# EXECUTIVE SUMMARY

## 1.0 INTRODUCTION

Uttam Galva Metallics Limited(UGML) intends to enhance the steel manufacturing capacity to 1.5 MTPA at Bhugaon Link Road, district Wardha, Maharashtra and produce hot metal & long product to meet the requirements of the customers. The expansion facilities will be built within the existing facilities.

UGML has submitted Form-I on 10th October, 2012 to Ministry of Environment & Forest for prescribing Terms of Reference (TOR) for expansion of Steel Plant to 1.5 MTPA along with waste gas based CPP (17 MW) at Wardha, Maharashtra. The TOR has been finalised during the 6th Reconstituted Expert Appraisal Committee (Industry) of Ministry of Environment & Forest held on 5th to 7th March, 2013 for preparation of EIA/EMP report for the expansion project.

EIA/EMP report has been prepared based on the approved TOR and contains all the information as per the generic structure of EIA.

Uttam Galva Metallics Limited is a group company of M/s Uttam Galva Steel Limited (UGSL). Uttam Galva Steels Limited (UGSL) registered and corporate office is located at Uttam House, 69, P.D'Mello Road, Mumbai – 400009, India. M/s UGSL is a producer of cold rolled steel (CR), galvanized products comprising galvanized plain (GP), galvanized corrugated (GC) coils and sheets and colour coated products. The company is in the business of procuring hot rolled steel (HR) and processing it into CR and further into GPs. The one million tonne plant is at Khopoli on Mumbai- Pune road. Its facilities are mainly in thinner gauge materials.

The proposed site is located at Bhugaon- Barbadi- Selukate in Wardha district of Maharastra state between latitude 20°42'12" N and longitude 78°38'15" E. The State highway No. SH-243 joining Wardha and Vaygaon passes about 2 km away from site on the West side. The site is approximately 5 km South of Wardha Town. The Wardha railway station of central railway is located 7 km from the site. The site is at an elevation varying from 270 to 280 m above MSL.

The proposed plant falls under Category 'A' (Sl.No. 3 (a) of Schedule : "Primary and Secondary Ferrous Metallurgical Industries") and intends to produce long products based on BF-BOF-Slab Caster-HRM route.

## 2.0 PROJECT DESCRIPTION

Uttam Galva Metallics Limited have plans to enhance the installed production capacity of the plant from 0.47 MTPA to 1.0 MTPA of Hot Metal and 0.5 MTPA Long Products for Techno-Commercial viability. The proposed facilities are presented in **Table ES.1**

**Table ES.1: Facilities envisaged for the project**

| Sl. No. | Area | Envisaged Capacity | Total Capacity |
|---|---|---|---|
| 1. | Sinter plant | 1 x 90 $m^2$ | 1 x 75 $m^2$ and 1 x 90 $m^2$ |
| 2. | Blast furnace | 1 x 450 $m^3$ | 2 x 450 $m^3$ |
| 3. | Basic oxygen furnace | 2 x 40 t | 2 x 40 t |
| 4. | Ladle furnace | 2 x 40 t, 10 MVA | 2 x 40 t, 10 MVA |
| 5. | Billet cum Bloom caster | 1 x 3-strand | 1 x 3-strand |
| 6. | Bar & Rod mill | 1 x 0.6 Mt/yr | 1 x 0.6 Mt/yr |
| 7. | Oxygen plant | 1x 250 tpd | 1x 250 tpd |
| 8. | Pig casting machine | 1 x 1700 t/d | 2 x 1700 t/d |
| 9. | Coke oven and by-product plant | Stamp Charged 4.3 m tall two battery comprising of 36 ovens | Three 4.3m tall batteries each comprising of 36 ovens |
| 10. | Captive power plant – waste gas based | 1 x 17 MW<br>* Major fuel being Internal surplus gases | 2 x 17 MW<br>* Major fuel being Internal surplus gases |

The details of products to be manufactured will be as per **Table ES.2**:

**Table ES.2 Proposed Product Mix after the project**

| |
|---|
| Hot Metal 1.0 mtpa |
| Long Product (Bar/rod) 0.5 mtpa |

The total product after expansion of the plant will be as follows:

| Sr. No | Products | Unit | Proposed Capacity after expansion |
|---|---|---|---|
| 1 | Gross hot metal | Ton/Year | 1,000,000 |
| 2 | Long Product | Ton/Year | 500,000 |

## 3.0 Land Use Pattern in the Study Area

Existing land use in the study area has been studied through Satellite image processing (Resource at LISS III, January,2008) with Satellite data of 23.5 m resolution. Existing land use of the study area radius of 10 kms are given in **Table ES.3**.

**Table ES.3 : Approximate land Use in the Study Area**

| Sr. No. | Land Feature | Area in Sq.Km | Area in Hectres | Percentage |
|---|---|---|---|---|
| 1 | Agriculture | 231.280 | 23128.023 | 73.859 |
| 2 | Barren Land | 28.370 | 2836.997 | 9.060 |
| 3 | Dual Road | 2.613 | 261.279 | 0.834 |
| 4 | Fallow_Land | 5.824 | 582.378 | 1.860 |
| 5 | Habitation | 29.673 | 2967.329 | 9.476 |
| 6 | Canal | 0.519 | 51.874 | 0.166 |
| 7 | Industrial Area | 3.131 | 313.067 | 1.000 |
| 8 | Layout | 5.853 | 585.293 | 1.869 |
| 9 | Marshy Land | 0.164 | 16.440 | 0.053 |
| 10 | Mining Area | 0.163 | 16.253 | 0.052 |
| 11 | Nala | 0.781 | 78.110 | 0.249 |
| 12 | Plantation | 1.641 | 164.118 | 0.524 |
| 13 | Pond | 0.910 | 90.982 | 0.291 |
| 14 | Quarry | 0.866 | 86.648 | 0.277 |
| 15 | Railway | 0.283 | 28.272 | 0.090 |
| 16 | Railway Property | 0.568 | 56.786 | 0.181 |
| 17 | River | 0.501 | 50.098 | 0.160 |
| **Total** | | 313.139 | 31313.948 | 100.000 |

Land use for the Expansion Project does not involve any Resettlement & Rehabilitation issues.

## 3.1 Biological Environment

The project site lies within the existing plant premises of UGML. The land on which the proposed project is coming is within the existing premises of UGML. Most of which is barren with occasional shrubs and on the periphery is planted with greenbelt.

The study area covers 10km radius around the project site. The area exhibits plain topography. The study area falls under **Tropical Wet and Dry** climate region and the agro-climate is characterised by **hot, dry, and subhumid** bioclimate with dry summers and mild winters. The area is plain and predominantly with agro-ecosystem and poor irrigation facilities. There is no forest area, wildlife and bird sanctuary within the study area. The soil in the area has low to medium fertility with reference to its agricultural production potential. In the study area, no rare, threatened or endangered plant species have been encountered.

# 4.0 DESCRIPTION OF THE ENVIRONMENT

## 4.1 Introduction

The study area was taken as 10 km radius from centre of the plant around the project site. The baseline environmental data were generated and compiled during in 2013

 

(Continuously for 13 weeks) for meteorology, air quality, water quality, noise levels and soil characteristics by setting up a number of monitoring stations. Further, existing ecological, geological, hydrological and socio-economic features were also studied. The collected data were analysed for identifying, predicting and evaluating environmental impacts. The maximum anticipated impacts were assessed and based on which an environmental management plan has been drawn.

## 4.2 Meteorology

A meteorological station was set up at project site. The predominant wind directions were W (21.6%), NW (14.5%) and SW (12.9%). Calm conditions prevailed for 9.0% of the time. The wind velocity was mostly between 1.0 to 5.0 km/hr. Ground based inversions and mixing height were also collected from IMD (Indian Meteorological Department) publications for Nagpur.

## 4.3 Ambient Air Quality (AAQ)

Nine AAQ monitoring stations were monitored. During the monitoring period, 24 hourly samples were collected twice a week for PM 10, PM 2.5, $SO_2$ and $NO_x$ whereas for CO three one hourly samples were taken on each monitoring day. It was observed that the average value for PM 10 and all the values of PM 2.5, SO2, NOx and CO during the monitoring period are well within the norms for Industrial, Residential, Rural and other area (**Table ES.4**).

**Table ES.4: Summarised Results of AAQ Monitoring During Summer around Wardha**

| Parameters | | Results (µg/m$^3$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Plant Gate **(A1)** | China Colony **(A2)** | Bapukuti Sewagram Area **(A3)** | Mandavgarh Village **(A4)** | Bhugaon Village **(A5)** | Kurjhadi Village **(A6)** | Salod Village **(A7)** | Borgaon Village **(A8)** | Wardha (Anand Nagar) **(A9)** |
| **PM -10** | Max | 70.3 | 63.8 | 62.6 | 63.8 | 66.3 | 53.4 | 62.8 | 69.2 | 77.2 |
| | Min. | 59.8 | 50.2 | 40.5 | 51.8 | 53.5 | 44.5 | 48.8 | 58.6 | 58.4 |
| | $C_{98}$ | 70.3 | 63.2 | 62.1 | 63.2 | 66.2 | 53.1 | 62.2 | 69.1 | 77.1 |
| | Avg. | 65.1 | 57.0 | 50.5 | 59.4 | 59.9 | 49.1 | 56.1 | 63.3 | 68.6 |
| **PM -2.5** | Max | 42.6 | 43.7 | 22.4 | 24.6 | 34.5 | 21.4 | 26.4 | 33.4 | 38.9 |
| | Min. | 32.6 | 36.9 | 14.6 | 18.1 | 26.5 | 16.5 | 17.6 | 24.9 | 26.5 |
| | $C_{98}$ | 42.4 | 43.1 | 22.2 | 24.3 | 34.2 | 21.1 | 26.1 | 33.3 | 38.7 |
| | Avg. | 38.3 | 40.6 | 18.4 | 21.5 | 30.3 | 18.6 | 21.4 | 28.0 | 32.5 |
| **$SO_2$** | Max | 19.6 | 16.7 | 13.1 | 10.4 | 17.6 | 11.8 | 11.3 | 13.8 | 18.6 |
| | Min. | 15.4 | 13.2 | 8.6 | 7.2 | 13.6 | 8.9 | 8.6 | 10.2 | 14.8 |
| | $C_{98}$ | 19.4 | 16.5 | 13.1 | 10.2 | 17.5 | 11.6 | 11.2 | 13.6 | 18.4 |
| | Avg. | 17.2 | 15.1 | 11.2 | 8.7 | 15.8 | 10.1 | 10.0 | 12.1 | 16.5 |
| **$NO_x$** | Max | 35.4 | 26.4 | 28.0 | 22.4 | 33.9 | 23.3 | 21.3 | 30.1 | 36.9 |
| | Min. | 18.3 | 15.9 | 11.6 | 10.4 | 18.4 | 11.0 | 10.9 | 13.4 | 17.4 |
| | $C_{98}$ | 35.2 | 26.2 | 28.0 | 22.1 | 33.6 | 23.1 | 21.1 | 30.1 | 36.5 |
| | Avg. | 23.6 | 19.7 | 18.7 | 15.1 | 24.8 | 15.9 | 14.8 | 19.3 | 26.3 |
| **CO** | Max | 220 | 212 | 76 | 56 | 222 | 50 | 42 | 223 | 236 |

| Parameters | | Results (µg/m$^3$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Plant Gate **(A1)** | China Colony **(A2)** | Bapukuti Sewagram Area **(A3)** | Mandavgarh Village **(A4)** | Bhugaon Village **(A5)** | Kurjhadi Village **(A6)** | Salod Village **(A7)** | Borgaon Village **(A8)** | Wardha (Anand Nagar) **(A9)** |
| | Min. | 196 | 186 | 30 | 18 | 200 | 16 | 13 | 193 | 200 |
| | $C_{98}$ | 219 | 210 | 74 | 52 | 220 | 48 | 40 | 221 | 235 |
| | Avg. | 208.6 | 202.3 | 58.1 | 37.1 | 209.2 | 30.1 | 26.9 | 208.4 | 220.3 |
| **$O_3$** | Max | 21.1 | 20.0 | 23.2 | 33.2 | 21.5 | 22.3 | 22.8 | 20.9 | 21.3 |
| | Min. | 7.2 | 7.4 | 9.7 | 9.9 | 8.5 | 8.2 | 8.4 | 6.7 | 8.0 |
| | $C_{98}$ | 21.0 | 20.0 | 23.1 | 33.0 | 21.3 | 22.1 | 22.7 | 20.8 | 21.2 |
| | Avg. | 14.1 | 13.7 | 16.4 | 21.5 | 15.0 | 15.2 | 15.6 | 13.8 | 14.6 |
| **$NH_3$** | Max | 12.6 | 11.8 | 12 | 11.4 | 11.2 | 9.2 | 10.7 | 10.8 | 13.4 |
| | Min. | 6.5 | 4.2 | 3.9 | 3.4 | 5.6 | 1.4 | 2.6 | 4.7 | 6.5 |
| | $C_{98}$ | 12.4 | 11.6 | 12 | 11.3 | 11.1 | 9.1 | 10.5 | 10.6 | 13.2 |
| | Avg. | 8.9 | 7.7 | 7.8 | 6.7 | 8.1 | 4.8 | 6.0 | 7.1 | 9.3 |
| **Pb** | Max | 0.046 | 0.032 | BDL | BDL | 0.03 | BDL | BDL | 0.031 | 0.052 |
| | Min. | 0.016 | 0.014 | BDL | BDL | 0.014 | BDL | BDL | 0.014 | 0.016 |
| | $C_{98}$ | 0.046 | 0.032 | BDL | BDL | 0.03 | BDL | BDL | 0.031 | 0.052 |
| | Avg. | 0.028 | 0.002 | BDL | BDL | 0.020 | BDL | BDL | 0.021 | 0.033 |
| **As ng/m$^3$** | Max | 1.24 | 1.09 | BDL | BDL | 1.2 | BDL | BDL | 1.21 | 1.64 |
| | Min. | 0.43 | 0.36 | BDL | BDL | 0.38 | BDL | BDL | 0.45 | 0.48 |
| | $C_{98}$ | 1.24 | 1.09 | BDL | BDL | 1.2 | BDL | BDL | 1.21 | 1.64 |
| | Avg. | 0.82 | 0.69 | BDL | BDL | 0.76 | BDL | BDL | 0.78 | 0.98 |
| **Ni ng/m$^3$** | Max | 2.56 | 2.13 | BDL | BDL | 1.8 | BDL | BDL | 1.64 | 2.69 |
| | Min. | 0.96 | 0.53 | BDL | BDL | 0.69 | BDL | BDL | 0.59 | 0.98 |
| | $C_{98}$ | 2.53 | 2.11 | BDL | BDL | 1.7 | BDL | BDL | 1.62 | 2.67 |
| | Avg. | 1.7 | 1.2 | BDL | BDL | 1.0 | BDL | BDL | 1.02 | 1.6 |
| **BaP** | Max | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Min. | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | $C_{98}$ | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Avg. | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **Benzene** | Max | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Min. | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | $C_{98}$ | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | Avg. | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**BDL = Below detection limit**

**ND = Not Detected**

## 4.4 Water Environment

A total of sixteen water-sampling locations were selected for the present study ( 8 surface water & 8 ground water). The water sampling locations were selected up gradient and down gradient of the project site.

The surface water quality was compared with CPCB norm for surface water. The surface water quality is not within the norms for Classes A, B, C, D, and E. The results indicate that surface water is not fit for drinking purposes.

Results of ground water analysis were compared with IS: 10500 (IS: 10500; 1991, amendment no.1, 1993 - norms for drinking water). All the parameters at the eight locations are well within the permissible limit of the norm (IS: 10500, 1991).

### 4.5 Soil

Five samples of top soil were collected and were analysed. The analysis results indicate that soils in the region are more or less of alkaline pH. Availability of Nitrogen & Phosphorus was medium to high in all the samples. Potassium was medium to high. Organic carbon content is medium to high in all the samples. Overall, the soil fertility in the area is good for plant growth.

### 4.6 Ambient Noise

The noise monitoring was done at nine locations. The values are well below the respective statutory norms as applicable.

### 4.7 Ecological Features

There is no suitable habitat for occurrence of ecologically important fauna in the area. Most of the avifauna that is found is associated with agriculture and human habitation and dominated by granivores, insectivores and omnivores. Since there are no forests around, the trees and shrubs on field bunds and roadsides provide important resting, breeding and perching sites. The trees Ficus and Neem provide important feeding and resting sites for birds especially when no food is available elsewhere in summer.

No endangered species have been reported in the study area. The mammalian fauna is limited and does not show much diversity. They mainly constitute domesticated animals and rodents. The area harbours granivores avian fauna because agricultural grains in the field provide food for such birds.

Due to lack of any forest area and biotic interference the only animals found in the study area are few rodents, reptiles and birds. Due to human interference, in general the availability of animals in the study area is low.

## 5.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 5.1 Impact during Construction

The proposed expansion plant will come up in the existing plant premises. Large-scale excavation, soil erosion, loss of topsoil is expected. Moreover, Wardha is already a fairly well developed area with all sorts of infrastructure available. Therefore influx of construction labour is not expected to change present land use pattern. Further this land

 

use change if any, during construction is only temporary and will persist during construction phase only.

## 5.2 Operational Phase Impact

During operation of the plant, environmental releases in the form of air emissions, wastewater discharges, solid waste & noise may affect air, water, land and ecological environment directly. In addition to the above primary impact, some indirect impact on the surrounding socio-economic environment may also take place. Impacts & mitigation measures envisaged are mentioned below in brief.

### I. Air Environment

In this report, the dust content of flue gas is taken as 50 mg/Nm$^3$. Accordingly, sources and emitted pollutants are a straightforward addition, which can be directly used as source data input in the ISCST-3 model to assess the additional contribution from the expansion plant to the background concentrations.

The following mitigation measures are envisaged in the design stage of the expansion plant.

| Sl. No | Area of operations | Air pollution control measures proposed to be adopted | Design limits |
|---|---|---|---|
| 1 | **Raw material handling** | | |
| | Fugitive emissions in material handling | Dust suppression systems (chemical and dry fog type)<br>Water sprinklers<br>DE systems with bag filters in case of conveyors, lime handling | • As per MOEF Norms<br>• Stack: 50 mg/Nm3 |
| **2** | **Sinter Plant** | | |
| | Raw material preparation and handling | DE systems with ESP | • As per MOEF Norms |
| | Sintering process | ESP for collected waste gases | 50 mg/Nm3 |
| | Sinter screening and transport | ESP | 50 mg/Nm3 |
| **3** | **Blast Furnaces** | | |
| | Sinter, coke and flux handling in stock house | Dust suppression systems (chemical and dry fog type) | 50 mg/NM3 |
| | BF processes | Dry Gas cleaning | 50 mg/NM3 |
| | Cast house | DE systems with ESP | 50 mg/NM3 |
| | Stoves heating | Use of lean gas | 50 mg/NM3 |
| **4** | **BOF** | | |
| | Material handling operations | Bag filters | 50mg/NM3 |
| | Converters | Secondary fume extraction system | 50 mg/Nm3 |
| | Desulphurisation,LHFs etc | Spark arresters followed by Bag filters | |
| **5** | **Bar & Rod mill** | Use of low sulphur gases for SO2 control | 50 mg/NM3 |

| Sl. No | Area of operations | Air pollution control measures proposed to be adopted | Design limits |
|---|---|---|---|
| **6** | **Coke ovens** | | |
| | Coal & Coke handling | DE systems | Stack: 50 mg/Nm$^3$ |
| | Coal charging | On main charging with HPLA aspiration<br>CGT car for aspirating gas into adjacent ovens | As per MOEF norms applicable for coke ovens |
| | | Adoption of relevant measures like suction hoods. | As per MOEF Norms |
| | Coke pushing | Land based pushing emission control | As per MOEF Norms |
| | Coke quenching | Wet quenching facility | As per MOEF Norms |
| **7** | **Power Plant** | ESP based air pollution control system | 50 mg/NM3 |

All the emissions from different stacks will be kept within the norm. Stack emission details are based on the consumption, gas balance, prevailing emission factors as available in literature, suppliers, from other steel plants and different statutory regulations prevailing in the country.

Meteorological data used as input data of the model during computation were generated during the monitoring period. Spatial distribution of hourly mixing depth over Indian region published by CPCB (Central Pollution Control Board) has been used for mixing height.

The predicted GLC (Ground Level Concentrations) values are given in **Table ES.5**

**Table ES.5: Prediction of GLC's at 1.5 MTPA**

| Sl. No | Description | Pollutants* | | |
|---|---|---|---|---|
| | | PM | $SO_2$ | NOx |
| 1 | Predicted ground level concentrations | 18.5 (10.7, 10.7) | 9.1 (12.5, 10) | 8.1 (12.5, 10) |
| 2 | Fugitive emission concentration | 2.38 (10.5, 10) | - | - |
| 3 | Monitored maximum Average background concentrations | 68.6 | 17.2 | 26.3 |
| 4 | Total maximum concentrations | 89.4 | 26.3 | 34.4 |
| | **Norms**<br>1. Industrial,Residential , Rural and other areas | 100 | 80 | 80 |

**Concentrations are in µg/m3 and of 24hours averaging time*
*Values in the parenthesis indicate the coordinates of the grid points in Km in the direction of occurrence from the plant stacks. Plant location at (10, 10)*

It is clear from the above that after expansion, the net change in SPM, SO2 and NOx will not be appreciable and the final concentrations will be well within the MOE&F norm for residential and rural areas. Thus it can be clearly concluded that there will not be any adverse changes in AAQ in the study area.

**II. Impact on Water Environment**

Effect of Water drawal & Water Usage

The proposed plant draws its requirement of raw water (1550 $m^3$/h) from balancing reservoir which in turn receives water from the pumping station on river Veena. Water is supplied to the plant for different activities from the balancing reservoir directly. In addition to this, water is also supplied to the plant from the reservoir after treating it in a water treatment plant.

Surface Water Pollution

During the design phase, all efforts have been made to adopt latest state of art technology and to install adequate effluent treatment facilities for different units expected to generate water pollutants, details of which are given in brief below:

- Re-circulating water in the process whereby discharged volume is minimum.
- Clarifier and sludge pond for removal of suspended solids.
- Neutralisation of acidic water by lime.
- Removal of oil and grease from the contaminated water by means of oil traps , skimming devices, etc.

The effluent quality will be kept within the permissible limits of MPCB/MoEF.

Ground Water Pollution

The proposed plant does not envisage any ground water drawal and hence no impact on ground water availability around the plant is anticipated. In addition, rain water harvesting measures are envisaged in the proposed project to re-charge/re-use the water to keep the water drawal at minimum.

**III. Impact of Solid Waste Disposal**

Solid waste generated from different units and its re-utilisation and disposal is given in **Table ES.6.** All the solid/hazardous wastes will be utilized/disposed as per statutory guidelines.

 

**Table ES.6: Solid Waste Generation & Disposal**

| Sl. No. | Solid wastes | Expected generation t/year | Proposed disposal |
|---|---|---|---|
| 1. | BF slag | 210000 | Sold to Cement Plants |
| 2. | BF sludge | 4200 | Partly used in the Sinter Plant and partly dumped |
| 3. | BF flue Dust | 9600 | 100% reuse in the Sinter Plant |
| 4. | BOF Slag | 90000 | Use in construction, BF, Sinter Plant & as rail ballast & Partly dumped. |
| 5. | BOF sludge | 9000 | Reuse in the Sinter Plant |
| 6. | BOF scale | 3000 | 100% reuse in the Sinter Plant |
| 7. | Mill scales | 6000 | 100% reuse in the Sinter Plant |
| 8. | Mill Scrap | 6000 | 100% reuse in the BOF Plant |
| 9. | Skull / Scrap | 2520 | 100% reuse in the BOF Plant |
| 10. | Pig casing m/c Sludge | 1260 | 100% reuse in the Sinter Plant |

### IV. Impacts on Noise Levels

During plant operations, noise generated will be close to the compressors and blowers and as a result, will be confined within respective area of the units, thus will not have any impact out of the plant boundary. The incremental noise at the boundary because of proposed plant will be negligible and the ambient noise will be within the norms.

### V. Impact on Ecological Features

The project site is within existing plant premises, thus change in land-use pattern will not be there and will not cause any significant loss of habitat. The project site comprises shrubby vegetation on some of the plateau and big trees in patches in plain areas, all care will be taken to avoid cutting of these vegetation. Efforts shall be made to have minimum damage to the existing vegetation and to amalgamate the existing vegetation with the green belt / cover plan.

The proposed project is designed for maximum re-circulation. The project and domestic waste water will be treated and after treatment the same will be used for gardening purpose. A small amount of effluent after treatment will be discharged from the proposed plant thus there will be no impact on the ecological components of surface water bodies in the area.

## 6.0 ENVIRONMENTAL MONITORING PROGRAMME

A detailed Environmental monitoring programme has been envisaged with the following objectives to ensure proper & effective implementation of the proposed mitigation measures.

- To evaluate the performance of mitigation measures proposed.

 

- To evaluate the adequacy of Environmental Impact Assessment.
- To suggest improvements in environmental management plan, if required.
- To enhance environmental quality.
- To implement and manage the mitigative measures defined in EMP.

Environmental aspects like Meteorological data, Stack emission monitoring, solid/hazardous wastes generation/utilisation, Green belt development, House keeping, Work zone air quality, Work zone noise, Ambient Air Quality, Ambient Noise, Effluent quality, Ground water quality etc. will be monitored as per the details worked out in the Environmental Monitoring Programme. The Monitoring plan specifies the parameters to be monitored, Location of the monitoring sites, Frequency and duration of monitoring, Applicable standards & Institutional responsibilities for implementation and supervision.

## 7.0 ADDITIONAL STUDIES

The present expansion project is of crucial importance for making it economically viable. At the same time viable project will help long-term development of the region and the state. Public consultation, Risk Assessment and Socio-economic assessment were carried out. Overall the project is going to improve the socio-economic condition of the area with negligible risk.

## 8.0 PROJECT BENEFITS

The following impacts are anticipated in the study area:

- The project is not going to cause any damage to the existing agricultural situation. Instead, it is likely to provide the farmers with non-farm income.
- The project is going to foster the change in pattern of demand among people of the study area by way of shift from food items to non-food items.
- There will be a positive employment and income effects, both direct as well as indirect.
- The project has strong positive effect on average consumption in the study area, which is likely to lead to increase average income through multiplier effect.
- There is a possibility increase in industrialisation in the vicinity of the project area. This is likely to bring more skill diversification among local people.
- Overall peoples' perception on the project is good.
- Community development activities are going to be implemented due to the proposed project.
- The project has positive impact on educational status of people of the study area.

## 9.0 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

### 9.1 Management Policy

Management has adopted a two-pronged strategy to abate pollution, as follows:

- Installation of new state of art pollution control equipment at the design stage itself.

- By developing a very strong monitoring/analysis and inspection setup for compliance.

## 9.2 Mitigation measures in the Proposed Project

Mitigative measures for air, water & noise pollution control, solid /hazardous waste management have already been envisaged in the proposed project. Environmental mitigation measures are also a part of equipment and will be commissioned along with the main equipment. Also, critical emission parameters have been covered under the performance guarantee clause so that to ensure compliance.

For proper implementation of the above, an organizational set-up, Laboratory set-up, functioning of the above, training, co-ordination with internal/external agencies have already been planned.

## 9.3 Air Pollution : Mitigation Measures

The expansion plant is taking a number of measures to control air pollution. The remedial and control measures planned to be adopted are discussed briefly in the following sections.

### Raw Material Handling Area

In RMH area dust extraction system will comprise of pulse jet type bag filter, centrifugal fan with motor and other accessories, suction hood, duct work, stack, etc. will be provided.

### Sinter Plant

**Plant De-dusting System**
In the sinter plant suitable de-dusting system have been envisaged. A dry type electrostatic precipitator (ESP) will be provided for the waste gas generated in the sinter plant. ESP system will comprise of multiple fields, unit multiple cells, ESP and its accessories such as dust disposal system, electrics and control, instrumentation, interlock, supports etc. The ESP will be dry, horizontal flow type.

In addition to above, there will also be plant dedusting system to maintain proper work-zone condition which will serve different material transfer points. There will also be ESP system, comprised of fan, ESP, suction hood, ducts and stacks.

### Waste Heat Utilisation

Waste heat utilization has been envisaged preheating the sinter mix before feeding to sinter bed. For the same ignition furnace with post heat hood and pre heating (before ignition furnace) shall be installed just after the sinter mix drum feeder. Hot air from waste heat recovery system of sinter cooler shall also be used for preheating of raw material before ignition furnace and post heat hood after ignition furnace.

 

**Blast Furnace**

The proposed project has one Blast Furnace and air pollution mitigation measures are described below:

**Coal Dust Injection (CDI)**

Coal dust injection system will be introduced involving handling, screening, drying and pulverisation system for coal. During this handling and drying, dust will be generated. To control this dust, dust extraction system comprising of bag filter (pulse jet type), fan, suction hood, duct and stack have been envisaged.

CDI has an economic as well as an environmental advantage as it direct injection of coal into BF as reducing agent reduces coke requirement (for every Kg of coal injected approximately 0.8 Kg. of coke requirement is reduced).

- **Gas Cleaning System**

A dry gas cleaning plant comprising of dust catcher and bag filter has been envisaged.

- **Cast House Dedusting System**

The fans will suck the air from the hoods of the cast house. Air laden with fumes of iron oxides will be cleaned in electrostatic precipitator before being discharged into atmosphere through stack with the help of centrifugal fans. The centrifugal fans are to be provided after ESP and before stack for sucking the air. The suction shall be taken from different points like tap hole, skimmer, slag runner, iron runner, tilting runners and from BF top charging conveyor discharge. Dust concentration of inlet air to ESP is 5 gm/ Nm3 Collected dust at ESP hoppers will be taken to storage hopper and from there dust will be disposed by truck. Clear height below storage hopper shall be 4.5 m to facilitate truck entry.

Dust concentration at stack outlet shall be less than 50 mg/Nm$^3$. Work zone dust concentration shall not exceed 5 mg/Nm$^3$ for cast house.

**De-sulphurisation Unit**

The gases generated during desulphurisation process will be contaminated with dust. The fume extraction system will comprise of suction hood, associated duct, cyclone/scrubber, centrifugal fan etc.

**Secondary Refining**

 

During secondary refining process, the gases generated during mixing and desulphurisation process will be contaminated with dust. The fume extraction system will comprise of suction hood, associated duct, cyclone/scrubber, centrifugal fan etc.

**Coke Oven and By-Product Plant**

It has already been indicated that during the expansion plant there will be two coke oven battery. These are described below:

**a. High Pressure Liquor Aspiration (HPLA) System**

To control charging emission from coke oven battery, high-pressure ammonia liquor aspiration system (HPALA) have been envisaged. It shall consist of high-pressure multistage booster pumps for ammonia liquor, spray nozzles and pipelines. The low pressure ammoniacal liquor shall be drawn from the liquor mains, pressurized to about 30 – 35 Kg / cm2 and injected into gooseneck while charging. The charging gasses evolved shall be sucked into the gas collecting mains, preventing emission of dust and smoke into the atmosphere. HPLA system will be complete with pumps, HP nozzles, LP nozzles, goosenecks, pipes, valves, valves & fittings, electric and instrumentation.

**b. New Charging Cars**

Charging cars fitted with screw feeders and hydraulically pressed sleeves have been envisaged. Feeding of coal into oven will be carried out with control speed by screw feeders. During charging hydraulically pressed sleeves will be helping to eliminate leakage around charging holes. The new charging cars shall be of modern single spot type with hydraulic drives to cater to the needs. The charging cars shall be provided with PLC and air-conditioned operators cabin. The charging cars shall also be equipped with oven top vacuum cleaner which will help in proper up keeping of oven top.

**c. Hydro Jet Door Cleaners**

The project has envisaged to provide hydraulic door cleaner system to reduce the pollution and improved working environment. The system will be complete with high-pressure water pump, tank, hose, nozzles etc. with pressure and volume control arrangement. The hydro jet cleaning system will be used for door and the doorframe cleaning with facility of hydro pressure up to 600 Kg/cm$^2$.

**d. Leak Proof Oven Door**

Project will install leak proof oven door in their batteries. Doors shall be of leak proof oven doors with flexible sealing strips and other modified features to ensure leak proof sealing. The doors shall be of heat resistant cast iron provided with spring-loaded latches and spring loaded sealing strips.

**e. Pushing Emission Control (PEC)**

The pushing emission control (PEC) system has been envisaged to capture the emission of hot coke dust and other pollutants when coke side door of a coke oven is opened and coke is pushed out of the oven and dropped into the coke car. In the PEC system the dust recovery hood unit /assembly will consists of two suction hoods and connecting duct piece. The coke car hood shall extend over the hot coke car and shall

 

be open to the top face of the hot coke car as well as to the discharge face of the coke guide car. This hood will suck dust-laden gas when hot coke is dropped from coke guide car into the hot coke car during coke pushing operation and will be a part of the coke guide car machine. The other suction hood i.e the oven door hood shall be movable inside a telescopic sleeve and shall move /extend over oven door area to extract smoke and dust arising /emitting when the door is taken off the oven for coke pushing operation. The telescopic sleeve of the oven door hood and the coke car hood shall be joined into a connecting duct piece which shall be extended over stationary collecting duct positioned along the full length of the coke oven battery. The collecting duct shall be open on top for its full length. The opening shall be internally braced with grating to provide support for a special high temperature rubber belt. The actual connection between the moving dust recovery hood unit / assembly and the stationary collecting duct shall be achieved by means of belt raising tripper car movable on the collecting duct along the length of the collecting duct.

The pushing emission thus collected in the moving suction hoods and evacuated into the stationary collecting duct shall be taken into a wet scrubber before discharging through a stack / chimney of suitable height.

**e. Coke Dry Cooling Plant**

One Coke Dry Cooling Plant (CDCP) consisting of four cooling chambers each of 52-56 t/h of coke cooling capacity will be installed to cool coke produced in the battery.

### 9.3.1 Water: Mitigation Measures

Water used and discharged from these plants are mainly from indirect cooling circuit which are not normally contaminated with any major pollutants. However occasional discharges are made as bleed off when there is built up of dissolved solids in the circulating water due to repeated circulation. The dissolved solids are mainly different salt constituents of calcium and magnesium already present in water. Thus major portion of water will be re-circulated after necessary physical treatment e.g settling, cooling etc. except for the bleed off portion, which is required to be discharged for the reasons, explained above. Some of the measures taken to reuse the wastewater generated in the plant will be:

- The wastewater generated from BF gas cleaning plant will be treated in scale pit and after physical treatment will be reused in the system. Only occasional bleed off is required to be discharged.
- Blow down water from BF re-circulation system will be reused in slag granulation plant as make up water.
- The wastewater is generated in the continuous casting units mainly due to machine / mould cooling and may be contaminated with suspended solids and oil. Quality of this discharged water will be continuously checked and as required will be treated to meet statutory norms before being discharged.

 

Blow down water from BOF re-circulation system will be reused in new SMS slag yard.

***Rain water harvesting:*** While developing the Plant General Layout, it will be ensured that rain water is harvested. There are two methods in the field of rainwater harvesting, viz. rainwater recharging and rainwater collection & reuse.

Recharge may be defined as the process of augmenting the groundwater table by providing artificial infiltration techniques which will reduce the excess surface run off and increase the storitivity of the soil. Other is the process of utilizing the rainwater by means of its collection. Collected water can be utilized for industrial and domestic purposes.

Run-off water from the administrative building roof will be collected and stored for future use.

***Sanitary wastewater treatment:*** A sewage treatment plant will be provided for the expansion plant and treated waste water will be utilised for afforestation.

### 9.3.2 Solid Waste: Mitigation Measures

The source of solid waste generation along with their re-use, re-cycle, utilization and disposal methodology are presented in **Table ES.7.**

**Table ES.7: Solid Waste Generation their Re-Use, Re-Cycle, Utilization and Disposal**

| SN | Type of Solid Waste | Re-Utilisation | | |
|---|---|---|---|---|
| | | Recycle | Re-use | |
| | | | Within Plant | To be Sold |
| 1 | BF slag | | - | To Cement Plants |
| 2 | BOF Slag | | - Crushed will be used for making roads, civil works, etc.<br>- Used in Sinter Plant<br>- Used in BOF<br>- Used in BF | - Will be sold to parties for building roads (aggregate for road making), civil engineering works, etc.<br>- Rail track ballast<br>- Scientific dumping for residual slag |
| 3 | Mill scale | | - Reused in Sinter Plant (Oil content from 1 - 3%).<br>- Reused as a reductant input material in BF (Oil content up to 15%) | |
| 4 | BF Flue | | | Sold to downstream |

| SN | Type of Solid Waste | Re-Utilisation | | |
|---|---|---|---|---|
| | | Recycle | Re-use | |
| | | | Within Plant | To be Sold |
| | Dust | | | Iron Industries for agglomeration and reuse in Iron making - BF route. |
| 5 | BF GCP Sludge | - | Re-used in Sinter Plant | - |
| 6 | BOF Sludge | - | - Recycled @ of 10.2Kg/t of liquid steel | - |
| 7 | Sinter ESP Dust | Recycled in Sinter plant | - | - |

- Recycle of waste means utilization of waste in the same process from which it has been generated
- Re-use of waste means utilization of the waste in any process other than the process from which the waste has been generated. The process utilizing the waste may be within the plant or out side the plant. In case of utilization outside plant, the waste is sold to firm utilizing the waste
- Disposal means dumping of waste in designated areas.

Hazardous waste disposal from the expansion plant and their utilization is given in **Table ES.8**.

**Table ES.8 : Hazardous waste generation & Utilisation**

| S. No. | Hazardous waste Generated from | Quantity t / KL Per month | Mode of utilisation |
|---|---|---|---|
| 1 | Tar Sludge from Coke Oven Decanter (Category 13.4) | 35 t | The entire generation will be despatched to MPCB approved TSDF Plants. |
| 2 | BOD plant sludge | 122 t | The entire generation will be despatched to MPCB approved TSDF Plants. |
| 3. | Spent/Wash/Lubricant (Category 5.1) and batteries | 15 KL/lot | Will be sold to registered recyclers. |

## 9.4 Additional Measures

Also, as an additional environmental protection measures, the following have been planned.

- Rain water harvesting for the expansion project.

- Various energy conservation measures to reduce CO2 emissions also.
- Community development measures like Social infrastructure development under CSR (Corporate Social Responsibility), Medical welfare, Sports etc are being planned to further strengthened the overall development.

## 10.0 COST CONSIDERATIONS

- The total project cost for the expansion project has been estimated to be Rs. 3727.3 crores.
- The capital outlay for environmental control measures alone is estimated to be Rs. 260 crores.

The environmental impacts identified by the study are manageable. The implementation of environmental mitigation measures recommended in the report will bring the anticipated impacts to minimum. Site specific and practically suitable mitigation measures are recommended to mitigate the impacts.