

Executive Summary

For

***Proposed Manufacturing of Manganese oxide,
Manganese Dioxide & Ferro Alloys***

At

***Plot No. C/156, MIDC Butibori, District Nagpur,
Maharashtra***

***Project Proponent
M/s. Singh Ferro Alloys***

EXECUTIVE SUMMARY

PREAMBLE

Ferroalloy refers to various alloy of iron with a high proportion of one or more other elements such as manganese, aluminum, or silicon. They are used in the production of steels and alloys. The alloy impart distinctive qualities to steel and cast iron or serve important functions during production and are, therefore, closely associated with the iron and steel industry, the leading consumer of ferroalloys. The leading ferroalloy-producing countries in 2008 were China, South Africa, Russia, Kazakhstan and Ukraine, which accounted for 77% of the world production. World production of bulk chromium, manganese and silicon ferroalloys was estimated as 29.1 million tonnes (Mt) in 2008, a 3% decrease compared with 2007.

Ferro-alloys are among the essential inputs required for steelmaking. It improves the quality of steel, by controlling the harmful impurities and at the same time improves the mechanical properties of steel through alloying. Growth in Global as well as domestic steel industry directly drives the demand of Ferro-alloys. Since Indian steel industry is under massive expansion, there is a tremendous potential for investment in Ferro-alloy production.

The increasing demand of Ferro Alloys, which is used as raw material in steel and stainless steel industries, prompted M/s. Singh Ferro Alloys to establish manufacturing of manganese oxide, Manganese dioxide, Ferro Titanium, Low/Medium Carbon Ferro Manganese, Ferro Molybdenum, Ferro Vanadium etc.

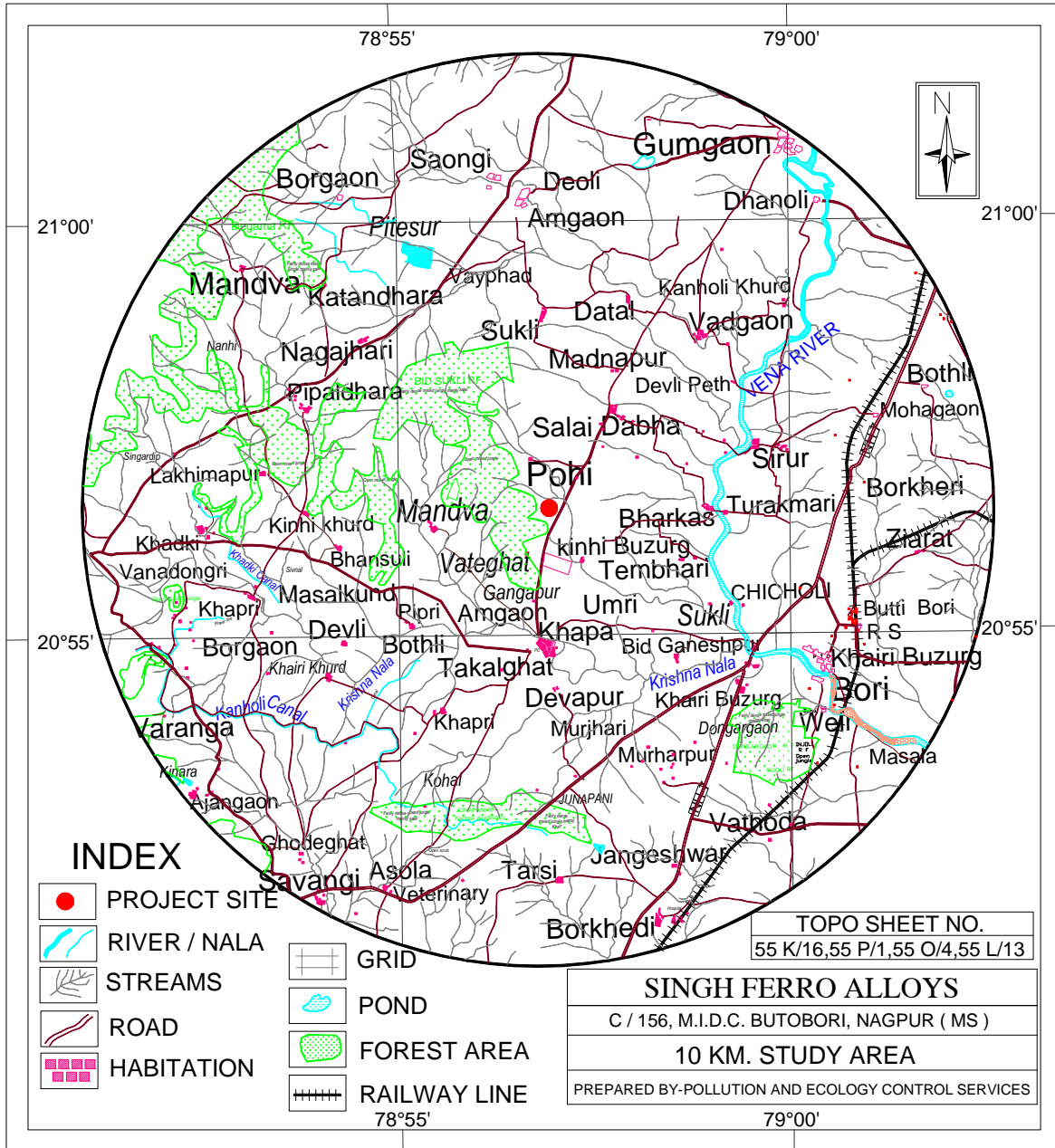
The plant of M/s. Singh Ferro Alloys is established to manufacture and process Manganese oxide, Manganese Dioxide and various Ferro Alloys. The factory is located 27 kms away from Nagpur city, at Plot No. C/156, MIDC Butibori, District Nagpur, (M.S.). The latitude and longitude of the proposed project are 20°56'45.91"N and 78°56'49.35"E respectively.

The location, topographical map and details of the proposed project are given below



Source:mapsofindia.com

Location of the Project Site



Source: SOI Toposheet

Topographical Map

DETAILS OF THE PROJECT SITE

Sr. No.	Particulars	Details
1.	Project Site	MIDC - Butibori Dist. - Nagpur State - Maharashtra.
2.	Nearest major road	NH – 7 : 5.5 Km (SE)
3.	Coordinates	Latitude - 20°56'45.91"N Longitude - 78°56'49.35"E
4.	Nearest railway station	Butibori railway station :8 kms (E)
5.	Elevation above MSL	288 mt
6.	Toposheet	55 L/13,55K/16, 55 P/1 and 55 O/4
7.	Climatic conditions (Based on IMD)	Maximum Average: 28 ⁰ C Minimum Average : 13 ⁰ C Humidity Average : 20 to 80% Rainfall Average : 1000mm
8.	Nearest village	Pohi :1.0 km (NW)
9.	Nearest major city	Nagpur - 25Kms (NE)
10.	Nearest water body	Vena river : 3.5km(E) Krishna nala : 3 km (S) Kanholi Canal : 4.5 km (SW) Vadgaon lake : 9.6km (SE)
11.	Defense Installation	Nil
12.	Sensitive locations	Archaeological structures, Historical places, Sanctuaries and Biosphere None within 10 km
13.	Nearest forest	Reserve forest : Bid Sukli – 0.5 Kms (W) Dongargao R.F. : 6.0 km (SE) Junapani R.F. : 6.5 km (S)

DESCRIPTION OF PROCESS

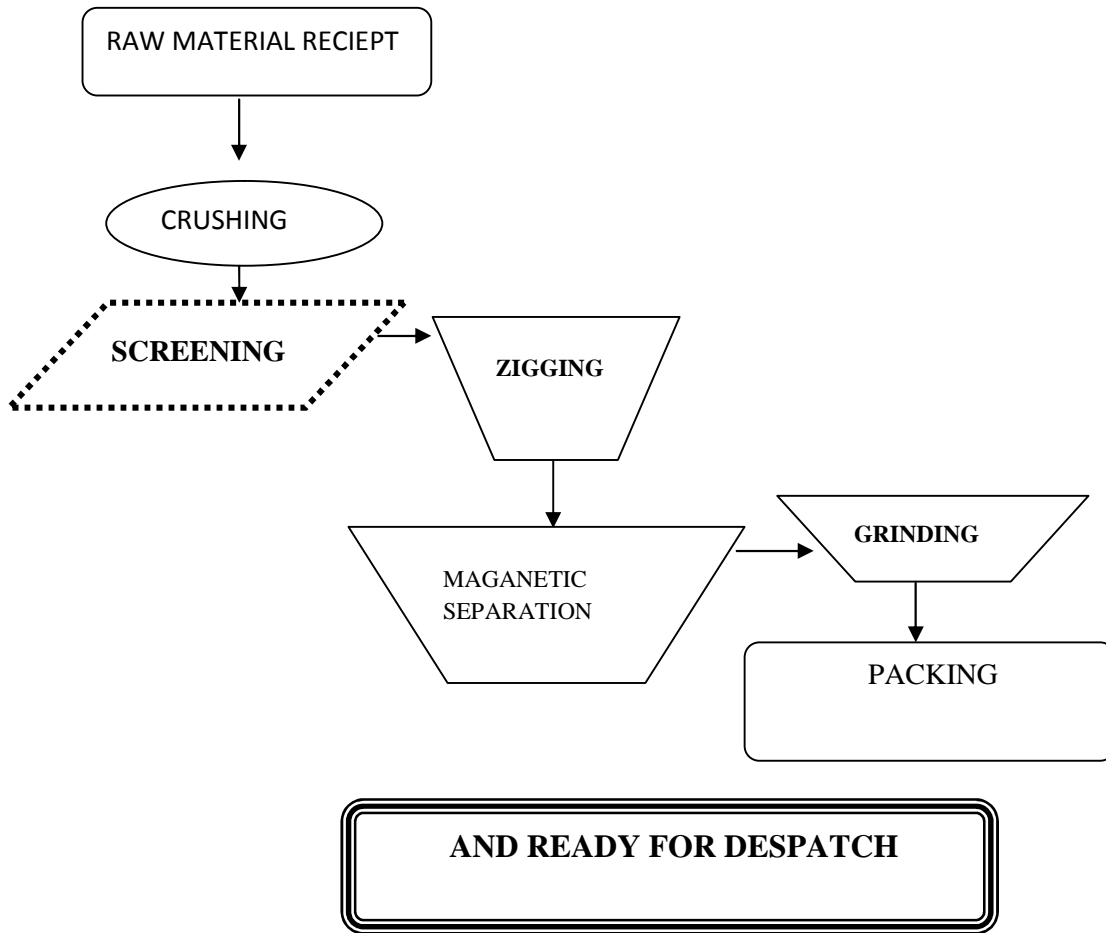
MANUFACTURING PROCESS OF MANGAESE DIOXIDE

After receipt of material it is tested for its impurities. After getting full information's about its impurities following processes are followed to remove impurities and improve the purity of Manganese Ore.

- **Screening:** The material is screened so that uniform sizes are obtained for further process.

- **Zigging:** Water jigging is done to separate and wash impurities.
- **Magnetization:** Different sizes of MnO₂ ore are feed to magnet where unwanted impurities get removed.

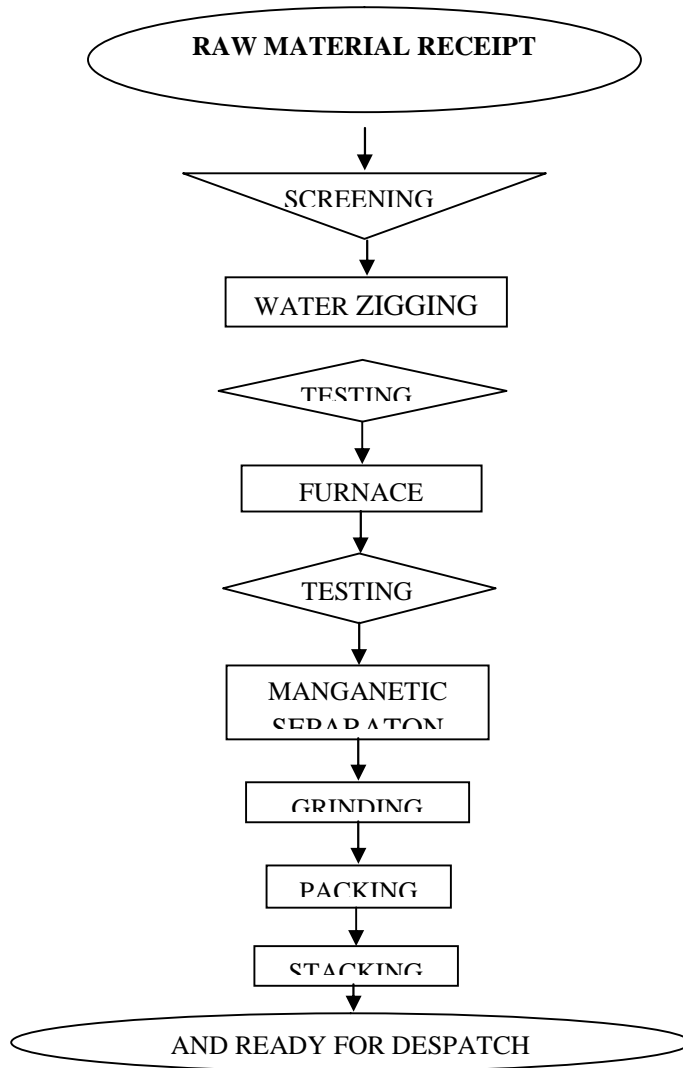
PROCESS FLOW CHART OF MNO₂ PRODUCTION



MANUFACTURING PROCESS OF MANGANESE OXIDE

- (A) After Raw Material receipt at the site it is tested for the contents of various elements and then the material is screened. After screening you get different sizes, which are jigged in automatic water jigging.
- (B) Then the material is dried and after Magnetic Separation it is feed to grinding Machine, where it is powdered in the required mesh size.
- (C) After grinding it is semi automatically packed in 25 kg/50 kg/ or 1000 kg HDPE Bags and kept ready for dispatch.

PROCESS FLOW CHART OF MNO PRODUCTION



FERRO ALLOYS / AND OTHER NOBLE FERRO ALLOYS THERMITE PROCESS

Manufacturing of Ferro Alloys through Termite Process is very easy and simple.

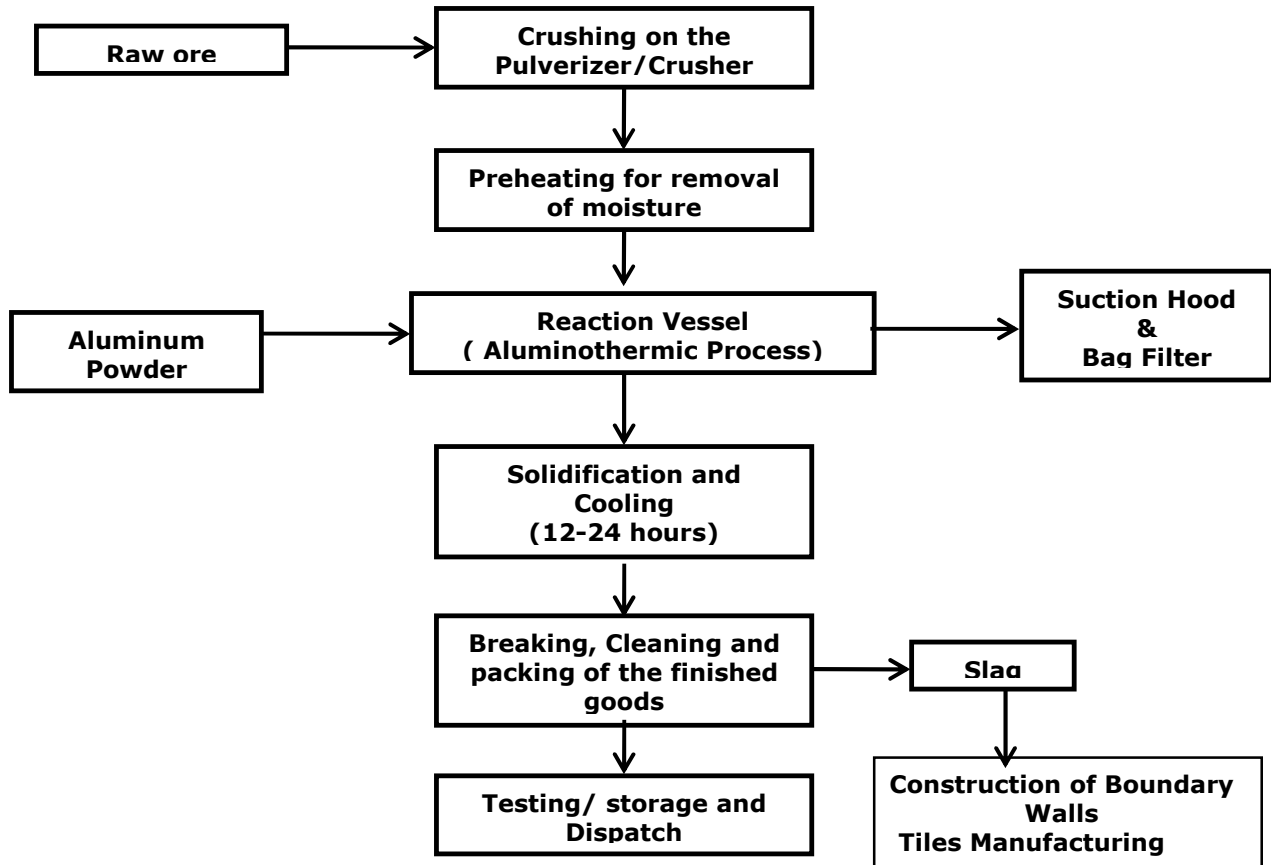
Following activities are carried on:

- (a) Powdering of different Alloys / Minerals.
- (b) Mixing in blender in the required proposition
- (c) Then a small fire is created (By aluminum powder) in the reaction vessel, where this blended material is added slowly. The powder starts melting inside the vessel and the

Metallic contents are automatically separated which settles down and the sludge floats.

- (d) Metal and Sludge are separated by manual processes.
- (e) Metal is crushed and for some customer it is powdered in Pulveriser.
- (f) The Metal is crushed and packed in bags and kept ready for dispatches.

PROCESS FLOW CHART



DESCRIPTION OF ENVIRONMENT

The baseline environmental quality for the period of October, November & December 2016 was assessed in an area of 10 km radius around the proposed project site.

Air Environment

It has observed that about 46.36 % of total time, the wind was calm i.e. the speed was less than 1 km/hr. The predominant wind directions were from NE (35%), 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 57.6 µg/m ³ .
PM _{2.5}	:	15.4 to 32.5 µg/m ³
SO ₂	:	7.6 to 24.5 µg/m ³
NO _x	:	9.9 to 25.2 µg/m ³

Industrial Area	PM ₁₀	PM _{2.5}	SO ₂	NO _x
Residential, Rural Area (CPCB Norms)				
	100 µg/m ³	60 µg/m ³	80 µg/m ³	80 µg/m ³

The concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 10 samples including two 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.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55

C	Residential Area	55	45
D	Silence Zone**	50	40

** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

Three 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.

- a. Texture of soil samples from agriculture land and waste land are silty loam and sample from Forest land are clay-loam in Texture Classification.
- b. Colour of soil samples from agriculture and Barren lands are gray and sample from waste land are dark grey in colour.
- c. The bulk density of soil samples from Forest 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 Forest land have pH values between 8.1 to 8.5 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 Forest land have conductivities between 0.137 to 0.192 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 Forest land have Organic Matter between 8.6 to 15.6 % 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 Forest land have concentration of Available Nitrogen values ranged between 98 to 150 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 Forest land have concentration of Available Phosphorous values ranged between 3.6 to 4.9 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 Forest land have concentration of Available Potassium values range between 137 to 194 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.
- j. Characteristic of Fores and Waste land soil is a little deficient in nutrients concentration. Whereas, agricultural land soils are moderately suitable for cultivation of climatic crops and have good fertility.

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The impacts on air quality due to source of the air pollution in the proposed facilities have been identified.

Sources of Emissions

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.

Raw Material Handling / Transport System

The possible pollutants are fugitive dust emissions from raw materials handling areas viz. loading / unloading, crushing units etc. The major sources of pollution from proposed units can be classified under the following heads:

- Pollutants in the waste gases namely, suspended particulate matter (SPM), sulphur dioxide, NO_x and Carbon monoxide, etc.
- Fugitive dust generated during vehicular movement

Mitigation Measures

- M/s Singh Ferro 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.
- Regular monitoring of air polluting concentrations, *etc.*
- Installation of Bag Filters followed by Stack.
- Predictions have been carried out using GPM-MODEL for study period. The predicted ground level concentrations obtained when superimposed on the baseline concentrations are within the prescribed NAAQ Standards for residential areas. PM₁₀, PM_{2.5} & SO₂ will increase by 0.28 µg/m³, 0.1 µg/m³ and 0.54 µg/m³ respectively.

Impacts Due to the Transportation of Raw Material

The major impact due to transportation of the raw material. The emissions due to transportation of vehicles in the study area were determined from fuel-based emission factors and number of vehicles plying on roads in the area. Loading and transportation of raw materials are the significant sources of emissions.

The majority of trucks (95%) plying in the study area are manufactured in India as per the standard norms hence it is assumed that emission from these trucks will be similar and is mandatory for the vehicle manufactures to follow emission norms under the Motor Vehicle Act. The emissions through transportation are assessed based on Emission factors for on-road vehicles (CPCB Publication 1998).

Mitigation Measures

- The vehicles transporting raw materials will be covered by tarpaulin in order to prevent dust emission during the transport.
- The vehicles used in transportation will comply norms as per the motor vehicle act.
- The repair and maintains of vehicle will be taken care by transporter
- Vehicles with PUC will be only allowed to operate

Air pollution mitigation measures

- Particulate matter will be controlled below 50 mg/Nm^3 by providing efficient dust suppression and extraction system. Water spray system shall be installed in the material handling system transfer points
- Green belt shall be provided around the plant area. Plantation in open space along with boundary wall in the plant premises will also be undertaken
- Water spraying will be practiced frequently
- The emissions from the stacks shall be regularly monitors for exit concentration of Sulphur dioxide, Nitrogen oxides and PM. Sampling ports shall be provided in the stacks according to CPCB guidelines.

Impact on 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 process. The sewage generated from the toilets and bathroom will be about $1.5 \text{ m}^3/\text{day}$ in the proposed facilities which will be treated in Packaged Type STP.

Impact on Noise Environment

During operation, the major noise generating sources are grinding mill, loading sections, blenders 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 within the Proposed plant the impact of noise levels on surrounding will be insignificant.

Mitigation Measures

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards. The general mitigation for the attenuation of the noise are given below:

- ❖ 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.

Solid Waste

The solid waste generation in the proposed plant is given in following table

Table: Solid Waste Generation & Mitigation Measures

Waste	Quantity	Mitigation Measures
Slag	520 TPA	Slag generated from manufacturing of Ferro manganese will be sold to manufacturer of Silico-manganese.
Ash	100 TPA	Will be sold to brick manufacturers

SOCIO-ECONOMIC ENVIRONMENT

The impacts of the proposed project, during its operation, on demography and socio-economic condition can be identified as follows.

- Increase in employment opportunities and Reduction in migrants to outside for employment.
- During operation phase 40 technical and nontechnical people will be employed.
- Increase in consumer prices of indigenous produce and services, land prices, house rent rates and Labour prices.
- Improvement in socio-economic environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade commerce and service sector.
- The overall impact on the socio economic environment will be beneficial.

The management of Singh Ferro Alloy has proposed to give preference to local people for recruitment in semi skilled and semi skilled category.

ENVIRONMENT MONITORING PROGRAMME

The environmental monitoring is important to assess performance of pollution control equipment installed in the proposed project of M/s Singh Ferro Alloys. The proposed project is for a manufacturing of Manganese oxide, Manganese Dioxide and Ferro Alloys. The sampling and analysis of environmental attributes including monitoring locations will be as per the guidelines of the Central Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s Singh Ferro Alloys through MoEF&CC Recognized Laboratory to assess the pollution level in the proposed plant. 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 pollutants;
- 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;

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

- Air quality
- Water and wastewater quality;
- Noise levels;
- Soil quality;

ENVIRONMENT MANAGEMENT PLAN

Air Environment

The sources of air pollution are raw material handling system, materials transportation, raw materials feeding to the operating equipments. Stacks of adequate height of 30 m is proposed for proper dispersion of flue gases from induction furnaces. The following Environmental Management Plan will be implemented to control air emissions from Furnace.

Action Plan to Control of fumes

- The primary fume pick up from Induction Furnace will be by a canopy hood placed over the furnace and to convey the same single walled MS ducting will be employed.
- Bag Filters followed by a stack will be installed.
- Fugitive emission from material unloading operations, material transfer points will be controlled fully with total enclosure.
- Fugitive as well ambient air quality monitoring shall be carried out on regular basis to ensure the compliance with National Ambient Air Quality Standards (NAAQS). The ambient air quality within the factory premises shall not exceed the standards

(PM₁₀ 100µg/m³, PM_{2.5} 60µg/m³ SO₂ 80µg/m³, NO_x 80µg/m³ and CO 04µg/m³) prescribed by CPCB.

- The monitoring frequency of air quality shall be as per the consent issued by State Pollution Control Board and reports shall be submitted as part of compliance. The records will be maintained.
- Regular Stack Monitoring will be done. All the emissions from the plant will be controlled to meet the relevant standard set by CPCB/State Pollution Control Board
- Fumes will be evacuated directly from induction furnaces through hoods with swirling mechanism and ducting.
- Plantation will be strengthen further to control fugitive emissions & gaseous pollutants to keep clean and healthy environment.

Water Environment

- During plant operation waste water will be generated from the Zigging Process. Waste water will be generated from the Zigging Process. This wastewater generated will be treated in the settling tank and will be reused in the process.
- 1.5 m³/ day of sewage will be generated which will be will be treated in Packaged Type STP.

Noise Environment:

- 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.

Land Environment

Apart from the aforesaid pollution control measures the management has decided to develop green belt covering more than 33% of total area reserved for industrial use. During plantation landscaping pattern will be considered.

Management Plan of Solid waste

- Process needs refractory lining and is being changed every month.
- Solid waste of slag generation will be about 520 TPA from thermite process. Solid waste is non hazardous and non-toxic in nature.
- Slag generated will be used for filling nearby village road and boundary wall constructions after receiving the necessary approval from the authorities.
- Fly ash generated will be reused in manufacturing of bricks.

Socio Economic Environment

M/s Singh Ferro Alloys would aid in the overall social and economic development of the region. The plant will give employment to about employment to 40 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

M/s. Singh Ferro Alloys will provide all necessary provisions under Factory Act. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved.