Executive Summary

1.0 Introduction

The M/s. Vigour Metals is registered as small scale industry registered with District Industries. The head office of 'Vigour Metals And Alloys' is at Nagpur (Maharashtra), the production processes will be carried out is well equipped unit in MIDC Industrial area Butibori Nagpur. A constructed shed has been leased out by MIDC to Vigour metals and alloys for their proposed Manufacturing activity. The incorporation of latest technology and machines will help them to meet the upcoming production requirements and growing market needs.

The purpose of this Environmental Impact Assessment (EIA) study is to provide information on the surroundings and the extent of environmental impact likely to arise on account of the proposed activities.

The objectives of the EIA study are:

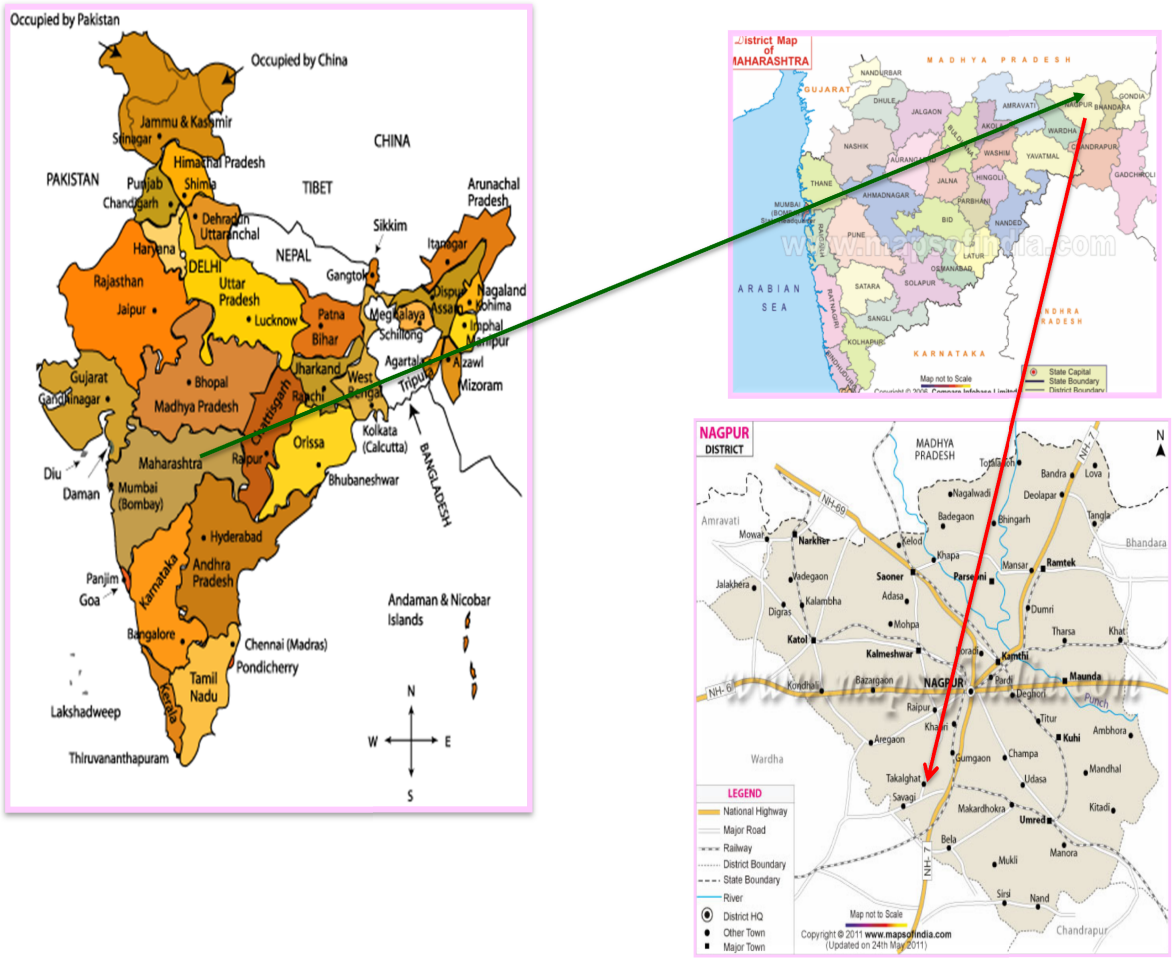
- To assess the present status (baseline) of air, water, land, noise, biological and socio-economic components of environment including parameters of human interest;
- To identify and quantify significant impacts of various activities by the proposed project
- To evaluate existing pollution controls measures and suggest modifications, if required;
- To prepare Environmental Management Plan (EMP) outlining control measures for mitigation of adverse impacts; and
- To delineate post project environmental quality monitoring program for management of emissions from the plant with increased capacity.
- To prepare risk assessment and disaster management plan.

1.1 SITE SELECTION CRITERIA

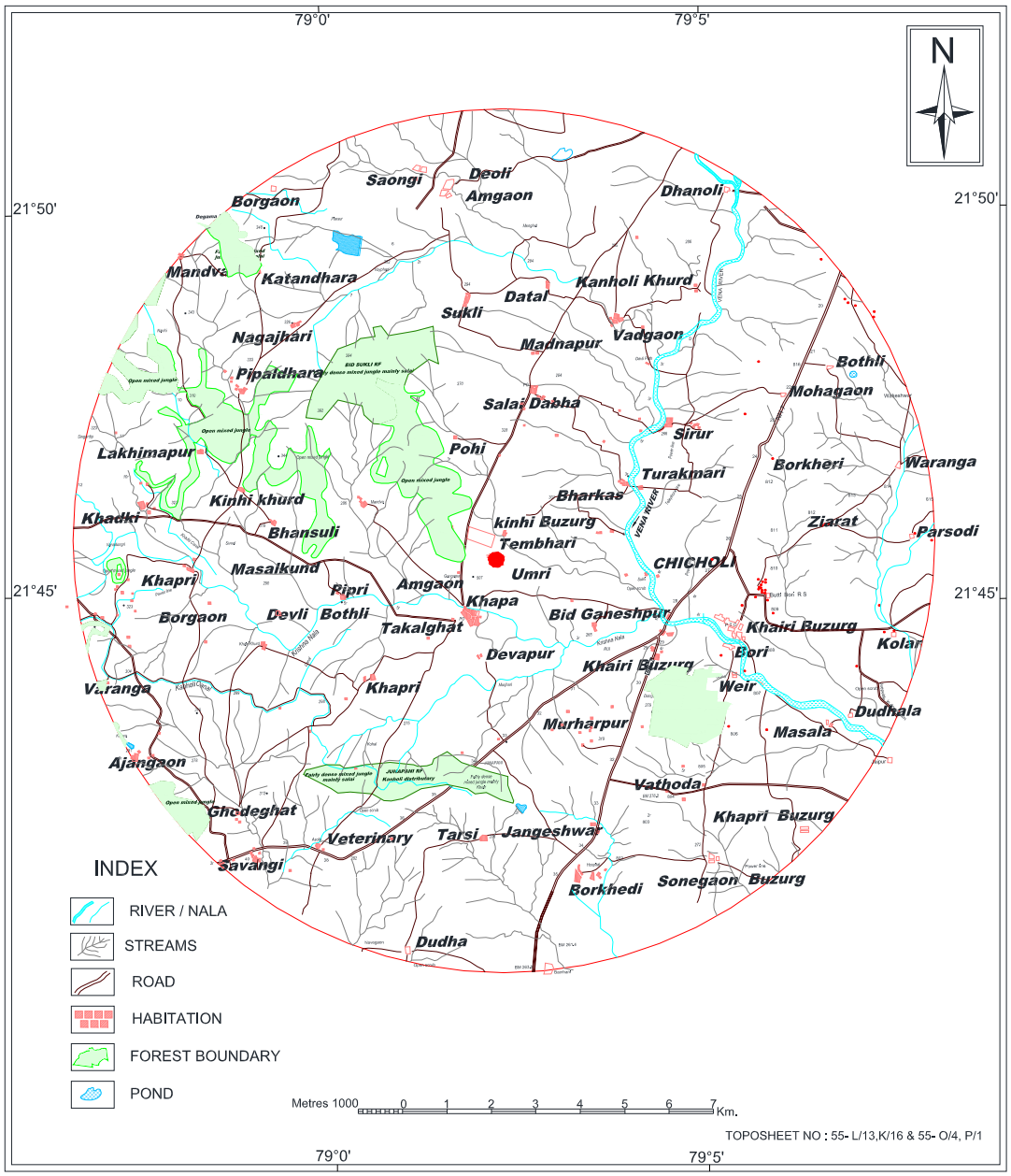
- The plant is proposed in Notified Industrial Area.
- Existing Plant in operation.
- No Rehabilitation/Resettlement issues.
- No nallah/water body, public roads, forests within the project site.
- Availability of Raw Material.
- Assured Water Supply from MIDC.
- Assured Power Supply.
- Market available for finished products.
- Availability of man power.
- Availability of industrial infrastructure.

1.2 DETAILS OF THE PROJECT SITE

Sr No	Particulars	Details
1	Project Site	MIDC - Butibori Dist. - Nagpur State - Maharashtra.
2	Latitude	20°55'55.77"N
3	Longitude	78°57'35.72"E
4	Elevation above MSL	900
5	Toposheet	55 L/13,55K/16, 55 P/1 and 55 O/4
6	Present landuse	Industrial land
7	Nearest National Highway/State Highway	NH – 7 : 4 Km NH-204 : 4 Km
8	Nearest Airport/ Air Strip	N agpur: 30 Kms
9	Nearest city	Nagpur
10	Forest	3 Patches of RF at 5 km, 7 km and 9 km
11	Water Bodies	Vena river – 2.5km(E) Krishna nala – 3km (ES) Wakeshwar lake- 9.6km Khadki lake – 10km(WN)



Location Map of the Proposed Project Site



Study Area of the Proposed Project

1.3 PURPOSE OF EIA

As per the Environmental Impact Assessment (EIA) Notification dated 14th September, 2006, Metallurgical Industries (Ferrous & Non Ferrous) falls under category 'A' which requires Environmental Clearance (EC) to be obtained from MoEF before the commencement of ground activity.

The application to prior EC (Form-1) for the proposed project was submitted to MoEF for approval of Terms of Reference (TOR). The proposal was considered by the Expert Appraisal Committee (EAC) during its 14th meeting held during 19th to 20th December 2013 for the TOR for preparation of EIA report. The EAC has suggested TOR for preparation of the EIA report vide letter F. No. J-11011/287/2013-IA-II (I) dated March 11th , 2014. The EIA report for the proposed project is prepared as per the guidelines of MoEF and contains 11 chapters including Environmental Management Plan. It is requested to accord approval to environmental clearance by MoEF, Government of India.

2.0 PROCESS DETAILS

[A] FERRO ALLOYS AND OTHER NOBLE FERRO ALLOYS

(1).Manufacturing of Ferro Alloys through Thermit Process is very easy and simple

Principal of Thermit Process:

Aluminothermic Process aims at the production of Ferro Alloys from the oxides of elements by reduction with Aluminum powder using exothermic heat of the reaction for smelting purpose. The highly exothermic reaction raises the temperature of the reaction to above 2000 ^{0}c or even more.

Metal Oxide + Al $\longrightarrow$ **Metal + Al_2O_3**

On ignition of the reaction mixture consisting of the oxide ore whose metal is to be obtained with aluminum powder/telic, aluminum readily reacts with the oxygen of the metal oxide liberating heat, which raises the temperature of the reacting substance and reacts thereby yielding the Ferro Alloys Slag.

Activities are proposed

(a) Powdering of different Alloys / Minerals, raw material packing the same in bags.

(b) Mixing in blender in the required proposition

(c) Then a small fire is created (By aluminum powder) the reaction vessel, where this blended material is added slowly

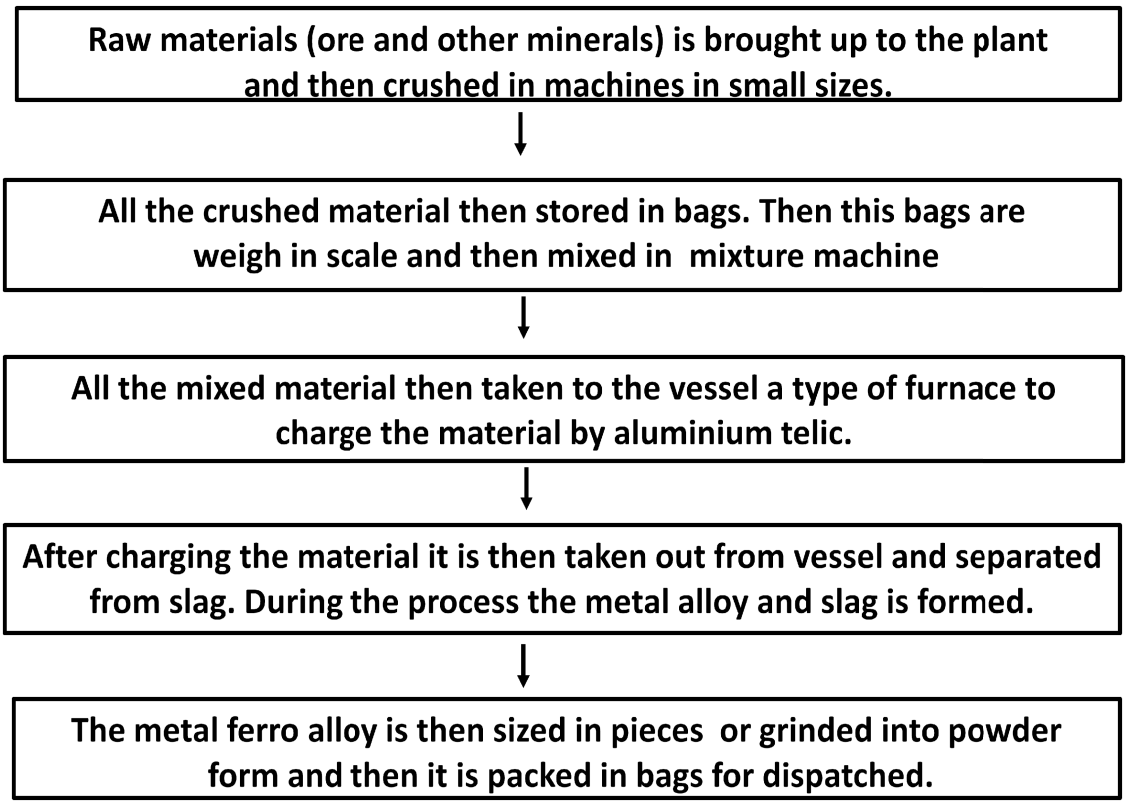
(d) The powder starts melting inside the vessel and the Metallic contents are automatically separated which settles down and the sludge floats.

(e) Metal and Sludge will be separated by manual processes

(f) Metal will be crushed and for some customer it will be powdered.

(g) Packed : The crushed metal will be packed in bags and kept ready for dispatches.

FLOW CHART OF PROCESS



[B] INDUCTION FURNACE [Capacity of Induction Furnace -150 Kg/heat]:

1. **Melting Iron / Steel Scrap : -** Initially Iron Scrap is placed into the Induction Melting Furnace (Electrically Operated) and allowed to melt.

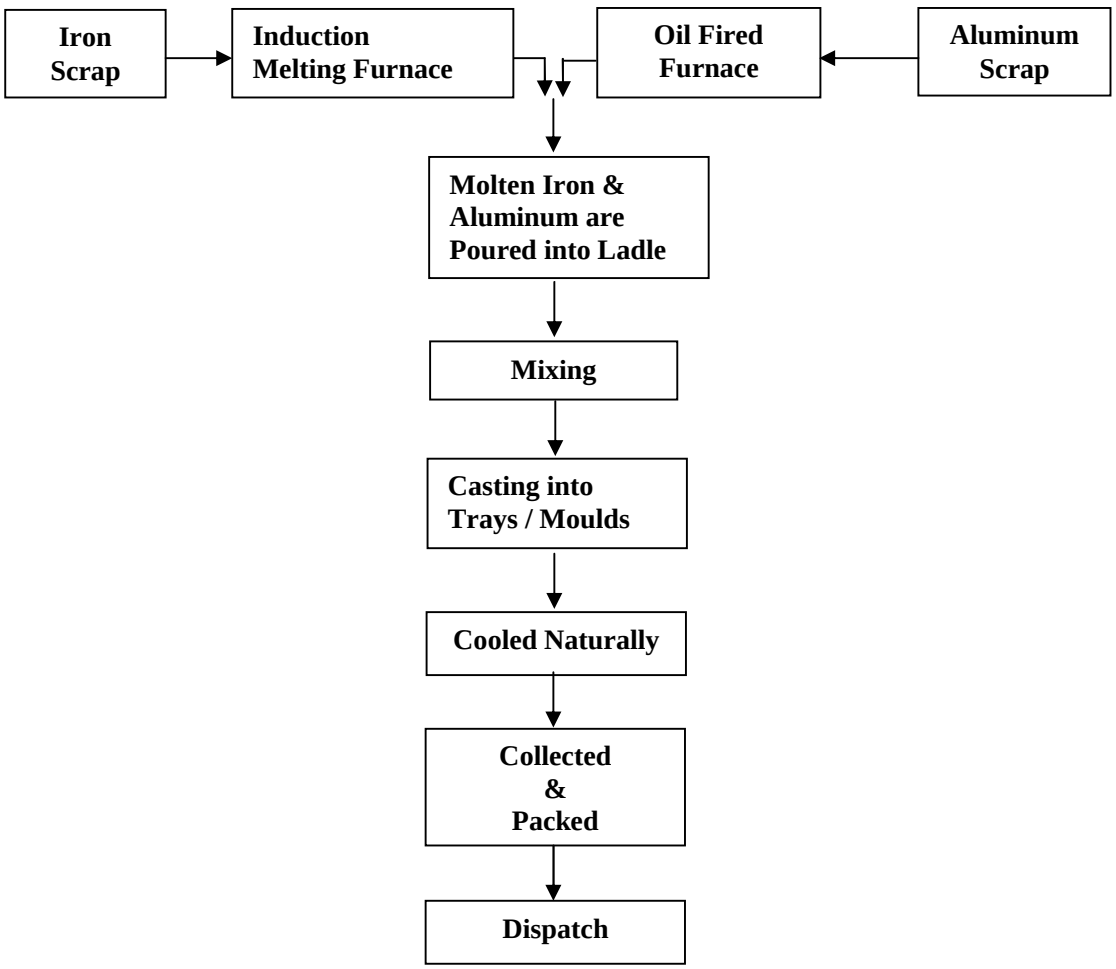
2. **Melting Aluminum / Scrap : -** The Aluminum / scrap is melted simultaneously in the oil fired furnace.

3. **Mixing :** Molten aluminum scrap is poured into the Ladle, which is then carried to the induction furnace, whereby molten Iron is also poured into the same ladle.

4. **Casting : -** The resulting mixture is then poured onto stationary patterns / moulds/ tray or casting machine and allowed to cool.

5. **Packing : -** The cooled Piglets are then taken into packing ready for dispatch.

FLOW CHART OF PROCESS



3.0 Description of the Environment (Baseline Data)

3.1 Air Environment

The baseline environmental quality for the **January, February, March and April 2014** was assessed in an area of 10 km radius around the proposed project site**.**

During the study period, the wind speed measured has observed that about 6.8 % of total time, the wind was **calm** i.e. the speed was less than 1 km/hr. The predominant wind directions were from **N** (16.8%), from **NNE** (14.5%) and from **NNW** (10.2%). Average wind speed was 5.9 km/hr during monitoring period and most of the time wind speed was between 1 to 5 km/hr.

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

PM_{10} - 31.5 to 63.8 µg/m^3.
$PM_{2.5}$ - 15.2 to 40.1 µg/m^3
SO_2 - 7.1 to 32.5 µg/m^3
NO_x - 9.5 to 23.8 µg/m^3

Parameters	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**
Industrial Area Residential, Rural Area (CPCB Norms)	100 µg/m^3	60 µg/m^3	80 µg/m^3	80 µg/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).

3.2 Water Environment

A total 5 samples including two surface & three 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 (IS 10500 – 1993 except high concentration of total coli form in surface water, which may be due to the human activities.

3.3 Noise Environment

Recorded Noise Levels in the core zone of proposed project site, are in the range of 26.1(night time) to 55.4 dB (A) (day time) at all eight monitoring stations. Maximum levels of noise have recorded in day hours which are natural as our most of activities have done in day hours.

Noise levels measured at all eight stations (N-1, N-2, N-3, N-4, N-5, N-6, N-7 and N-8) are very low and well within limit of either 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.

3.4 LAND ENVIRONMENT

Three soil samples were collected from agriculture, waste land and barren land in order to assess the existing soil conditions around proposed project site.
The observations of soil characteristics are discussed parameter wise below;
The observations of soil characteristics are discussed parameter wise below;

(a) Texture of soil samples from agriculture land and waste land are silty loam and sample from Barraien land are clay-loam in Texture Classification.

(b) Colour of soil samples from agriculture and Barraien lands are gray and sample from waste land are dark grey in colour.

(c) The bulk density of soil samples from barraien land are in the range of 1.64 to 1.93 g/cc and sample from agriculture land are in the range of 1.85 to 1.88 g/cc and sample from waste land are in the range of 1.68 to 1.75 g/cc.

(d) Soil samples from barraien land have pH values between 8.03 to 8.12 and sample from agriculture land have 8.15 to 8.20 and sample from waste land have 7.83 to 7.90 ranges of pH values. The pH values are indicating nature of soil samples is neutral to alkaline.

(e) Soil samples from barraien land have conductivities between 0.148 to 0.185 mmhos/cm and conductivities of soil sample from agriculture land ranges between 0.260 to 0.292 mmhos/cm and conductivities of soil sample from waste land ranges between 0.125 to 0.162 mmhos/cm.

(f) Soil samples from barraein land have Organic Matter between 0.24 to 0.56 % and sample from agriculture land have between 1.97 to 2.16 % Organic Matter and sample from waste land have between 1.13 to 1.65. These values represent good fertility of soils.

(g) Soil samples from barraein land have concentration of Available Nitrogen values ranged between 95.5.0 to 229.1 kg/ha and samples from agriculture land range between 801.1 to 878.2 kg/ha and samples from waste land range between 458.2 to 668.2 kg/ha Available Nitrogen value.

(h) Soil sample from barraien land have concentration of Available Phosphorous values ranged between 6.6 to 8.2 kg/ha and soil samples from agriculture land have concentration values ranges from 34.5 to 45.1 kg/ha and samples from waste land have concentration values ranges from 7.4 to 10.7 kg/ha.

(i) Soil sample from barraien land have concentration of Available Potassium values range between 209.3 to 239.6 kg/ha and sample from agriculture land concentration of Available Potassium as its values range between 989.7 to 1482.4 kg/ha and sample from waste land have values range between 245.4 to 286.0 kg/ha.

4.0 Anticipated Environmental Impacts & Mitigation Measures

- **Impact on Air Quality**

Air pollution sources are raw material handling and transport system. The fugitive emissions from the sources will be suppressed by water sprinklers. All vibrating screens and weigh feeders below the hopper; day bins etc are totally covered to prevent leakages of dust. All material transfer points are connected with dust suppression water nozzles to avoid air pollution.

Ventury scrubbers/ Bag filters will be provided for the extraction of dust particles.

Predictions have been carried out using AERMOD for study period. The predicted ground level concentrations obtained when superimposed on the baseline concentrations are within the prescribed NAAQ Standards for residential areas.

- **Noise Environment**

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.

Noise levels will be attenuated by providing encasement of noise generating equipment, noise proof cabins to operators, noise generating sources will be insulated by providing suitable enclosures, Inlet and outlet mufflers will be provided which are easy to design and construct and all the rotating items will be well lubricated.

- **Water Environment**

The total water requirement for the proposed activities is 5 KLD. During plant operation waste water will be generated from the zigging process. The wastewater generated in this process will be treated in the settling tank and will be reused in the zigging process..

- **Impact on Flora Fauna**

The reserved forest in the study area is in patches. There is no designated ecological park or Bio Reserve/Wild life sanctuary in the 10 km radius of the proposed plant site. The impact on terrestrial ecology will be negligible and shall be insignificant.

4.2.4 Solid Waste Generation

The solid waste generation in the existing and proposed plant is given in **Table 4.5**

TABLE 4.5
Solid Waste Generation & Mitigation Measures

Waste	Quantity	Mitigation Measures
Slag (Cumulative)	1200 TPA	Slag generated from manufacturing of Ferro manganese will be sold to manufacturer of Silico-manganese.

- **Impact on Socio-Economic Environment**
  - ✓ The impact on socio-economic environment will be positive due to the increase in employment, opportunities to the local people, during operation phase 40 technical and nontechnical people will be employed and improvement in transport, communication, health and educational services.
  - ✓ M/s Vigour Alloys and Metals Limited is equally conscious for the all round socio-economic development and is committed to raise the quality of life and social well being of communities where it operates. Its CSR initiatives will be prioritized on local needs, which focus on Health, Education, Sustainable Livelihood, Social Mobilization, Infrastructure Development and Environment Conservation.

5.0 ENVIRONMENTAL MONITORING PROGRAM

The environmental monitoring is important to assess performance of pollution control equipment installed in the project of M/s Vigour Alloys and Metals Ltd. The sampling and analysis of environmental attributes including monitoring locations will be as per the guidelines of the Central Pollution Control Board/ State Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s Vigour Alloys and Metal Ltd. to assess the pollution level in the proposed plant as well in the surrounding area. Therefore, regular monitoring program of the environmental parameters is essential to take into account the environmental pollutant of the study area. The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments;
- To follow the trend of parameters which have been identified as critical;
- To check or assess the efficiency of the controlling measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical due to the commissioning of proposed facilities;

- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures;
- To establish a database for future Impact Assessment Studies for new projects.

The attributes, which needs regular monitoring, are specified below:

- Air quality
- Water and wastewater quality;
- Noise levels;
- Soil quality;
- Ecological preservation and afforestation; and
- Socio Economic aspects and community development

Environmental Budget

Total cost of the project will be Rs.145 lacs. The budgetary provision for EMP will be as Rs. 6.5 lacs

6.0 ENVIRONMENTAL MANAGEMENT PLAN

- **OPERATION PHASE**

Air Environment

The following Environmental Management Plan will be implemented to control air emissions from proposed project.

- M/s Vigour Metal and Alloys shall provide dust suction system which will control fugitive emission due to material and raw material handling.
- Dust suppression system will be provided in the form of water sprinklers.
- All vibrating screens and weigh feeders below the hopper; day bins etc are totally covered to prevent leakages of dust.
- All bins are packed and covered so that there is no chance of dust leakage.
- All discharge and feed points wherever the possibility of dust generation, is provided with dust suppression system.

- All material transfer points are connected with dust suppression water nozzles to avoid air pollution.
- Regular monitoring of air polluting concentrations, *etc*.
- Wetting of roadways to reduce traffic dust and reentrained particles
- Installation of windscreens to breakup the wind flow.
- Provision for masks when dust level exceeds, *etc*.
- Installation of Wet Scrubber/Bag Filters followed by Stack.
- Two types of the scrubber will be provided, one will be water spray type wet venturi scrubber and the other one will be a dry scrubber.
- In the wet scrubber, the gas enters through the top of the scrubber. The cold water is then sprayed from the side of the scrubber body using a spray nozzle. The mixture of gas and water thus formed will be drawn towards using a long venturi. The particulate mixed with the water will be collected at the bottom cone by means of a sealing tank.
- The water collected will be filtered using a 3 stage sand filtering tank and will be circulated/re-used for the process again. The cold gas will be blown out through the outer ring of the wet scrubber through a dry scrubber.
- The gas coming out of the wet scrubber will have some water particulates, which will be scrubbed and dropped down to the sealing tank by a set of conical baffles in the side/shell of the dry scrubber. The gas from the wet scrubber enters at the bottom of the dry scrubber and gets out at the top of the stack.
- The scrubber will be designed in such a way that the velocity after hitting the baffles will be reduced gradually, so that any particulates or drop of water scrubbed by the baffles falls to the bottom cone of the scrubber body.

- **Noise Environment**

  - ✓ The areas where noise levels are high will be partitioned off, noise levels will be minimized at the source, and noise reflection and transmission will be minimized.
  - ✓ The workers working in the high noise areas will be provided with ear muffs/ear plugs.

- ✓ Acoustic laggings and silencers will be provided in equipment wherever necessary. Ventilation fans shall be installed in enclosed premises.
- ✓ The silencers and mufflers of the individual machines shall be regularly checked
- ✓ The noise level shall not exceed the limit 75 dB (A) during the day time 70 dB (A) night time within the plant premises.
- ✓ Avenue plantation around the plant area will reduce the noise level further. Training of personnel is recommended to generate awareness about damaging effects of high noise levels.

➢ **Water Environment**

During plant operation no waste water will be generated from Thermite Process and Induction Furnaces the water is being used for cooling the products which will be evaporated and condensed, water if generated will be recycled. Provision for oil/grease separators will be made to skim oil / grease, if any in the waste water. After skimming of the oil water will be stored in guard pond. Domestic waste will be disposed through Septic Tanks along with soak pits.

➢ **Rain Water Harvesting System (RWH)**

RWH structures have already been provided in the existing facilities.

➢ **Land Environment**

Strengthening of the existing green belt

The plantation will 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 area will be further strengthen. The selection of the species will be finalized in consultation with the local Forest Department.

➢ **Management Plan of Solid waste**

- Process needs refractory lining and is being changed every month.
- Solid waste is non hazardous and non-toxic in nature.
- Solid waste will be use for land filled, in own premises.

- Temporary Landfill will be designed for slag and dust as per the guidelines of MoEF New Delhi.

- **Socio Economic Environment**

The project proponent would aid in the overall social and economic development of the region. The plant will give employment to about40 people of local area. 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.

- **Occupational Safety & Health Management**

Project proponent will provide all necessary provisions under Factory Act. In addition a Safety committee will be formed and manned by equal participants from Management and Workers. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved. In case a person inhales CO, he should be removed to fresh air and given mediated oxygen through a mask for 30 minutes and if required cardiopulmonary resuscitiation should be performed.

- **Conclusion**

  The potential environmental, social and economic impacts have been assessed. The proposed activities will have the marginal impacts on the local environment. With effective implementation of proposed environment management plan and mitigation measures, these impacts will be insignificant. Implementation of the project has beneficial impact in terms of providing direct and indirect employment opportunities. This will be a positive socio-economic development in the region.