Executive Summary

of

Expansion of Sponge Iron Plant from 3,24,000 TPA (4 x 100TPD & 1 x 500 TPD) to 6,84,000 TPA by Installation of Additional 2 x500 TPD Kilns & Power Plant from 25 MW to 85 MW(WHRB + AFBC)

Project by
M/s Lloyds Metals and Energy Limited.
At Plot A-1 and A-2, MIDC Area, Ghugus, Chandrapur, Maharashtra.

Environmental Consultant
Pollution and Ecology Control Services
Extension Letter: QCI/NABET/ENV/ACO/21/2133 dated 17th November, 2021

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The proposed project attract the provisions of EIA Notification, 2006 and falling under Category A of Schedule, 3 (a) Metallurgical Industries (Ferrous and Non-ferrous). The proponent made online application on 16th July 2021 along with Form-1, Pre-feasibility report and other documents for proposing Terms of Reference (TORs) for undertaking detailed EIA study. Standard ToRs were granted for undertaking EIA study for proposed project of Expansion of Sponge Iron Plant from 3,24,000 TPA (4 x 100TPD & 1 x 500 TPD) to 6,84,000 TPA by Installation of Additional 2 x500 TPD Kilns & Power Plant from 25 MW to 85 MW (WHRB + AFBC) at Plot No. A-1 and A-2, MIDC Area, Ghugus, Chandrapur, Maharashtra. Accordingly, the Ministry prescribed ToRs vide letter No. J-11011/243/2019-IA.II(I) dated 20.07.2021 for the proposed expansion project.

"After detailed engineering and calculation it was observed that the quantity of waste gas and steam which is to be generated from expansion phase will generate 35 MW power instead of 25 MW Power. Accordingly the size of boiler and turbine will be enhanced to generate 35 MW power instead of 25 MW power. As per OM no F. No. 22-24/2018-IA.III dated 23rd January, 2019 issued by MoEF & CC, New Delhi, Power generation through WHRB does not attract EIA notification 2006"

Project at a Glance

Sr. No.	Description	Details
1	Nature of the project	Expansion of Sponge Iron Plant from 3,24,000 TPA (4 x 100TPD & 1 x 500 TPD) to 6,84,000 TPA by Installation of Additional 2 x500 TPD Kilns & Power Plant from 25 MW to 75 MW(WHRB + AFBC)
2	Production Capacity	Sponge Iron Plant: Existing: 3,24,000 TPA (4 x 100TPD & 1 x 500 TPD) Proposed: 3,60,000 TPA (2 x500 TPD) Power Plant Existing: 25 MW [WHRB + (AFBC For Backup only)] Proposed: 60 MW(WHRB + AFBC) Coal Washery: 0.216 MTPA (No Change) M.S. Billets: 5,00,000 TPA TMT Bars: 5,00,000 TPA Ferro Alloys: 25,000 TPA } Public Hearing Conducted on 30th June 2021
3	Raw Material Requirement for expansion project	Iron ore, Coal, Dolomite, Dolachar
4	Water requirement	The total water requirement will be 5123 KLD Source: Wardha River. The application letter for renewal of Agreement signed with Irrigation Department, Chandrapur is attached as Annexure II.
5	Power requirement & Source	The power required for the proposed expansion project will be 10 MW which will be sourced from own power plant & MSEDCL.
6	Land for proposed plant	Total Land in Possession: 93.52 ha (A-1 is 4.00 Ha & A-2 is 89.52 Ha).
7	Total manpower after commissioning of the unit.	The proposed expansion project creates employment for 500 people.
8	Estimated Cost of the project	Existing Cost: Rs. 701 Crores Proposed Cost for IF,RM & SAF: Rs. 760 Crores Proposed cost for the Project under Consideration: Rs. 300 Crores

2.	**Location Details**	
i.	Plot no.	At Plot A-1 and A-2, MIDC Area, Ghugus, Chandrapur, Maharashtra
ii	Village	MIDC Area, Ghugus
iii	Tehsil	Chandrapur
iv	District	Chandrapur
v	State	Maharashtra

vi	Co-ordinates	Boundary Co-ordinates: A: 19°56'29.54"N 79° 6'58.36"E B : 19°56'29.52"N 79° 7'3.04"E C: 19°55'29.26"N 79° 6'56.26"E D: 19°55'29.54"N 79° 7'2.05"E E: 19°55'37.71"N 79° 7'18.27"E F: 19°56'0.20"N 79° 7'25.25"E
vii	Toposheet No.	56 M/1, 55 P/4
viii	Elevation above MSL	189 m
ix	Nearest Highway	SH:6, 1.0Km(N)
x	Nearest Airport	Nagpur Air Port, 127Km(N)
xi	Nearest Railway Station	Ghugus Railway station - 2.0 Km
xii	Nearest Village	Ghugus, 0.5 Km (N)
xiii	Forest	Pardi Reserved Forest (6.0 Km (SW) Distance from Existing Boundary of Tadoba Wildlife Sanctuary : 25.5 km Distance from Proposed Boundary of Tadoba Wildlife Sanctuary as per Notification dated 13th July 2018 : 17.5 km
xiv	Nearest major water body	Wardha River (2.5 Km (SW) NirgudaNala (3.0 Km (SSW) Penganga River (5.0 Km (SE) Sarai Nala (6.5 Km (NE)
xv	Major Industries within 10 km area	A.C.C. Cement (In operation) (3 million tonne per annum) Gupta Energy Power Ltd. (2 X 60 MW) (Not in operation), Western coalfield Ltd (WCL mines)

2.0 PROJECT DESCRIPTION

The proposed project is Expansion of Sponge Iron Plant from 3,24,000 TPA (4 x 100 TPD & 1 x 500 TPD) to 6,84,000 TPA by Installation of Additional 2 x500 TPD Kilns & Power Plant from 25 MW to 85 MW(WHRB + AFBC). The existing projects for sponge iron manufacturing plant was accorded environmental clearance vide lr.no. Env (NOC)2005/747/CR.97/D.I dated 28th December 2005. The existing projects for coal washery environmental clearance was accorded vide lr.no. J-11015/272/2007-IA.II (M) dated 9th April 2008. The existing projects for waste Heat Recovery based captive power plant of 25 MW capacities environmental clearance was accorded vide lr.no. J-13012/123/07-IA-II dated 12th October 2009.

Production Scenario

Name of unit	**Existing Unit**	**Proposed Configuration & Capacity**	**Total After Expansion Production**	**Remarks**
Sponge Iron	4 X100 TPD and 1x500 TPD (3,24,000 TPA)	2 x500 TPD (3,60,000 TPA)	4 X100 TPD and 1x500 TPD 2 x500 TPD (6,84,000 TPA)	Proposed Project under Consideration in this application
Coal Washery	0.216 MTPA	-	0.216 MTPA	
Electricity Generation	25 MW [WHRB + (AFBC For Backup only)]	60 MW (35 MW WHRB + 25 MW AFBC)	85 MW (WHRB + AFBC)	
*Ingots/ Billets	-	6 X 30 T (5,00,000 TPA)	5,00,000 TPA	Public Hearing Conducted on 30th June 2021
*Hot rolled long product / TMT	-	5,00,000 TPA	5,00,000 TPA	
*Ferro Alloys (Silico Manganese, Ferro Silicon, Ferro Manganese)	-	2 X 9MVA (25,000 TPA)	25,000 TPA	

***** Terms of Reference was granted for the proposed project by MoEF&CC, New Delhi vide Letter No. J-11011/243/2019-IA.II(I) dated 10.02.2020, accordingly the Draft EIA Report was submitted and Public Hearing was conducted on 30th June 2021.

PROCESS DESCRIPTION

SPONGE IRON PLANT (Proposed Expansion)

- Sponge iron is a metallic product produced through direct reduction of iron ore in the solid state. It is a substitute for scrap and is mainly used in making steel through the secondary route. The process of sponge iron making aims to remove the oxygen from iron ore. The

quality of sponge iron is primarily ascertained by the percentage of metallization (removal of oxygen), which is the ratio of metallic iron to the total iron present in the product.

- The basic raw materials for the production of sponge iron are iron ore, non-coking coal and dolomite. Sizing of the Raw materials also play vital role in sponge iron manufacturing process. The required size of Iron ore, MPS (Mean particle size) , its physical properties like T.I., A.I. & chemical properties like Fe (T), LOI, gangue content In Sponge Iron Process , two types of coal are being used such as feed coal and injection coal.
- A long slightly inclined (2.5%) to the horizontal slowly rotating kiln is employed to carry out the reduction. The charge were fed from feed end which is at a higher level and it travel under gravity aided by the rotating motion through several heating zones & the reduced charge comes out from the other end of the kiln. This is a solid phase and gaseous reaction and no liquid phase occurs inside the kiln.
- For the direct reduction of iron ore the main furnace used is rotary kiln. The rotary kiln is the refractory lined cylindrical vessel on which blowers are mounted & the air pipes, to provide combustion air to the inside of the kiln. During light up there is a start up burner at the kiln discharge end which is oil fired to heat up the rotary kiln. To ignite the injected coal from outlet of the kiln. When the desired temp. is reached, Iron ore, coal & dolomite are fed from feed end and also coal is injected from discharge end.
- The start up burner which uses oil for initial heat up is withdrawn after getting the ignition temperature of the injected coal. Now the coal if the desired temp. for reduction process is obtained , iron ore with dolomite is fed from inlet of the kiln. Since the kiln has a downward slope of 2.5% from the feed end side to discharge end side, its rotation causes the iron ore & coal to mix and travel through the system. The rotational speed of the kiln is adjustable as per the feed rate & percentage of metallization. The % age of inclination, rotational speed the length of the kiln and time the material is exposed to the reducing agent CO, the temperature all to be taken into consideration.

  $C+O_2=CO_2$;

  $CO_2+C=2CO$;

  The above reaction is known as “Boudouard” reaction which is reversible.

  $Fe_2O_3+CO=Fe_3O_4+CO_2$;

$Fe_3O_4+CO=FeO+CO_2$;

$FeO+CO=Fe$ (Metallic) $+CO_2$;

$2\ Fe_2O_3$ ---------- $2\ Fe_3O_4$ ---------- 6 FeO ----------6 Fe

Hematite ---------- Magnetite---------- Wustite ---------- Iron

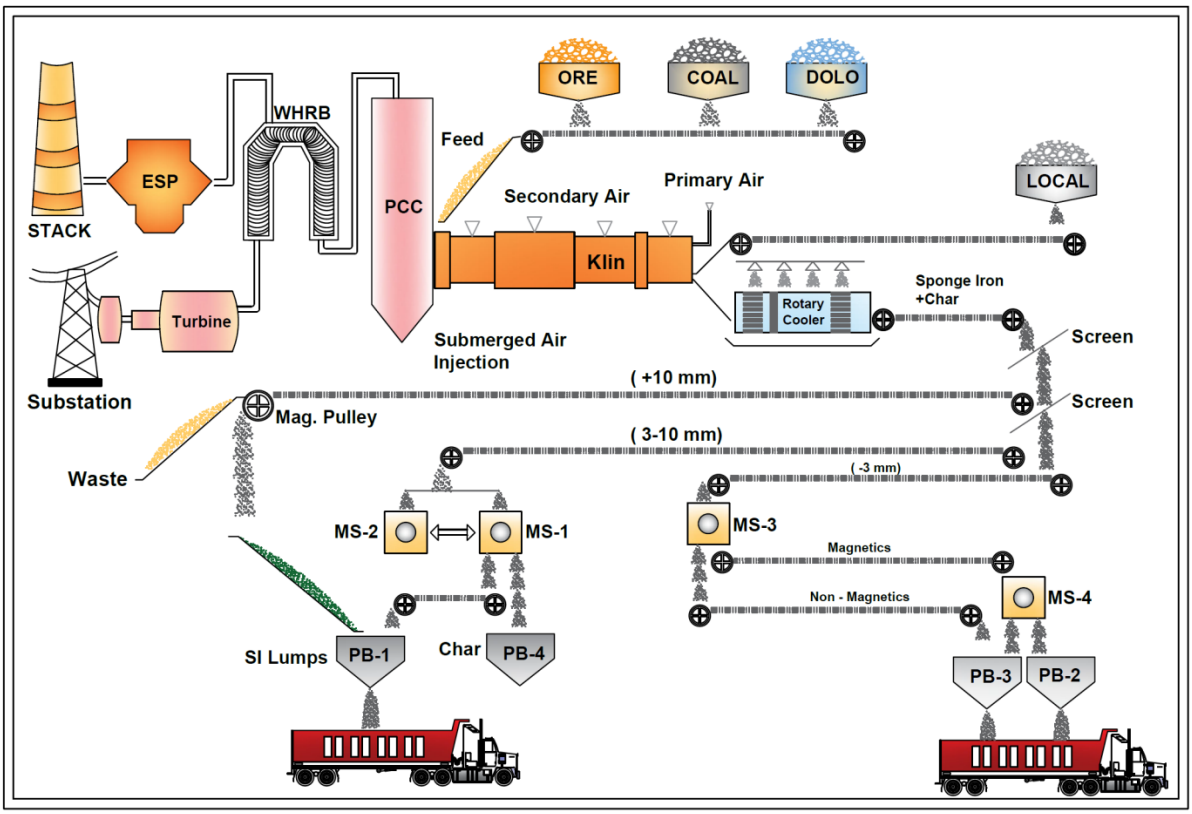
The degree of reduction between each stage is as follows:

11%---------- 22% ---------- 67%

$3Fe_2O_3$---------- $2Fe_3O_4$---------- 6FeO----------6 Fe

The byproduct of above reaction is carbon die oxide (CO_2).

This CO_2 reacts with carbon from coal to produce CO.



Process Flow Chart of Sponge Iron Plant

Waste Heat Recovery System &CPP (Proposed Expansion):

Waste heat recovery system to generate Power

In Sponge Iron manufacturing, flue gases are generated with a temperature of 900-1000 ^{0}C during the process. This heat is cooled without utilizing heat by supplying the air by using FD fans. The heat content in the flue gas is enough to generate the power by installing the waste

heat recovery system i.e. boiler. The high temperature flue gases are pass through the boiler for generate the steam and that can be used in turbine to generate the power.

Background

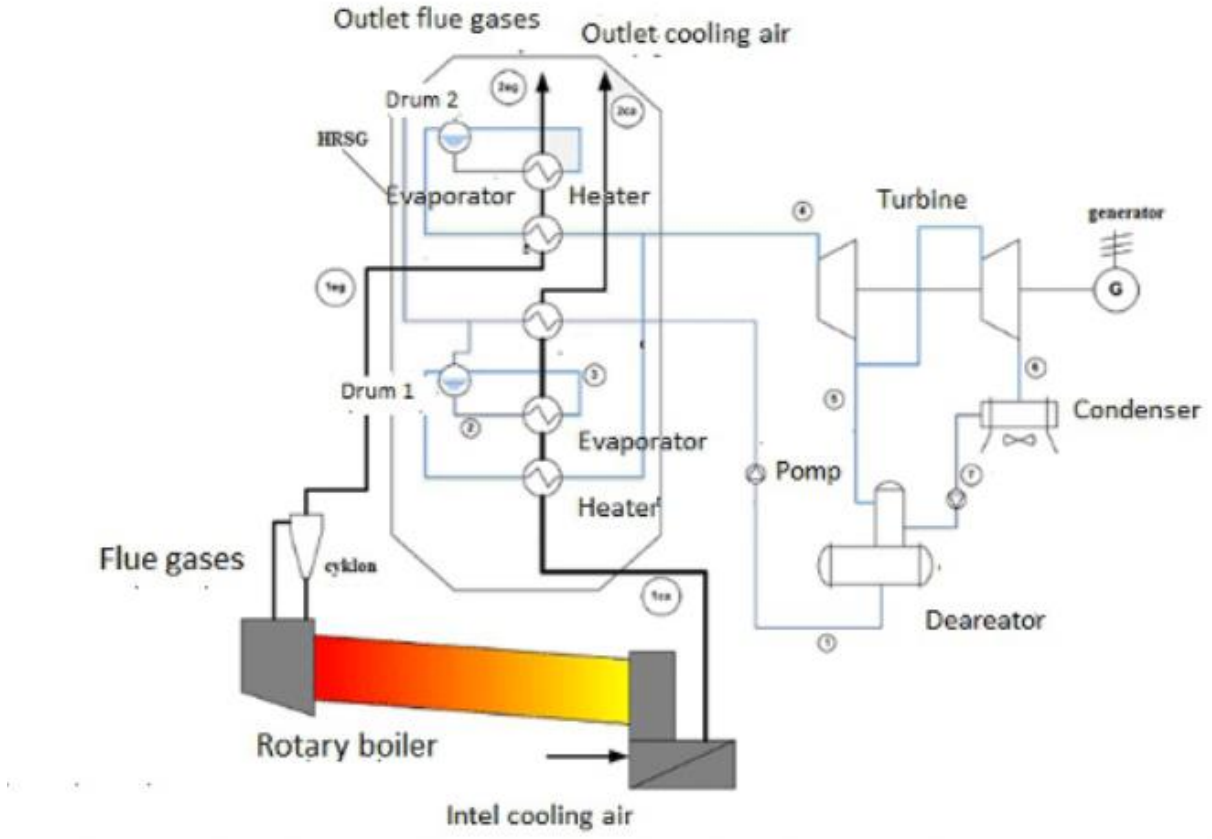
All sponge Iron Manufacturing Industries in India are coal based industries and flue gases are generated during the process which have higher temperature i.e.900-1000 Deg C. These industries are operated throughout the year. At present all industries are not utilizing the heat from the flue gases and cooled by FD/GCT system before sending to ESP. Thus power generation using generated flue gases are one of energy conservation opportunities in sponge iron plants by installing waste heat recovery system.

Energy Conservation Potential

In 500 TPD coal based sponge iron plants, during the process at least 120000 m^3/hr flue gases are generated and having the temperature of 900-1000 ^{0}C. The total power generated in sponge iron plants are depends on installed capacity of sponge iron plants.

Process Details

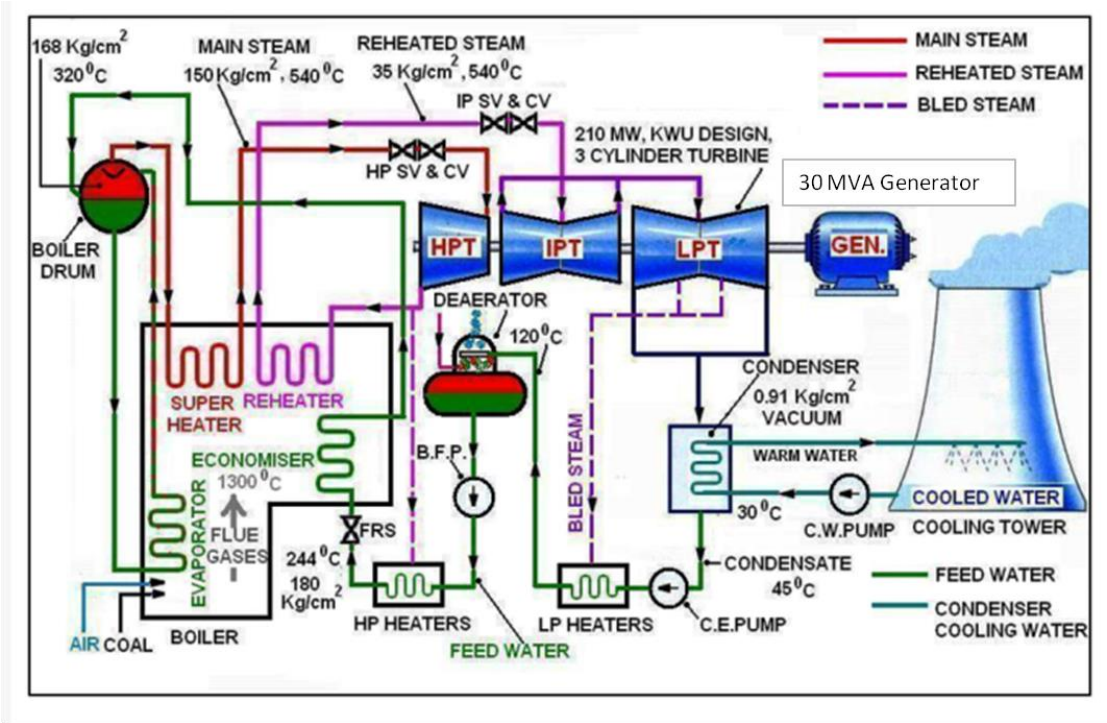
The waste gases generated from the Rotary kiln is passed through the boiler to generate the steam. The generated steam is used for generation of power. The temperature available in flue gasses is enough to generate the required steam for power generation through boilers. The boiler is a bi-drum, water tube boiler. The super heater in boiler is designed for an outlet temperature of 490 deg C. The gases leaving the kiln would enter a super heater. The gases leaving the super heater would enter a set of boiler bank tubes are expanded into the steam and water drums. The gases after passing across the boiler bank would enter a bare tube economizer. This is an inline counter flow economizer and heats up the feed water going to the drum.



Process Diagram of WHRB

The gases are reduced to around 180 Deg C for the economizer. After the economizer, the gases are let into ESP which is provided to reduce the dust emission level. An ID fan has been provided to take care of the gas draft losses in the system. The steam turbine is of multistage horizontal spindle condensing type turbine. The turbine is provided with gear unit capable of continuously transmitting the necessary power and designed for speed reduction ratios for the turbine

Captive Power Plant :A power plant continuously converts the energy stored in fossil fuels (coal, oil, natural gas) or hot gases into shaft work and ultimately into electricity. The working fluid is water, which is sometime in liquid phase and sometimes in vapour phase, during its cycle of operation. Power Plant as a bulk energy converter from fuel to electricity using water is a working medium.



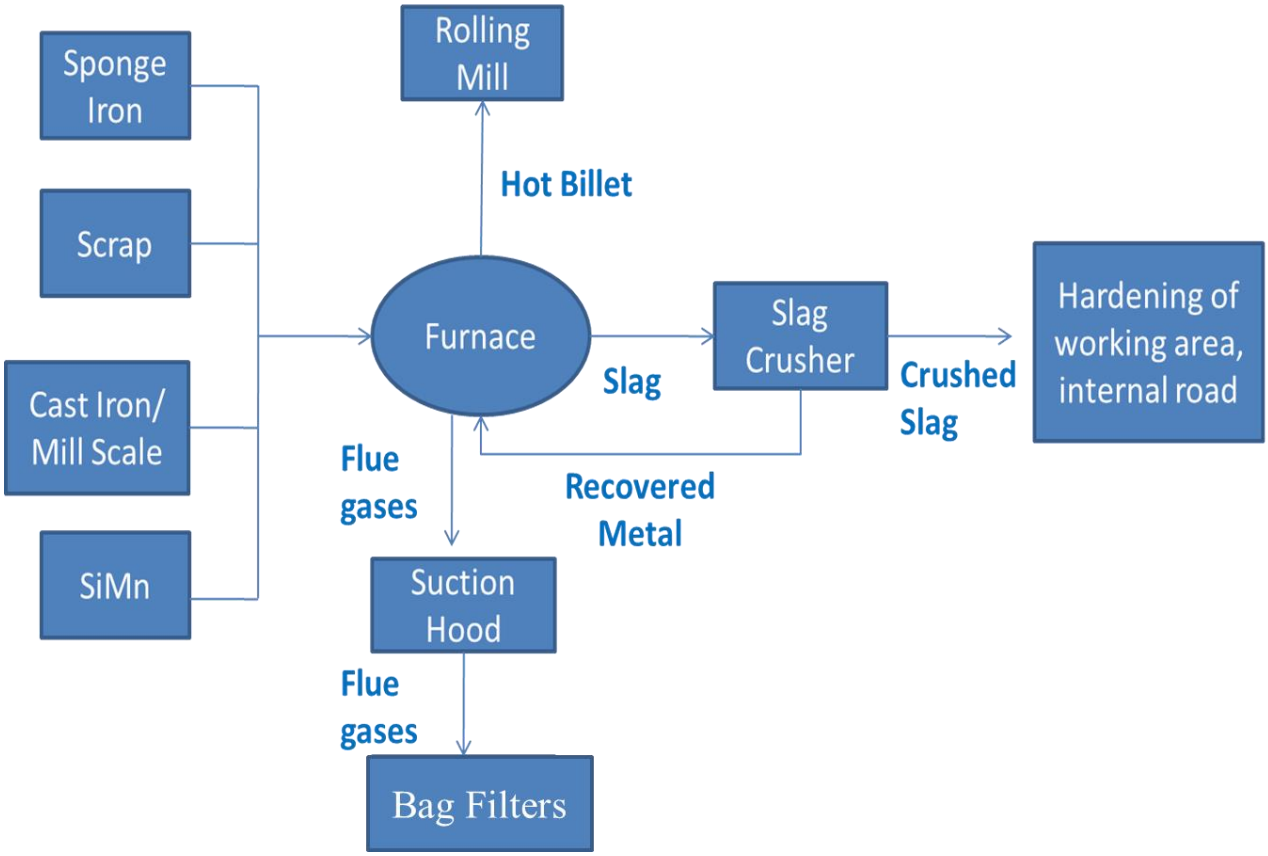
Process Diagram of Coal based power plant

Manufacturing Process of M.S. BILLETS & TMT BARS

The induction furnace is used to melt many different sorts of metals, from common steel to more exotic alloys or precious metals. The greatest advantage of the induction furnace is its low capital cost, its easier installation, simpler operation, no noise generation and there is very little heat loss due to radiation from the furnace. The raw material (Sponge Iron, MS scrap, Ferro Manganese and Ferro Silicon) is charged into the induction furnace. As soon as the furnace is charged, the switches admitting power current to the induction coil are closed.

After the furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap which is known as eddy current, this eddy current flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap starts. Soon a pool of molten metal forms in the bottom causing the charge to sink. The induced current which is generated in the charge mixed and heated more homogenously. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added. When these additives have melted completely, the power input may be increased to bring the

temperature of metal upto the point most desirable for pouring. The current is then turned off and the furnace is tilted for pouring into a crucible. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again. The temperature of the furnace will be 1650^0C. When the total scrap as per the capacity of the crucible is molten, the sample is taken from liquid steel and tested for the composition of steel and the carbon contents. Therefore some additives of ferro-alloys like Silico-managanese, silicon, aluminum shots and are added to the liquid steel to maintain the composition and quality. The billets in the molten stage are transferred to rolling line for the production of TMT Bars bypassing the reheating furnace. The cooled TMT Bars are then inspected and dispatched. The process flow chart is presented in the **Figure.**



Process flow Chart for Hot Billet Rolling

Advantages of Hot Billet Rolling Process

- Energy saving is the main benefit as it consists in avoiding the normal cooling of the billet down to room temperature and the reheating for initiating the rolling. Thus the process is of less energy and more environmentally friendly.
- Billets in molten condition will be directly fed to Hot Billet Rolling machine thus saving of fuel & electricity.
- No additional increment in GLC for PM & SO_2.
- No need of storing fuel required in Gasifier for conventional Re-heating Furnace in rolling mill
- No generation of Fly Ash.
- No space will be required for storage of Billets and fly ash.
- Easy handling of Process.
- Low operational cost of rolled steel depending on unit costs
- Reduced civil works and infrastructure costs
- Reduced energy consumption
- Less man power required.

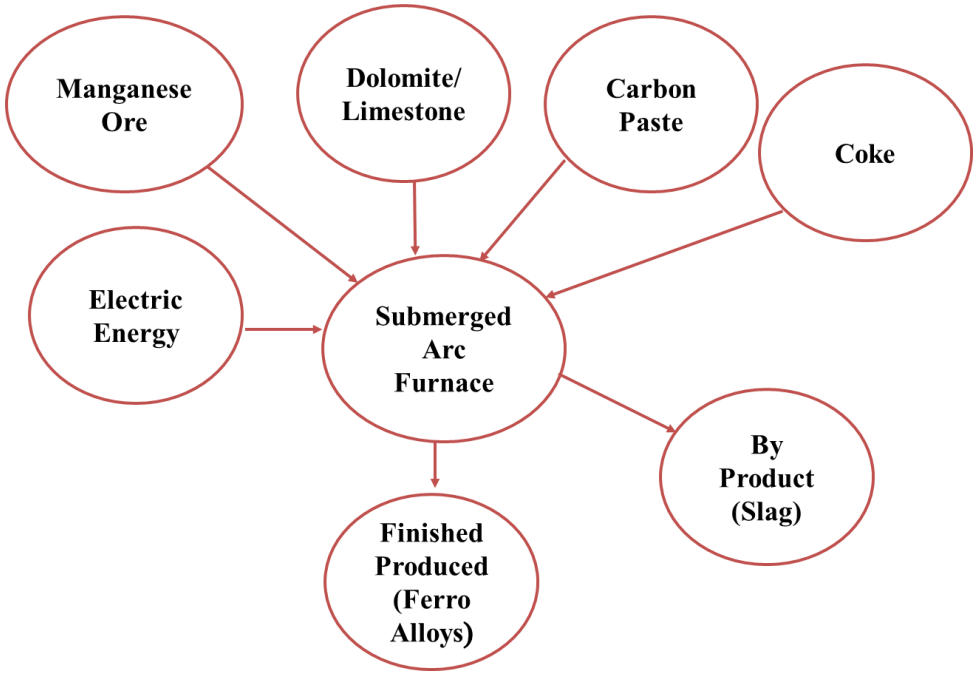
FERRO ALLOY PLANT

Standard High Carbon Ferro/Silico Manganese is smelted at about 1700 - 1800^0C. A conventional Submerged Arc Electric Furnace achieves this. The three carbon electrodes, partially submerged in the charge, are supported on hydraulic cylinders for upward and downward movements to maintain the desired electrical conditions in the furnace. The body of the furnace is cylindrical in shape, and is lined with firebricks, silicon carbide bricks and carbon tamping paste. Two tap-holes are pro vided at 120^O. Apart for draining out both the molten alloy and the slag.

During the repair works of one of the tap holes the other will function as standby. The raw materials are thoroughly mixed in the proper proportion before being charged into the

furnace. Manual poking rods or stroker car are used for stoking the charge on the furnace top. As the charge enters the smelting zone, the metal alloy formed by chemical reactions of the oxides and the reluctant, being heavy gradually settles at the bottom. The slag produced by the unreduced metal oxides and the flux, being relatively lighter, floats on the metal alloys surface. At regular intervals the furnace is tapped. The tap hole is opened by Oxygen lancing pipe and after tapping is completed, it is closed by clay plug.

The liquid Silicon manganese and the slag flow the C.I. Pan. The slag being lighter overflows from the C.I. pan and is taken into the sand mould. The alloy cake from C.I. pan is removed and broken manually with hammer to required lump size. The slag produced in the process is generally free from metal thus after cooling the slag is shifted to slag dump.



Manufacturing Process of Ferro Alloys

Capital Cost

Project Cost:

Existing Cost: Rs. 701 Crores

Proposed Cost for IF,RM & SAF: Rs. 760 Crores

Proposed cost for the Project under Consideration: Rs. 300 Crores.

Budget for Implementation of Environmental Management Plan

Total Rs. 360 lakhs as a capital investment and 70 lakhs as recurring cost has been earmarked for implementation of Environmental Management Plan for proposed expansion.

Site Selected for the Project

The present project proposal is envisaged for expansion, within the premises of the company, thus possibility of alternate site consideration does not arise.

3.0 DESCRIPTION OF THE ENVIRONMENT

Air Environment

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM_{10} : 40.9 to 79.4 $\mu g/m^3$.

$PM_{2.5}$: 24.0 to 43.2 $\mu g/m^3$

SO_2 : 10.7 to 35.6 $\mu g/m^3$

NO_x : 17.5 to 46.3 $\mu g/m^3$

Industrial Area Residential, Rural Area (CPCB Norms)	PM_{10}	$PM_{2.5}$	SO_2	NOx
	100 $\mu g/m^3$	60 $\mu g/m^3$	80 $\mu g/m^3$	80 $\mu g/m^3$

The concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 16 samples including eight surface & eight ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (BIS 10500 – 2012) except high concentration of total coli form in surface water, which may be due to the human activities.

Noise Environment

Noise levels measured at eight stations are within limit of 55.0 dB (A) for Residential Area or 75.0 dB (A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Land Environment

Four Soil samples were collected analyzed for physico-chemical characteristics at selected locations in the study area to assess the existing soil conditions around the proposed project site. The relevant parameters show the following characteristics.

The observations of soil characteristics are discussed parameter wise below;

a) Texture of all soil samples are silty-loam, Sandy and sandy Loamy in Texture Classification.
b) Colour of soil samples from agriculture and waste land is black & grey, brown in color.
c) The bulk density of soil samples are in the range of 0.69 to1.99 gm/cc.
d) Soil samples have pH values in the range of 6.93 to 7.39. The pH values are indicating nature of soil samples as neutral.
e) Soil samples have conductivities between 0.058 to 1.266 mmhos/cm.
f) Soil samples have Organic Matter between 0.37 to 1.27 %. These values represent average fertility of soils.
g) Soil samples have concentration of Available Nitrogen values ranged between 148.58 to 515.09 kg/ha.
h) Soil sample have concentration of Available Phosphorous values ranged between 180.18 to 1263.26 kg/ha.
i) Soil sample have concentration of Available Potassium values range between 22.58 to 81.45 kg/ha.

4.0 Anticipated Impacts & Mitigation Measures

Impact on Air Quality

The major pollutants of air in a proposed plant are the particulate matters from the various stacks and fugitive emissions due to material handling. SO_2 also add to the pollutant level due to Boiler. Company is presently taking all measures to effectively control the air emissions and periodic monitoring of the stack emissions & ambient air quality is being done to monitor the pollutant concentrations. Same will be continued after the proposed expansion. During operation phase, air emissions both gaseous and fugitive will be on account of process emissions from stacks of Sponge Iron Plant, induction furnace, captive power plant as well as transportation of men and material. The impacts on air quality due to source of the air pollutant in the proposed facilities have been identified.

I. Stack Emission

Emissions released from the stack during operation phase will get dispersed in the atmosphere and finally reach the ground at a specified distance from the sources. From the proposed activities the possible environmental impact on air quality has been envisaged due to the following sources.

In this case the source emission is envisaged from various sources, 10 Stacks of different heights are available for proper dispersion of gaseous pollutants (**Table 4.1**).

Mitigation Measures

Sponge Iron Plant

- 5 Nos. of ESP are installed in the existing plant to control emissions from sponge iron plant.
- 100 nos. of water sprinklers are installed in the existing plant.
- Dust Suppression system and water sprinklers are installed to control Fugitive emission.
- Internal roads and working area is concreted
- 2 Nos. of ESP will be installed in the proposed plant.

- All the other pollution control practices stated above will be practiced in the proposed plant also.
- Adequate spares of critical components of dust and gas collection systems will be kept to ensure trouble - free operations and continuous compliance to emission norms.

Power Plant

- The waste gases from DRI plant will be fed in the Waste Heat Recovery Boiler wherein Electro Static Precipitator is installed and AFBC boiler is also installed with ESP.
- The fly ash is being utilized in cement plants.
- All internal roads are tarred.
- All belt conveyors are covered.

Coal Washery

- Water Sprinkling is being done to reduce fugitive emission in the plant and maintain the ambient air quality within CPCB standard.
- Ambient air quality is being regularly monitored, so as to keep a check on the emissions of different pollutants.
- Fugitive emission sources are being identified and monitored at regular basis.

Induction Furnace & Rolling Mill & Submerged Arch Furnace

- Fourth hole extraction will be provided in the furnaces to control secondary emissions.
- Fugitive emission will be collected using suitable fume extraction system, connected to bag filter.
- Bag filters of Capacity 50000 m^3/Hr will be installed in steel melting shop and Arc furnaces.

Sources of Fugitive Emissions& Mitigation Measures

In plant, the fugitive dust is emitted primarily from the following:

Transportation: Movement of heavy trucks/vehicles on the roads generates substantial Quantity of dust. This is due to the presence of dust over the road, which is carried away by wind.

Raw Material Handling: Raw materials like Scrap, Sponge Iron, Manganese ore Dolomite etc. when transferred within the premises by road, Wagon Tripler, etc. will lead to the fugitive dust emissions.

Material Transfer: Dust is/will be generated from all the transfer points of belt conveyors. This is/will be controlled by providing bag filters at material transfer points.

Fuel Handling: Fuel (coal) transportation causes dispersion of dust while handling, loading etc.

Storage of Raw Materials & Finished Product: Dust may be generated due to carryover by wind. However, to avoid this, the raw materials is/will be stored in covered shed.

Action plan to control Fugitive emissions

- All Internal roads are paved to prevent the fugitive dust emission due to vehicular movement.
- Speed limit in plant premises is in control.
- All transportation vehicles carry/ will carry a valid PUC (Pollution under Control) Certificate.
- Flow of vehicles is being/will be maintained.
- Proper traffic management is being/will be undertaken.
- Proper servicing& maintenance of vehicles is being/will be carried out.
- Proper dust masks are being/will be provided to workers coming in direct contact of fugitive emissions
- Adequate greenbelt has already been developed in the plant area. Greenbelt acts as a surface for settling of dust particles and thus reduces the concentration of particulate matter in air.
- Water Sprinkling is being /will be done to reduce fugitive emission in the plant and maintain the ambient air quality within CPCB standard.

- Adequate spares of critical components of dust and gas collection systems will be kept to ensure trouble - free operations and continuous compliance to emission norms.
- Ambient air quality is being/will be regularly monitored, so as to keep a check on the emissions of different pollutants.
- Fugitive emission sources are being /will identified and monitored at regular basis.

Noise Levels

During operation, the major noise generating sources are auto loading section, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 85 dB (A).

Noise levels generated in the project site will be confined to the noise generating plant units hence the impact of noise levels on surroundings will be insignificant

Mitigation Measures

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards.

- By providing padding at various locations to avoid sharp noise due to vibration.
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- All the openings like covers, partitions will be designed properly
- Inlet and outlet mufflers will be provided which are easy to design and construct.
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission.
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Water

The water requirement for the proposed expansion project under consideration will be about 5123 KLD. Water requirement for the project will be sourced from Wardha River. An agreement has been signed with Irrigation Department, Chandrapur for supply of water. 250

KLD Industrial waste water will be treated in Neutralization Pit and settling tank.

18.5 KLD of Domestic waste water will be taken to STP. The treated water will be recycled for utilization in Green Belt Development.

Impact on Terrestrial ecology

There is no National park, Wildlife sanctuary, Biosphere reserves and protected forest within 10 km of the plant area. No schedule- I species were recorded in the core and buffer zone of plant area during the biodiversity assessment. There may be an impact on the biological environment of the area due to operation of plant, if proper care will not be taken:

- Particulate matter emissions and fugitive emissions due to transportation activity & material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.
- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photosynthesis and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.

The present running plant has no significant impact on surrounding ecology and biodiversity as following mitigation measures have been / will be adopted:

- Greenbelt development and plantation in and around the plant site.
- Using paved roads for transportation to minimize fugitive emissions.
- Transporting material in truck covered with tarpaulin and storing it under covered facilities.
- Transport vehicles and machinery will be properly maintained and periodically checked for pollution level to reduce noise and gaseous emission in the surrounding environment.

Solid Waste Generation

The solid waste generation in the existing and proposed expansion activities are given in following table

Solid Waste Management

Solid Waste Quantity and Disposal for Existing and Proposed plant

Solid Waste generation	Existing Quantity (TPA)	Proposed Quantity (TPA)	Method of Disposal
Char	48000	53333	Reused in Power Plant and Sold to local entrepreneurs for making a coal briquettes
Bottom Ash	9855	10950	-
Accreation	3650	4055	-
Fly ash	39785	44205	Low Land Filling and Brick Manufacturing
Dust from ESP	7300	8111	Brick Manufacturing

Solid Waste Generation and Management in Power plant

Solid Waste	Quantity (TPA)	Utilization
Fly Ash	46,200	Land filling / levelling and will be supplied to brick manufacturing units/ cement plants

Solid Waste Generation and Management in Coal Washery (No Change)

Solid Waste	Quantity	Mitigation Measures
Washery reject	91250 TPA	Sold to Third Party

Solid Waste Generation and Management in Induction Furnace, Rolling Mill & Submerged Arc Furnace (Public Hearing Conducted on 30th June 2021)

Solid Waste	Quantity	Mitigation Measures
Slag	25000 TPA	A slag crusher will be installed to crush slag. Iron particles will be separated by using Magnetic Separator. These iron particles will be reused in Induction Furnace. Initially Slag It will be used for hardening of working area & construction of internal roads. In future possibilities will be explored to use slag for construction of internal village roads.
Tail cutting	15,000 TPA	100% reuse in Induction Furnace
Ferro/Silico Manganese Slag	15,000 TPA	100% Ferro manganese slag will be used in Plant for production of Silico manganese.

Impact on Socio-Economic Environment

LMEL is providing direct employment 500 workers. The local persons have been given preference in employment as per the qualification and technical competencies. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP for smooth initiation and functioning of the project. The suggestions are given below:

- Communication with the local people will be established regular basis by project authority to provide an opportunity for local youth.
- Project authorities will undertake regular environmental awareness program on environmental management
- Job opportunities are the most demanding factor, the local people as per their education will be employed.
- For social welfare activities to be undertaken by the project authorities, collaboration should be sought with the local administration, gram panchayat, block development office etc for better coordination.

The overall impact on the socio economic environment will be significant.

5.0 Environmental Monitoring Programme

Lloyds Metals and Energy Limited is carrying out the Environmental Monitoring on regular basis. The methodologies adopted for environmental monitoring are in accordance with the CPCB guidelines.

The environmental monitoring points is done considering the environmental impacts likely to occur due to the operation of existing and proposed project as the main scope of monitoring program is to track, timely and regularly, the change in environmental conditions and to take timely action and adopt mitigation measures for protection of environment.

Ambient Air Quality Monitoring

Ambient air quality monitoring at 3 locations in and around the plant are being carried out by NABL accredited lab (Mahabal Enviro Engineers Pvt. Ltd. (MEEPL) on regular basis and reports are being submitted to MPCB regularly.

Water Quality Monitoring

Ground water quality & Waste water quality samples are being collected and analyzed by NABL accredited lab, ground water from different locations on quarterly basis and analyzed by NABL accredited lab. Reports are being submitted to MPCB, CPCB and MoEF.

Noise Environment

Noise levels are being monitored at various locations of the plant premises for day and night time as per the CPCB guidelines.

Fugitive emission

Monitoring of Ground level dust concentration/Fugitive emission along with gaseous pollutants viz SO_2, NOx are being carried out periodically. Dust concentration and gaseous emission levels from all the fugitive sources are well within prescribed limit and it is being regularly monitored.

Necessary control measures are being adopted to keep the secondary fugitive emission within limits.

Further, same practice of monitoring of environmental parameters will be continued as per the State Pollution Control Board norms after establishment of proposed project

6.0 Additional Studies

The additional studies as per the ToR issued by MoEF&CC are Public Consultation, Social Impact Assessment, Risk Assessment, & Disaster Management Plan.

7.0 Project Benefits

Rs.14,532,376.38 have been spent towards various CSR activities in last 5 years. The summary of CSR amount spend in last five years for various activities such as sports, education, medical facilities and water facilities are given below:

CSR BUDGET SPEND SUMMARY	
Year	**Amount**
2014 - 2015	609079.00
2015 - 2016	462870.00
2016 -2017	274483.00
2017 - 2018	2151848.84
2018 - 2019	2433526.54
2019 -2020	5384863.00
2020 - 2021	3215706.00
Total	**14,532,376.38**

8.0 Environmental Management Plan

Environmental Management Cell

A separate environmental management cell is established to implement the management plan. The group is headed by a Vice President-Comml/HR. The group will ensure the suitability, adequacy and effectiveness of the Environment Management Program. The functions of Environmental Management Cell are:

- Obtaining consent order from State Pollution Control Board.
- Environmental monitoring.
- Analysis of environmental data, preparations and submission of report to statutory authorities, & Corporate Office.
- To co-ordinate with statutory bodies, functional groups of the plant units & head office.

- Interactions with plant official for modification programme if any to improve pollution control devices / systems.
- Environmental Appraisal (Internal) and Environmental Audit.

The following mitigation measures will be undertaken for the proposed project

AIR POLLUTION

The sources of air pollution are materials transportation, raw materials feeding to the operating equipments. The automatic process equipments will be employed for the raw material feeding system. Stacks of adequate height is proposed for proper dispersion of flue gases. Plantation along the internal roads in the plant premises will be strengthen and all the internal roads shall be concreted / asphalted to reduce the fugitive dust due to vehicular movement..

WATER POLLUTION

The waste generated from the industrial process will be treated in neutralization tank and reused in the process and for dust suppression and waste water generated from domestic use will be treated in STP and used for plantation purpose. As no wastewater will be discharged outside the plant premises, there will be no impact on the water quality of any surface water bodies of the area.

NOISE POLLUTION

Regular maintenance of the various equipment, ear plugs/muffs will be provided for the personnel working close to the noise generating units. Further all the openings like covers, partitions will be designed properly to abate noise pollution.

SOLID WASTE DISPOSAL AND MANAGEMENT

The main solid waste generated from the proposed expansion project will be char, fly ash Dust from ESP. Char will be Reused in Power Plant and Sold to local entrepreneurs for making a coal briquettes. Fly as will be used in Land filling / levelling and will be supplied to brick manufacturing units/ cement plants.

GREEN BELT DEVELOPMENT

The plantation helps to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics quality of the region. Avenue plantation within the plant and green

belt development is done. Total area of the project area is 93.52 ha. Out of the total area, green belt development is done in 47.7 ha (51%) of plant area of A-1 & A-2. The plant is in operation since 1994-95 and 2,14,650 nos. of trees are planted and survived till 2014.

The total area of green belt will be 47.7 ha (51% of the total land)

Year-wise Plantation Details

Sr. No.	**Year**	**Trees planted**	**Survival**
1.	2015	3000	2872
2.	2016	3000	2725
3.	2017	3000	2950
4.	2018	3000	3002
5.	2019	3000	2795
6.	2020	3000	2895
	Total	**18000**	**17239**

After commissioning of the proposed project the LMEL is going to follow all the measures as per EMP in the plant premises that will results in the further improvement in the environmental quality and all the parameters will be maintained within the prescribed limits.

9.0 Conclusion

It can be concluded that there would be negligible impact in the buffer zone due to the proposed expansion. The project shall contribute to the socio-economic development, strengthening of infrastructural facilities like medical, educational etc. The plant shall be operated keeping "Sustainable Development" of the region in mind.

Further, management is committed to contribute towards improving socio-economic status of the surrounding local community.

Environmental monitoring is a successful tool for the management for implementation of adequate & effective environmental measures. It also helps the management to take mid-course correction, if required based on the environmental monitoring results. Considering the above overwhelming positive impact on the community, there shall be overall development of the area.