
<td>Clerical</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
<td><strong>44</strong></td>
<td></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>
The Services of experienced consultants will be being utilized for detailed planning, preparation of techno-economic feasibility report and other associated activities like discussions with financial institutions, phasing of capital expenditure etc. Considering the existing expertise of the company, the company expects to adhere to the schedule. However, the implementation of the proposed projects primarily will depend upon statutory clearances including environmental clearances. If the environmental clearances is taken as the zero date, then the implementation schedule of installation & commissioning of the project will be as follows:

<table>
<thead>
<tr>
<th>Completion date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company formation Existing</td>
</tr>
<tr>
<td>Procurement of land Existing</td>
</tr>
<tr>
<td>Commissioning of Iron Ore Beneficiation Plant 6 months from zero date</td>
</tr>
</tbody>
</table>