PRE-FEASIBILITY REPORT 
FOR 
INCREASING THE PIG IRON 
PRODUCTION CAPACITY 
FROM 
188000 TPA TO 224000 TPA 
(19% INCREASE) 

AT 
GOPALPUR, DURGAPUR 
DISTRICT BURDWAN, WEST BENGAL 

APPLICANT 

NEO METALIKS Limited 
Registered Office: 71, Park Street 
3E, Park Plaza, North Block 
Kolkata – 70006 (WB) 

FEBRUARY 2018
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PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

EXECUTIVE SUMMARY

Background Information

M/s Neo Metaliks Limited is operating a Mini Blast Furnace (MBF) of 215 m³ capacity. The blast furnace produces 1,88,000 tons pig iron annually (TPA). The blast furnace gas is used to produce 4.5 MW power, which is used as captive power.

Consent to Establish the MBF was obtained from West Bengal Pollution Control Board (WBPCB) on 16-5-2005. The project cost was Rs. 82.15 Crores (below the threshold limit of Rs.100 Crores for obtaining Environmental Clearance). The Consent to Operate of the MBF was obtained from West Bengal Pollution Control Board (WBPCB) on 29-11-2006. The latest Consent to Operate dated 20-4-2017 is valid till 30-4-2022.

The company obtained EC for expansion of the pig iron plant vide letter No. J-11011/779/2007-IA.II(I) dated 4-1-2008. Following units are included in the EC.

1. Sinter Plant : Sinter – 300000 TPA
2. Bars and Rods in EAF : 369000 TPA
3. IF based SMS with LF and CCM : Cast Billets - 233000 TPA
4. EAF based SMS with LF and CCM : Billets – 384000 TPA

The Sinter Plant was commissioned on 2012. The company decided not to install the EAF, IF and SMS because of commercial reasons.

Location

Neo Metaliks Ltd is located in Industrial Area, surrounded by many steel units, namely VSP Udyog Ltd, Shyam Steel Ltd, Jai Venkatesh, Kejriwal Casting Ltd, Rudh Ispat Pvt Ltd., Sova Ispat Pvt Ltd., Ram Swarup Udyog Ltd, etc. The postal address of the plant is Post: Gopalpur, PS: Kanksa, Durgapur, District: West Burdwan 713212. The site is about 500 m away from NH2: Kolkata – Durgapur – Delhi.

Proposal

The blast furnace was commissioned in December 2006. In 2008 Neo Metaliks obtained Environmental Clearance (EC) for establishing Sinter Plant, Steel Melting Shop and Rolling Mill. Only Sinter plant has
been established where iron ore fines, coke fines and limestone fines are used to make sinter. The
company did not establish the Electric Arc Furnace, Induction Furnace, SMS and Rolling Mill.
Point xi (Specific Conditions) of EC letter No. J-11011/779/2007-IA.II (I) dated 4-1-2008 states “All the
recommendations made in the CREP for Steel Plans shall be implemented”. Point No. 9 of CREP for Iron
and Steel Plants mentions: The industry will initiate steps to adopt the following clean technologies /
measures to improve the performance of industry towards production, energy and environment
- Reduction of Green House Gases by promotion of energy optimization technology.
- To set targets for resource conservation such as raw material, energy and water conservation.

In order to implement CREP recommendations (energy optimization and conservation measure), M/s Neo
Metaliks Ltd has installed a Recuperator (Heat Recovery System) for Blast Furnace. The blast furnace
gas coming out from top of the furnace is cleaned in Gas Cleaning Plant and then reused in Stoves,
Power Plant and Sinter Plant. Stove Exhaust Gas, is used to pre-heat the combustion air and BF gas in
Recuperator, before venting through Stack. The pre-heated air, and BF gas is used in blast furnace stoves,
where CO rich BF gas acts as fuel to increase Hot Blast from 950°C to 1030°C.

In order to implement CREP recommendations (resource conservation such as raw material), M/s Neo
Metaliks Ltd proposes to use upto 67% sinter and 33% iron ore as burden in Blast Furnace. Sinter is a
self-fluxing material as it contains limestone and dolomite. Use of sinter will eliminate the requirement of
limestone as flux material and reduce the requirement of coke, dolomite and quartzite. This will enable
charging more sinter as burden in the furnace, resulting in extra hot metal production.
Increase in HBT will reduce the requirement of Coke in MBF. This will enable charging of more Iron
bearing Material (Sinter and Iron Ore), resulting in extra hot metal production.

Thus additional hot metal production will be achieved by
1. Using 67% sinter & 33% Iron ore as burden.
2. Using additionally available Hot Blast Temperature of 80°C.

Trials have indicated that hot metal production by above means would increase the productivity by 19%.
Justification is given below:

<table>
<thead>
<tr>
<th></th>
<th>Present production rate per day (per annum)</th>
<th>537 tons (188000 TPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>No of working days</td>
<td>350 days</td>
</tr>
<tr>
<td>3</td>
<td>Expected production per day (per annum) due to 67% sinter addition as burden</td>
<td>639 tons (224000TPA)</td>
</tr>
<tr>
<td>4</td>
<td>% increase in production per day</td>
<td>19%</td>
</tr>
</tbody>
</table>
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

<table>
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<tr>
<th></th>
<th>Present BF gas generation per day</th>
<th>52000 Nm³/hour (max)</th>
</tr>
</thead>
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<tr>
<td>6</td>
<td>Expected BF gas generation due to 67% sinter addition as burden</td>
<td>52000 Nm³/hour (max)</td>
</tr>
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</table>

**Theory of Increase in Productivity**

<table>
<thead>
<tr>
<th></th>
<th>For 1% sinter usage, coke rate reduces by</th>
<th>1.1 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>For 1 kg coke rate reduction, production increases by</td>
<td>1.25 tons</td>
</tr>
<tr>
<td>3</td>
<td>Expected % of sinter usage in burden</td>
<td>67%</td>
</tr>
<tr>
<td>4</td>
<td>Expected productivity increase per day</td>
<td>92.5 tons</td>
</tr>
<tr>
<td>5</td>
<td>For 10 deg rise of HBT, coke rate reduces by</td>
<td>1.0 kg</td>
</tr>
<tr>
<td>6</td>
<td>For 1 kg coke rate reduction, production increases by</td>
<td>1.25 tons</td>
</tr>
<tr>
<td>7</td>
<td>Rise in HBT due to Recuperator</td>
<td>80 deg C</td>
</tr>
<tr>
<td>8</td>
<td>Expected productivity increase per day due to rise in HBT</td>
<td>10 tons/day</td>
</tr>
<tr>
<td></td>
<td>Total Production raise per day</td>
<td><strong>102.5 T/day</strong></td>
</tr>
</tbody>
</table>

**Process Description: Blast Furnace**

Blast furnace (BF) is an enclosed vertical furnace into which the raw materials and fluxes enter at the top, while the products (molten iron and slag) are tapped from the bottom (the hearth). The raw materials (iron ore and sinter) and additives (slag former, such as limestone) is called the “burden”. The burden and coke are fed into the top of the furnace via a sealed charging system to prevent furnace gases from escaping. Coke reduces iron ore to iron and supplies heat for reaction. Iron ore gets converted to iron and impurities are converted to slag. The solid burden moves downwards, counter current of a rising stream of hot reducing gas. The hot reducing gas is provided by hot stoves and is needed to transfer heat to the solid burden. The BF gas (having significant CO) is collected from the top of the furnace for treatment and reuse.

The blast furnace is periodically tapped to remove the hot metal and slag from the hearth. For this purpose, a tap-hole is opened in the side wall of the hearth. The slag and hot metal from the furnace flows along the refractory covered runners and they are subsequently separated at the skimmer in the cast house, after which each continues in a separate runner. Slag flows in runners to slag granulation plant. At the end of casting cycle, the tap hole is closed by injecting a heat resistant tap hole clay mixture, using a so-called “mud gun”. The molten iron is converted to pigs in Pig Casting Machine.
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Blast furnace gas is presently reused as fuel in the blast furnace stoves. Surplus BF gas is used as source of heat in other process (ladle heating and in sinter plant) and balance to generate power using turbine. The provision of flare stack with auto ignition device has been kept to burn the BF gas during any emergency condition.

Transportation of raw material from storage yard to the stock house is done by closed belt conveyors. The raw materials are distributed into the respective bunkers through shuttle conveyors located at the top of the stock house bunkers. All materials, stored in different weigh hoppers is charged sequentially into collecting conveyors which is discharged into common charging conveyor which in turn feed the material to the blast furnace top charging equipment.

Pollution Control Equipment

Gas Cleaning Plant: The BF gas coming out of the BF top is cleaned using dust catcher followed by 2-stage wet ventury scrubber. The cleaned BF gas is sent for further reutilization. The slurry is taken in a treatment plant for settling and dewatering. The water used in scrubber is recycled. The residual solid is reused in sinter plant. The dust content of treated BF gas is less than the prescribed limit of 50 mg/Nm³. The stack height of blast furnace is 30 m.

Plant Dedusting System: The dust generated in stock house and cast house is passed through dedusting system comprising extraction system, ducts and bag filter.

Blast Furnace Gas Balance

The BF gas generation is 52000 Nm³/hour (max). It is reused in following manner:

i. Used in CPP for power generation: 25500 Nm³/hour
ii. Reused in stoves: 22000 Nm³/hour
iii. Used in Ladle heating: 1000 Nm³/hour
iv. Used in sinter plant: 3500 Nm³/hour

Total: 52000 Nm³/hour

Thus, there is no CO gas to bleed in the atmosphere.
PFR for increasing the production capacity of blast furnace from 1, 88,000 TPA to 2, 24,000 TPA

Raw Materials

Iron ore is purchased from mines located in Odisha. Coke is imported. Limestone, Dolomite, Quartzite and Manganese ore is purchased from local traders. Transportation of raw materials and finished product is done by road.

Material Balance of 1,88,000 TPA and 2,24,000 TPA Production

<table>
<thead>
<tr>
<th>INPUT (Name and Quantity in TPA)</th>
<th>OUTPUT (Name and Quantity in TPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Quantity for 188000 TPA</td>
</tr>
<tr>
<td>Iron ore (60-64% Fe)</td>
<td>319600</td>
</tr>
<tr>
<td>Coke</td>
<td>141000</td>
</tr>
<tr>
<td>Limestone</td>
<td>18800</td>
</tr>
<tr>
<td>Dolomite</td>
<td>13160</td>
</tr>
<tr>
<td>Quartzite</td>
<td>5640</td>
</tr>
<tr>
<td>Manganese Ore</td>
<td>1880</td>
</tr>
<tr>
<td>Sinter 50-55% Fe</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>500080</td>
</tr>
</tbody>
</table>

Material Handling and Transportation

<table>
<thead>
<tr>
<th></th>
<th>Existing Material Handling</th>
<th>Proposed Material Handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Incoming Raw Materials</td>
<td>500080 TPA</td>
</tr>
<tr>
<td>2</td>
<td>Outgoing Product</td>
<td>188000 TPA</td>
</tr>
<tr>
<td>3</td>
<td>Outgoing BF Slag</td>
<td>56400 TPA</td>
</tr>
<tr>
<td>Total</td>
<td>744480 TPA</td>
<td>602780 TPA</td>
</tr>
<tr>
<td>Truck movement 28 tons capacity truck</td>
<td>75 trucks per day</td>
<td>61 trucks per day</td>
</tr>
</tbody>
</table>

Water

M/s Neo Metaliks Ltd has obtained permission from Asansol Durgapur Development Authority for supply of 2090 m$^3$/day water. The company has obtained permission from State Water Investigation Directorate to draw up to 320 m$^3$/day ground water for domestic use.
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Water Balance of the Plant

<table>
<thead>
<tr>
<th>Water Requirement (Make-up)</th>
<th>Quantity (m³/day)</th>
<th>Wastewater (m³/day)</th>
<th>Wastewater Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MBF Shell Cooling</td>
<td>150</td>
<td>15</td>
<td>Cooling tower blowdown used as makeup water for SGP</td>
</tr>
<tr>
<td>2 Pig Casting Machine</td>
<td>220</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>3 Slag Granulation Plant</td>
<td>480</td>
<td>NIL</td>
<td>100% recycled through settling tanks</td>
</tr>
<tr>
<td>4 Gas Cleaning Plant</td>
<td>80</td>
<td>NIL</td>
<td>100% recycled through settling tanks</td>
</tr>
<tr>
<td>5 Cooling water for CPP</td>
<td>480</td>
<td>48</td>
<td>Cooling tower blowdown used as makeup water for SGP</td>
</tr>
<tr>
<td>6 CPP Boiler</td>
<td>50</td>
<td>2.5</td>
<td>Used as makeup water for SGP</td>
</tr>
<tr>
<td>7 Sinter Plant</td>
<td>300</td>
<td>NIL</td>
<td>100% evaporated and in process</td>
</tr>
<tr>
<td>8 Domestic use</td>
<td>120</td>
<td>96</td>
<td>Treated and disposed in soak pits</td>
</tr>
</tbody>
</table>

There will be no increase in consumptive water requirement after the proposed production capacity enhancement.
Pollution Load Statement

<table>
<thead>
<tr>
<th>Component</th>
<th>Pollution Load after capacity enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Land Area</td>
<td>There will be no increase in land area</td>
</tr>
<tr>
<td>2 BF layout</td>
<td>There will be no physical expansion, hence no change in BF layout</td>
</tr>
<tr>
<td>3 Water Consumption</td>
<td>There will be no increase in water consumption</td>
</tr>
<tr>
<td>4 Wastewater Discharge</td>
<td>Entire wastewater from the complex will be treated and recycled and reused. There will be no discharge of wastewater outside the plant premises.</td>
</tr>
<tr>
<td>5 Gas Cleaning Plant</td>
<td>There will be no increase in dust content or gas volume, hence the existing GCP capacity is adequate to meet the enhanced production. Entire wastewater from GCP will be recycled.</td>
</tr>
<tr>
<td>6 Air Environment</td>
<td>Since sinter addition in Blast Furnace will increase to 67%, iron ore and flux handling / requirement will reduce, hence dust and sludge generation will not increase. The Bag Filter of cast house have adequate margin to take care of additional 19% load. The Pig Casting Machine have additional capacity to take care of extra 19% productivity. Existing Bag Filters and Gas Cleaning Plant will be adequate because the dust and sludge generation will not increase. 100% dust collected from the pollution control equipment will be reused in the sinter plant</td>
</tr>
<tr>
<td>7 BF Slag</td>
<td>Slag generation will increase due to increased use of Sinter in burden. (56400 TPA to 78400 TPA). The SGP has adequate margin for granulation of additional slag. 100% BF slag will be granulated and sold to cement plants. MOU for lifting of additional slag (22000 TPA) is available.</td>
</tr>
<tr>
<td>8 Truck movement</td>
<td>Truck movement will reduce from existing 75 to 61.</td>
</tr>
<tr>
<td>9 Manpower requirement</td>
<td>There will be no change in staff structure</td>
</tr>
<tr>
<td>10 Project Cost</td>
<td>No increase in project cost</td>
</tr>
</tbody>
</table>
1. **Introduction of Project / Background Information:**

   (i) **Identification of Project and Project proponent.**

   **Name of Project:** Production Capacity Enhancement of Pig Iron from 1,88,000 TPA to 2,24,000 TPA.

   **Category of Project:** “A” Category.

   **Project Proponent:** Neo Metaliks Limited (Kolkata)

(ii) **Brief description of nature of the project:**

   The volume of existing blast furnace is 215 m$^3$. The existing production capacity is 1,88,000 TPA. It has been observed from the existing BF as well as similar BF technology installed at other plants in India that through appropriate process optimization the production capacity could be increased by 19% to 2,24,000 TPA. This could be achieved by increasing the sinter burden in BF, thereby reducing the coke and flux addition and using hot blast of 1030°C. The extra volume available in BF could increase productivity of hot metal

   There will be no change in the general process, layout and water consumption. The plant area will remain same. Technically, the air pollution load will decrease.

(iii) **Need of Project and Importance to the Country or Region:**

   Sustainability and economic viability of the project will increase and we will be able to compete with China and CIS countries whose production and selling cost is cheaper than Indian steel. Air pollution load will
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

decrease. There will be optimum utilization of natural resources. Carbon foot print and GHG emission will decrease.

(iv) Demand – Supply Gap:

Demand of Pig Iron has started picking up in India.

(v) Imports Vs Indigenous production:

100% indigenous production

(vi) Export Possibility:

Yes. Nearest port is Haldia, which is connected to Durgapur by road and rail.

(vii) Domestic / Export Markets:

The project is located close to Haldia Port. This will enhance the export chance by remaining cost competitive.

(viii) Employment Generation (Direct & Indirect) due to project:

No change.
2. **Project Description:**

   (i) **Type of project including interlinked and interdependent projects, if any:** This is a stand-alone project.

   (ii) **Location (map showing general location, specific location, and project boundary & project site layout) with coordinates:** Attached.

   (iii) **Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental conditions gone into to be highlighted:**

   This is an existing project. Land area and general layout remains unchanged.

   (iv) **Size and Magnitude of Operation:**

   It is ‘A’ Category Project as per EIA Notification 2006.

   No additional expenses will be incurred for production capacity enhancement using process optimization.

   (v) **Project description with process details (a schematic diagram/flow chart showing the project layout, components of the project etc. should be given):**

   MBF- Conventional technology. Description provided in subsequent sections. There is no change in Project Layout (Fig 3).
(vi) **Raw Material required along with estimated quantity, likely source, marketing area of final product / s, Mode of transport of raw material and finished product:**

<table>
<thead>
<tr>
<th>INPUT (Name and Quantity in TPA)</th>
<th>OUTPUT (Name and Quantity in TPA)</th>
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<tbody>
<tr>
<td><strong>Name</strong></td>
<td><strong>Quantity for</strong></td>
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<td>Sinter</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>500080</td>
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</table>

Iron ore is purchased from mines located in Odisha. Coke is imported. Limestone, Dolomite, Quartzite and Manganese ore is purchased from local traders. Transportation of raw materials and finished product is done by road.

(vii) **Resource Optimization / recycling and reuse envisaged in the project, if any, should be briefly outlined:**

Entire dust collected in Bag Filter, Gas Cleaning Plant of BF and Scales of PCM is recycled in Sinter Plant.
Slag generated from BF is granulated and 100% sold to cement making plants.
Wastewater generated from BF is treated and recycled.
BF gas shall be partially reused in stoves for making hot blast and balance shall be used to generate power, ladle heating and in sinter plant.

Stove Exhaust Gas, is used to pre-heat the combustion air and BF gas in Recuperator, before venting through Stack. The pre-heated air, and BF gas is used in blast furnace stoves, where CO rich BF gas acts as fuel to generate Hot Blast of 1030°C. This HBT reduces the coke charging rate in BF. Thereby it is energy optimization process, it reduces GHG and also aids in raw material conservation (coke).

Sinter is used as burden in blast furnace. Sinter is made using iron ore fines, mill scales, dust and sludge from gas cleaning systems. Sinter replaces the use of raw material iron ore and Fluxes. Therefore it aids in resource conservation.

In this manner the BF project will technically continue to remain as zero-discharge project.

(viii) Availability of water it’s source, Energy / power requirement and source should be given:

There is no change in source of water and its quantity.

There is no change in source of power.

(ix) Quantity of Wastes to be generated (liquid or solid) and scheme of their management / disposal: (Total after capacity enhancement)
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Slag Generation is increased from 56400 TPA to 78400 TPA. It will be 100% granulated and sold to cement makers.

Dust from air pollution control equipment: 100% reused in the Sinter Plant.

Spent oil and lubricants: 100% sold to authorized re-processors

Water Management

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<th>Water Requirement (Make-up)</th>
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<td>8 Domestic use</td>
<td>120</td>
<td>96</td>
<td>Treated and disposed in soak pits</td>
</tr>
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</table>

(x) Schematic representations of the feasibility which give information of EIA purpose:

There is no change in pollution load. No additional land or water is required. The production capacity enhancement is about 19%. The company is submitting 6-monthly compliance report of environmental clearance (EC) to MOEF, its Regional Office located at Bhubaneshwar on regular basis. The company is generating environmental data on regular basis as stipulated by WBPCB; related to stack emissions, ambient air quality, fugitive dust emission, wastewater quality, etc and keeping records of use of solid wastes like slag, dust, spent oil, etc. No litigation is pending against the project in any court of law or tribunal, etc. Therefore, detailed EIA is not required for this project.
3. **Site Analysis:**

(i) **Connectivity:** The project is well connected by road.

(ii) **Land Form, Land use and Land Ownership:**

Land area: 94 acres  
The land form is now graded to suit the project establishment.  
33% land has been earmarked for greenery development.  
The existing land use is industrial land  
Neo Metaliks Limited owns the entire land and it is in its possession.

(iii) **Existing Infrastructure:**

i. Boundary wall  
ii. Plant civil structures, blast furnace, sinter plant & power plant  
iii. Internal roads  
iv. Water reservoir  
v. ESP, Bag Filters, GCP, ETP  
vi. Raw material Stock Yard  
vii. Finished products Stock Yard  
viii. Administration building  
ix. Security Cabins  
x. Occupational Health Center.

(iv) **Soil Classification:**

The soil is lateritic type. The area falls under Seismic Zone III.

(v) **Climatic Data from secondary sources:**

Annexure 3.

(vi) **Social Infrastructure available:**

All infrastructure is available in Durgapur, 2-3 km away from site which is an industrially developed city.
4. **Planning Brief**

(i) **Planning Concept (types of industries, facilities, transportation etc) Town and Country planning/Development authority Classification:**

This is A Category Project as per EIA Notification 14-9-2006 and requires EC.

(ii) **Population Projection:**

Nil

(iii) **Land use planning (breakup along with green belt etc):**

Out of 94 acres land 33% land earmarked for greenbelt. No additional land is required for capacity enhancement.

(iv) **Assessment of infrastructure demand (Physical as well as social):**

No additional infrastructure is required for capacity enhancement.

(v) **Amenities / Facilities:**

No additional amenities / facilities are required for capacity enhancement. The existing amenities / facilities are adequate for the BF production enhancement.
5. **Proposed Infrastructure**

There is no change in the land area, greenbelt area and general layout plan of the project.
6. Rehabilitation and Resettlement (R & R) Plan

(i) Policy to be adopted (Central/ State) in respect of the project affected persons including home oustees, land oustees and landless laborers (a brief outline to be given):

Not applicable because no additional land will be required for the production enhancement of blast furnace.
7. **Project Schedule and Cost Estimates**

(i) **Likely date of start of construction and likely date of completion (time schedule for the project to be given):**

The existing Blast Furnace is already operating. The process optimization could be done without stopping the BF. It will be completed instantly after getting EC.

(ii) **Estimated project cost along with analysis in terms of economic viability of the project:**

The process optimization will not add to the cost of the BF project.
8. **Analysis of Proposals (Final Recommendations)**

(i) **Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any in the area:**

Financial Benefit
The process optimization will not add to the cost of the BF project. Therefore without spending any extra CAPEX, annually 224000 tons of pig iron could be produced.

Social Benefit
The cost of production of pig iron by Indian Producers is more than the sale price of China. In order to remain sustainable, profitable and socially viable, the company decided to optimize the process. The demand of general grade pig iron at competitive cost exists in the domestic and international market.
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Figure 1  Location Map
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Fig 2: Map Showing 10 km Area around Site
PFR for increasing the production capacity of blast furnace from 1,88,000 TPA to 2,24,000 TPA

Fig 3  General Layout of the Project
Annexure 1 - TEST REPORT OF AMBIENT AIR ANALYSIS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>RESULT OF ANALYSIS</th>
<th>FY 16-17</th>
<th>FY 17-18</th>
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<tr>
<td></td>
<td>DATE OF SAMPLING</td>
<td>CONCENTRATION</td>
<td>DATE OF SAMPLING</td>
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<td>NEAR MAIN GATE</td>
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<tr>
<td>SN</td>
<td>PM 10 µg/m³</td>
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<td>83.1</td>
</tr>
<tr>
<td>I</td>
<td>19.03.17 TO 20.03.17</td>
<td>43.84</td>
<td>06.10.17 TO 07.10.17</td>
</tr>
<tr>
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<td>06.10.17 TO 07.10.17</td>
<td>10.05</td>
<td>23.01.18 TO 24.01.18</td>
</tr>
<tr>
<td>III</td>
<td>20.03.17 TO 21.03.17</td>
<td>40.65</td>
<td>23.01.18 TO 24.01.18</td>
</tr>
<tr>
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<td>20.03.17 TO 21.03.17</td>
<td>40.65</td>
<td>23.01.18 TO 24.01.18</td>
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<tr>
<td>NEAR ADMINISTRATIVE BUILDING</td>
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<td>SL. NO.</td>
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<td>23.01.18 TO 24.01.18</td>
</tr>
<tr>
<td>IV</td>
<td>23.01.18 TO 24.01.18</td>
<td>40.29</td>
<td>23.01.18 TO 24.01.18</td>
</tr>
<tr>
<td>NEAR BOUNDARY WALL (NORTH-EAST SIDE)</td>
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<td>72.76</td>
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</tr>
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<td>40.12</td>
<td>23.01.18 TO 24.01.18</td>
</tr>
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<td>NEAR CPP COOLING TOWER</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SL. NO.</td>
<td>PM 10 µg/m³</td>
<td></td>
<td>23.01.18 TO 24.01.18</td>
</tr>
<tr>
<td>I</td>
<td>23.01.18 TO 24.01.18</td>
<td>23.01.18 TO 24.01.18</td>
<td>60.19</td>
</tr>
<tr>
<td>II</td>
<td>23.01.18 TO 24.01.18</td>
<td>23.01.18 TO 24.01.18</td>
<td>60.19</td>
</tr>
<tr>
<td>III</td>
<td>23.01.18 TO 24.01.18</td>
<td>23.01.18 TO 24.01.18</td>
<td>60.19</td>
</tr>
<tr>
<td>IV</td>
<td>23.01.18 TO 24.01.18</td>
<td>23.01.18 TO 24.01.18</td>
<td>60.19</td>
</tr>
</tbody>
</table>
**Annexure 2 - Status of CREP Implementation**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Action Points For Integrated Iron &amp; Steel Industry</th>
<th>Status at NML/ Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coke oven plant</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>a.</strong> To meet the parameters PLD (% leaking doors), PLL (% leaking lids), PLO (% leaking off takes), of the notified standards under EPA within three years (by December 2005). Industry will submit time bound action plan and PERT chart along with Bank guarantee for the implementation of the same.</td>
<td>Not applicable because we do not have the Coke Oven Plant.</td>
</tr>
<tr>
<td></td>
<td><strong>b.</strong> To rebuild at least 40% of the coke oven batteries in next 10 years (December 2012)</td>
<td>Not applicable because we do not have the Coke Oven Plant.</td>
</tr>
<tr>
<td>2</td>
<td>Steel Melting shop</td>
<td>Not applicable because we do not have the Steel Melting Shop</td>
</tr>
<tr>
<td></td>
<td>Fugitive emission to reduce 30% within March 2004 and 100% in March 2008 (Including installation of secondary Dedusting facilities)</td>
<td>Not applicable because we do not have the Steel Melting Shop</td>
</tr>
<tr>
<td>3</td>
<td>Blast furnace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direct injection of reducing agent by June 2013 (C.D.I)</td>
<td>This is a Mini Blast Furnace of 215M3 Volume planned in 2004&amp; installed in 2006. Only two such plants are operating in the Country. Technical feasibility of retrofitting PCI is not available. However we have operated this plant for almost 11 years and carried out some studies by involving experts. We are now planning to retrofit PCI during the next maintenance Schedule proposed in Oct-Dec ‘18.</td>
</tr>
<tr>
<td>4</td>
<td>Solid waste / Hazardous waste management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utilization of steel Melting shop (SMS)/ Blast Furnace(BF) slag by:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>By 2004-70%</td>
<td>100% BF Slag is Sold for Cement Making.</td>
</tr>
<tr>
<td></td>
<td>By 2006-80%</td>
<td>100% Dust Collected from Air Pollution Control Device and Sludge from Gas Cleaning Plant is reused in the Sinter Plant.</td>
</tr>
<tr>
<td></td>
<td>By 2008-100%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hazardous Waste Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charge of tar sludge &amp; ETP sludge to Coke ovens by June ’03</td>
<td>We are using ETP Sludge of Gas Cleaning Plant of BF in Sinter Plant.</td>
</tr>
<tr>
<td></td>
<td>Inventorisation of hazardous waste as per Hazardous Waste (Management &amp; Handling) Rules, 1989 as amended in and implementation of the Rules by Dec’03 (tar sludge, acid sludge, waste lubricating oil falls in the category of hazardous waste.)</td>
<td>Tar Sludge and Acid Sludge is not generated in BF. Waste lubricating Oil is sold to authorised re-processor.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>Water Conservation / Water Pollution</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>To reduce specific water consumption of 5 m³/t for long products by December 2005</td>
<td>We are not making any long product / No Rolling Mill Exists in the Plant.</td>
</tr>
<tr>
<td>b.</td>
<td>To operate the CO &amp; BPP effluent treatment plant efficiently to achieve the notified effluent discharge standards - by July 2005</td>
<td>No Coke Oven and By-Products plant existing in the Plant.</td>
</tr>
<tr>
<td>7</td>
<td>Installation of continuous stack monitoring system &amp; its calibration in major stacks and setting up of the online ambient air quality monitoring stations by June 2005</td>
<td>Installed in Major Stacks.</td>
</tr>
<tr>
<td>8</td>
<td>To operate the existing pollution control equipment efficiently and to keep proper record run hours, failure time and efficiency with immediate effect. Compliance report in this regard is submitted to CPCB/SPCB every three month</td>
<td>Pollution Control Equipment are operated efficiently and record maintained. Compliance report in this regard is submitted to SPCB as Stipulated in CTO.</td>
</tr>
<tr>
<td>9</td>
<td>To implement the recommendations of Life Cycle Assessment (LCA) study sponsored by MOEF by December 2003</td>
<td>Not Applicable because no such recommendation of LCA Studies is available in MOEF &amp; CPCB Website.</td>
</tr>
<tr>
<td>10</td>
<td>The industry will initiate the steps to adopt the following clean technologies/ measures to improve the performance towards production, energy, land environment:</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Energy recovery to top blast furnace gas</td>
<td>Blast furnace gas is being utilized as a fuel in C.P.P, Stoves, Sinter Plant, Ladle pre-heating</td>
</tr>
<tr>
<td>b.</td>
<td>Use of tar free runner linings.</td>
<td>We are using Tar Free runner linings.</td>
</tr>
<tr>
<td>c.</td>
<td>Cast house de-dusting (tap holes, runners, skimmer, ladle and charging points).</td>
<td>We have installed fume extraction System in Cast House.</td>
</tr>
<tr>
<td>d.</td>
<td>Suppression of fugitive emissions using nitrogen gas or any other inert gas.</td>
<td>There is no fugitive emission of Hydro Carbon or Volatile Organic Compounds from the BF and Sinter Plant that requires suppression by using nitrogen gas or any other inert gas.</td>
</tr>
<tr>
<td>e.</td>
<td>To study the possibility of slag flyash transportation back to the abandoned mines to fill up the cavities through empty railway wagons while they return back to the mines and its implementation.</td>
<td>We are Selling 100% Slag in Cement Making. We are not generating any Fly Ash.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>f.</strong></td>
<td>Processing of the waste containing flux &amp; ferrous wastes through waste recycle plant.</td>
<td>We are reusing entire dust waste in sinter plant</td>
</tr>
<tr>
<td><strong>g.</strong></td>
<td>To implement rain water harvesting.</td>
<td>We have a natural pond, which is acting as a rain Water Harvesting Structure. The Capacity of the Pound is 11000M3. Water is Collected from the surrounding catchment area to the pond. Water from this pond is used in the Plant.</td>
</tr>
<tr>
<td><strong>h.</strong></td>
<td>Reduction of green houses gases by:</td>
<td></td>
</tr>
<tr>
<td><strong>I.</strong></td>
<td>Reduction in power consumption</td>
<td>We have reduced the Power Consumption (Compliance report of the last Energy Audit).</td>
</tr>
<tr>
<td><strong>II.</strong></td>
<td>Use of by product gases for power generation</td>
<td>The hot gas generated from blast furnace is being utilized in the power generation in CPP which generates 4.5 MW power.</td>
</tr>
<tr>
<td><strong>III.</strong></td>
<td>Promotion of energy optimization technology, including energy audit.</td>
<td>Complied. We have installed waste heat recovery system (recuperator) in Blast furnace, which pre-heats the combustion air and BF gas by utilizing waste heat from the flue gases of stove</td>
</tr>
<tr>
<td><strong>i.</strong></td>
<td>To progressively set targets for resource conservation such as raw material, energy and water consumption to match international standards.</td>
<td>We are converting the dust to Sinter and using the Sinter in BF. Now we are planning to increase the use of sinter upto 67%. Trials have been conducted successfully. This is reducing the use of Iron Ore in BF and helping in resource Conservation. Our Water Consumption is less than 2000 M3 per day. We are making efforts to further reduced the specific water consumption.</td>
</tr>
<tr>
<td><strong>j.</strong></td>
<td>Up gradation in the monitoring analysis facilities for air and water pollutin. Also to impart laboratory training to the manpower so that realistic data is obtained in the environmental monitoring laboratories.</td>
<td>Our Lab Staff is trained for analysing the basic parameters in water and waste water. Online Monitoring facility has been provided in all major stacks. The Staff has been trained to analyse the trends and reports non-compliances.</td>
</tr>
<tr>
<td>k.</td>
<td>To improve house keeping</td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>--------------------------</td>
<td></td>
</tr>
</tbody>
</table>

To improve the house keeping within the plant area, we have dedicated team of 5S. On regular basis cleaning of the spillage especially in RMHS and Ground hopper area is carried out by using machines. The materials are collected and sent for re-use in the Sinter process plant. This is being monitored regularly and the concerned department have been made responsible to report.
ANNEXURE 3: CLIMATOLOGICAL DATA

<table>
<thead>
<tr>
<th>MONTH</th>
<th>DAILY TEMPERATURE(°C)</th>
<th>RELATIVE HUMIDITY (%)</th>
<th>ATM. PRESSURE (mb)</th>
<th>TOTAL RAINFALL (mm)</th>
<th>NO. OF RAINY DAYS</th>
<th>CLOUD COVER</th>
<th>MEAN WIND SPEED (KM/H)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAX</td>
<td>MIN</td>
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<td>1730</td>
<td>0830</td>
<td>1730</td>
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<td>JAN</td>
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<td>45</td>
<td>1002.8</td>
<td>999.0</td>
<td>16.6</td>
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<td>39</td>
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<td>996.3</td>
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<td>MAR</td>
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<td>47</td>
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<td>28</td>
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<td>989.0</td>
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<td>MAY</td>
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<td>26.3</td>
<td>62</td>
<td>42</td>
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<td>JUNE</td>
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<td>26.4</td>
<td>74</td>
<td>65</td>
<td>985.9</td>
<td>982.4</td>
<td>192.4</td>
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<td>JUL</td>
<td>32</td>
<td>25.6</td>
<td>84</td>
<td>80</td>
<td>985.6</td>
<td>982.6</td>
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<td>AUG</td>
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<td>55</td>
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<td>994.6</td>
<td>1392.2</td>
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</table>

Table 3.6.2 ONSITE METEOROLOGICAL DATA (1st OCTOBER – 30th NOVEMBER, 2008)

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<thead>
<tr>
<th>Month</th>
<th>Temperature</th>
<th>Relative Humidity</th>
<th>Barometric Pressure</th>
<th>Average Velocity (Km/h)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Maximum (°C)</td>
<td>Minimum (°C)</td>
<td>Maximum (%)</td>
<td>Minimum (%)</td>
</tr>
<tr>
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<td>66</td>
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<tr>
<td>NOVEMBER, 2007</td>
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<td>64</td>
<td>55</td>
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<tr>
<td>OVERALL</td>
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<td>14</td>
<td>77</td>
<td>55</td>
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