RAPID ENVIRONMENTAL IMPACT ASSESSMENT

EXECUTIVE SUMMARY

For

PROPOSED ENHANCEMENT OF POWER GENERATION FROM 4.8 MW/ HR TO 6 MW/ HR

At

SABARI INDUSTRIES PRIVATE LIMITED
S. F. No 230, 231 & 234, Lakshmanampatti Village,
Kulathur Taluk,
Pudukkottai District - 622 504
Tamil Nadu

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EXECUTIVE SUMMARY

1.0 Introduction

M/s. Sabari Industries Pvt. Ltd. (SIPL) is an existing sponge iron manufacturing unit with Co-gen power plant. The unit at present manufactures 3000 TPM of Sponge Iron and 4.8 MW of power generation. SIPL has proposed to expand the power generation from its present capacity of 4.8 MW to 6 MW using available equipments. However there is no change in the sponge iron production. The plant is located at S.F.Nos.230, 231 & 234, Lakshmanapatti village, Kulathur Taluk, Pudukkottai District.

As per the EIA notification, the project requires Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA), Tamil Nadu based on EIA of the project in line with the guidelines of the MoEF. Accordingly, the company has carried out Rapid Environmental Impact Assessment (REIA) study.

1.1 Objectives and scope of EIA study

The objective of this EIA study is to evaluate the beneficial and/or adverse impacts of proposed enhancement activity of power generation. The present EIA and EMP report for Sabari Industries Private Limited has been prepared based on the Terms of Reference (ToR) issued by State Level Expert Appraisal Committee, vide their letter No. SEAC/TN/F.No.331/TOR-59/2010 dated 27.05.2010.

1.2 Salient Features of the project

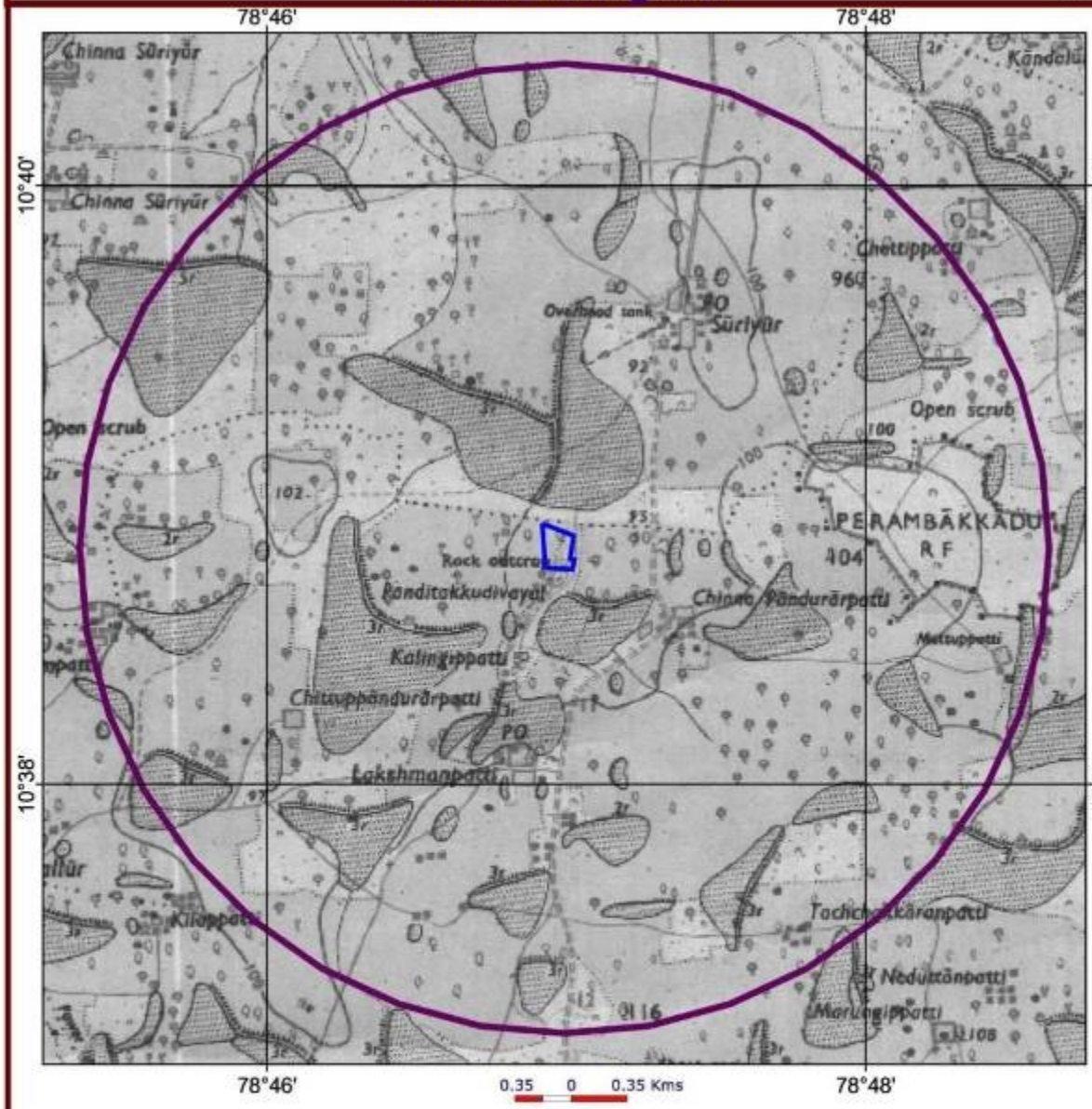
The important features of the project are given in table 1.1

Table 1.1: Salient Features of the unit

S.No	Feature	Details
1	Name of the Project	Proposed enhancement of power generation of Co-gen plant to 6 MW/Hr - Sabari Industries (P) Ltd
3	Type of plant	Sponge iron manufacturing unit with Co-gen power plant
4	Total Land area	10.5 hectares (25.96 acres)
5	Boilers Installed	2 fluidised bed combustion (FBC) boilers of 10 & 12 TPH capacity & 1 Waste Heat Recovery Boiler of 10 TPH
6	Fuels for the Boiler	Dolochar, Coal
7	Power evacuation	11 KV Transmission line of TNEB grid

Location map of the project site is given below

M/s SABARI INDUSTRIES PRIVATE LIMITED
Topo Map showing the project site and its latitude and longitude



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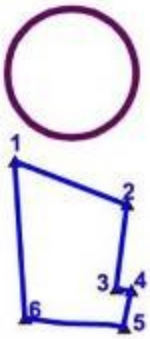

3 km radius from Project Site

Sabari Project Site

Project site Latitude and Longitude (Corners)

No	Longitude	Latitude
1	78° 46' 55.167"	10° 38' 52.241"
2	78° 47' 10.379"	10° 38' 49.848"
3	78° 47' 00.768"	10° 38' 45.197"
4	78° 47' 10.600"	10° 38' 45.078"
5	78° 47' 10.209"	10° 38' 43.041"
6	78° 46' 55.744"	10° 38' 43.533"

Elevation at Project site 102 - 103 m (amsl)

Survey of India Toposheet No: 58-J/14

2.0 Environmental Setting

The Project site is located at Lakshmanapatti village in Kulathur taluk which is about 35km away from Pudukkottai. It is located about 4 km from Pudukottai-Trichy National Highway. The land use classification of the site is certified as unclassified by DTCP Sivagangai. The location does not have any archaeological and cultural monuments, national parks or wildlife sanctuaries, reservoirs and dams, defence installation within 10 km radius of plant site and is devoid of any endangered species of flora and fauna within 10 km radius. The environmental setting is given in table 2.1

Table 2.1: Environmental Setting of the Project Site

S. No.	Particulars	Details
1.	Existing Climatic Conditions	Max. Temp: 40^0C Min. Temp: 23^0C Annual Total Rainfall: 921.5 mm
2.	Land use	Unclassified
3.	Nearest Highway	NH-210
4.	Nearest Railway Station	Pudukottai
5.	Nearest Airport	Chennai
6.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10 km radius
7.	Reserve Forests	None within 10 km radius
8.	Historical / Archaeological places	None within 10 km radius
9.	Water body	None within 10 km radius
10.	Defense Establishments	None within 10 km radius
11.	Categorization of Project Site for ground water availability	The project site falls in Viralimali Block of Pudukottai District which has been categorized as safe area*. As per Central Ground Water Authority's guidelines, projects located in safe area can extract ground water of 1000 m^3/ day, but the proposed project requires about 58.5 m^3/ day of water.
12.	Socio-economic factors	No Resettlement and Rehabilitation issues
13.	Nearest Sea Port	Chennai
14.	Seismicity Zone	Zone-III as per IS: 1893 (Part-1) 2002

3.0 Brief description of project activity

The salient features of the proposed enhancement project are furnished hereunder.

3.1 Product and Raw Materials

The products are sponge iron and co-gen power, the details of which are given in table 3.1. The major raw materials for the sponge Iron plant are Iron ore, Coal and limestone and the major byproduct is dolochar. The dolochar and waste heat from the reduction process are used for co-gen power generation. Enhancement of power generation to 6MW would involve only the additional usage of dolachar (1220 T/M).The details of raw materials are given in table 3.2

Table 3.1: Products Manufactured

S.No.	Name of the products	Existing Unit	Proposed expansion
1.	Sponge Iron	3000 T/M	3000 T/M
2.	Co-gen power generation	4.8 MW/Hr	6 MW/Hr

Table 3.2: Raw Materials Consumption

S. No	Raw material	Existing Unit (4.8 MW)	Proposed expansion (6 MW)	Source of raw material
1	Iron ore	5250 T/M	5250T/M	Procured from Bellary and Tumkur mines of Karnataka
2	Coal	3900 T/M	3900 T/M	Imported from Indonesia & South Africa
3	Limestone	120 T/M	120 T/M	Purchased from suppliers
4	Dolochar (By product)	750 T/M	750 T/M	Obtained from sponge Iron manufacturing unit.
5	Dolochar	1320 T/M	2540 T/M	To be Purchased from out side

3.2 Land area details

The total area occupied by SIPL is 25.96 acresThe breakup of land area details for the unit is given below in table 3.3

Table 3.3: Land Area Details

Item	Area (acres)	Area (hectares)

Built up area	2.02	0.8175
Green Space Area	7.8	3.1565
Area for solid waste disposal	3.0	1.2141
Vacant area	13.14	5.3175
Total	**25.96**	**10.5056**

3.3 Water Requirement

The total water requirement after the proposed enhancement will be about 58.5 KLD. Water required for domestic use will be 5 KLD to cater the manpower requirement 90 persons. While the water required for process uses will be about 53.5 KLD. The breakup water usage for various uses is shown in the table below in table 3.4.

Table 3.4: Details of Water Consumption

Sl. No.	Description	Existing (in KLD)	After enhancement (in KLD)
1.	Domestic	5.00	5.00
2.	Boiler feed through R.O. Plant and D. M Plant	32.50	42.50
3.	Cooling water make up for sponge Iron cooler	10.00	10.00
4.	Make up water for wet scrubber	1.00	1.00
	Total	**48.50**	**58.50**

4.0 Baseline Environment

A study of the existing environmental settings was conducted in the area covering 10 Km radius of the existing unit where enhancement is proposed. A monitoring schedule was prepared covering one month during April - May'2010 to generate baseline data on ambient air, ground water soil, noise level, flora & fauna, socio-economic and demographic factors, land use pattern, forests, geology, hydro-geology, soil and agriculture, mineral resources etc. were carried out by field survey and secondary data has been collected from the State Government authorities.

Identification of different pollutants, which are expected to be released into the atmosphere and having significant impact on the neighbourhood, is an essential component in impact assessment of the air environment. The ambient air quality status

of the study area of 10 km radial distance from the existing project will form the baselne information.

4.1 Micrometeorology at site

Predominant wind direction was from SW and SSW and the minimum wind speed was 3 km/h and the maximum was 26 km/h. Temperature values were ranging from 23 °C to 40°C.

4.2 Air Environment

Ambient air quality of the project area was measured at eight locations within the 10 km radius of the project site and summary given in table 4.1. The Ambient Air Quality monitored in the study area was found to be well within the limits of CPCB standards prescribed.

Table 4.1: Air Quality in the Study Area

S.No	Pollutant	Range Of Values (µg/m^3)	CPCB Limit (µg/m^3)
1	$PM_{2.5}$	35-43	60
2	PM_{10}	64-74	100
3	SO_2	14.7-15.6	80
4	NO_x	20.1-24.4	80

4.3 Noise Environment

Eight monitoring locations were selected to assess the noise levels in the study area. The day time noise levels are in the range of 48 dB(A) to 54 dB(A) and night time noise levels are in the range of 39 dB(A) to 44 dB(A). The noise levels measured during the study period were found to be within the limits prescribed by CPCB – 55 dB during day time and 45 dB during night time.

4.4 Water Environment

Ground water samples were collected from eight locations in and around the plant site within 10 km radius and readings are given in table 4.2. The water quality was found to be well within the drinking water standards.

Table 4.2: Water quality in the study area

Parameter	Range	Drinking Water Standard (IS 10500)
pH	6.9-8	6.5 – 8.5
Total hardness ($CaCO_3$), mg/l	259-278	300*/600#
Chlorides (Cl), mg/l	189-261	250*/1000#
Sulphates (SO_4), mg/l	87-120	200*/ 400#
Total dissolved solids, mg/l	902-1045	500*/2000#

Note:
* Requirement (Desirable Limit)

Permissible Limit in the absence of Alternate source

4.5 Soil Environment

Eight soil samples were collected to assess the soil quality in the 10 km study area of plant site and it revealed soil of medium fertile quality. Details are given in table 4.3

Table 4.3: Soil quality in the study area

Parameter	Range
pH	7.4-8.6
Electrical Conductivity (Micromhos/Cm)	0.2 -0.35
Nitrogen (%)	0.05 – 0.098
Potassium (%)	0.011-0.02
Phosporus (%)	0.054 -0.093

4.6 Land use

Of the total study area of 23818.99 Hectares**,** 14.63% is total irrigated area, 38% is unirrigated area, 17.5% is cultivable waste land and 29.74% is not available for cultivation.

4.7 Biological Environment:

A study was undertaken to list out flora & fauna in the study area. From the study it was observed that there are no endangered, endemic or threatened species in the study area.

4.8 Socio Economic Study

Study on Demographic Profile of 10 Km Radius showed that the total population in the study area is 40394. Of which Male Population is 50.33% and Female Population is 49.67%. The total literates in the area are 23060 of which 57.08% are males and 42.91% are females.

4.9 Occupational Structure

The occupational pattern in the study area shows that majority of the population in the villages belongs to the cultivator's category. The total workers in the study area is 17704 of which 39.00% are main cultivators,16.08% are main agricultural labourers, and about 1% are household workers.Non- workers constitute to about 30% of the total population of the study area.

4.10 Amenities Available

The study area has amenities such as drinking water, medical educational, accessible roads communication, transport and electricity.

5.0 Anticipated Environmental Impacts and mitigation measures

5.1 Impact on physical Environment

Project activities and operation do not involve major or long term impacts on the macro climate and meteorology of the area.

5.2 Impact on Air Environment

The emissions from co-gen power plant comprise PM, SO_2 and NO_X. The sources of air pollution and their control measures from handling, process and utilty are tabulated below in table 5.1 and table 5.2. One of the major air pollution control measures is ESP and is described below.

Electrostatic precipitator:

In ESP, one discharge electrode (negatively charged) is hung between two earthed plates (collecting electrodes). High voltage (maximum 70 KV) is given to the discharge electrode by Transformer Rectifier thus creating an electric field which ionizes the gases around the discharged electrode. Then it charges the ash particles negatively by the mechanism of ion ash particle collision. After charging, the particles start migrating toward the collecting electrode. On reaching the collecting plates these dust particles looses their charge and get deposited. The deposited dust layer is dislodged by raping

at fixed intervals and falls into hoppers. The collected fly ash is being sold to cement plant. The schematic diagram of the top view of ESP is shown in the figure below.

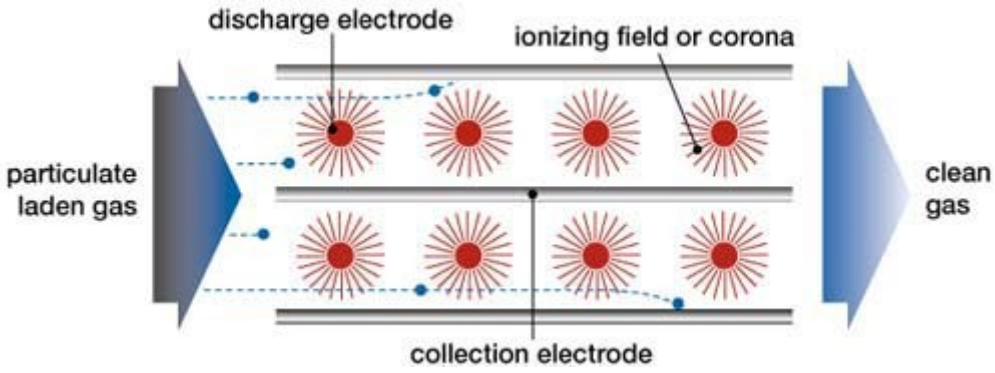

Fig Schematic Diagram of ESP

Table 5.1: Sources of Air Pollution and Control Measures

S. No.	Sources of Air Pollution	Air Pollution Control Measures	Stack Height (m)	Stack Diameter (mm)
1.	Kiln/ Boiler	Common Stack & ESP	30	1200
2.	Coal & Iron Ore Crushing	Stack , Bag Filter	16.5	500
3.	Stock House & Transfer Tower	Stack, Bag Filter	18.8	550
4.	Cooler Discharge & Intermediate Bin Building	Stack, Bag Filter	11	675
5.	Product House	Stack, Bag Filter	18	675
6.	FBC Boiler	Stack, ESP	30	1350
7.	FBC Boiler 10T/Hr	Stack, ESP	30	1350
8.	Injection Coal Platform	Table Type Bag Filter	-	475

Table 5.2: Details of Utility Stacks

S. No.	Sources of Air Pollution	Air Pollution Control Measures Provided	Stack Height (m)	Stack Diameter (mm)
1	DG set (180KVA)	Exhaust Pipe	6	100
2	DG set (725KVA)	Exhaust Pipe	8	200

5.3 Air quality modelling

To estimate the ground level concentration due to the emission from the plant, an EPA approved ISCST3 (Industrial Source Complex Short Term dispersion model) has been used. ISCST3 provides option to model emission from a wide range of sources that are present at a typical industrial source complex. The model considered the sources and receptors in undulated as well as plain terrain and combination of both. The basis of the model is the straight line steady state Gaussian Plume equation

ISCST3 model with the following options has been employed to predict the cumulative ground level concentration due to emission from the proposed project.The details are given in table 5.3

The maximum ground level concentration is found to be at a distance of 2.5 km from the source of emission. The combined predicted and background levels in the area are well below the CPCB standards. Hence the impact due to the stack emission is unlikely to deteriorate the ambient air quality.

Table 5.3: Maximum Predicted 24 hour ground level concentration

Pollutant	Max. Predicted conc. µg/Nm^3	Background conc. µg/Nm^3	Overall conc. µg/Nm^3	Regulatory Standards µg/Nm^3
SO_2	14.49	17.1	31.59	80
NO_X	10.87	24.4	35.27	80
RSPM	3.88	74	77.88	100

The results show that there will be marginal increase in the overall pollutant load on the air after the proposed enhancement activity, however it will be within the prescribed standards of CPCB. Hence there will be no appreciable effect on the ambient air quality.

Presently, the unit has three numbers of high efficiency Electro Static Precipitators (99.5%) which are adequate to handle the increased quantity of air pollutants generated after the enhancement. Thus, the existing infrastructure and machinery are adequate to maintain the pollution level within the limits.

5.4 Fugitive emission

The coal handling system includes storage silo, coal conveyor, crushing mill & transfer to the furnace attached with the boiler. The coal conveyance from stock yard to

raw material feeding point is carried out through covered mechanical conveyance system with adequate water sprinkling arrangement at all transfer points.

5.5 Impact on Water Environment

The entire water requirement after the proposed enhancement would be 58.5 m^3/day which will be obtained from the bore wells. The impacts due to such activities are envisaged to be insignificant. The project site which falls in Viralimalai Block of Pudukottai District has been classified as Safe Zone by the Public Works Department, Tamil Nadu. The rainwater harvesting system at the plant site would also aid in ground water recharging.

The major sources of trade effluent from the power plant are Boiler blow down (2 KLD), DM plant (2 KLD), and RO reject (8 KLD). The total effluent from the plant is expected to be about 12 KLD. The presence of air cooled condensers require no water as against the water cooling condensers which in turn reduces the quantity of effluent generated from the plant.

The effluent generated is neutralized and sent to common collection tank. The treated effluent is proposed to be used for gardening. Sewage from domestic consumption will be sent to septic tank with dispersion trench.

5.6 Impact on Noise Environment

Normal sources of noise during operation are Steam Turbine, Cooling Water Pumps, Air compressors and Transformers. The effect of noise emission is minimum around the plant area due to control measures.

5.7 Impact on Land Environment

Since majority of the land area comes under unclassified category, the impact on land-use pattern is less significant.

5.8 Impact due to Solid Waste

The solid waste generated from the plant is fly ash and slag (bed material). Entire quantity of Fly Ash is sold to cement manufactures and other consumers where the ash could be used for cement, concrete manufacture, brick manufacture, etc. while the slag is collected and used for landfilling. There will not be any hazardous waste in any form from the plant. Hence the impact on the environment due to solid waste is insignificant.

6.0 Environment monitoring programme

Environment monitoring programme is devised to evaluate the performance of mitigation measures proposed in the EMP

A monitoring strategy is required to ensure that all environmental resources which may be subject to contamination are kept under review and hence monitoring of the individual elements of the environment is necessary. The Environment Management Department (EMD) of Sabari will be entrusted with this responsibility. The officers of EMD will assess the progress and analyze the data periodically.

6.1 Monitoring of Emissions and Air Quality

The proponent will monitor the ambient air quality regularly in 4-6 locations in and around the plant to ascertain the effect of process emissions on the ambient air quality. The monitoring schedule is given in table 6.1

Table 6.1: Monitoring Schedule for Air & Meteorology

Particulars		Monitoring Frequency	Duration of Sampling	Important Monitoring Parameters
A	**Stack Monitoring**			
1	Stack	On Line	Continuous	SPM, SO_2, NOx
B	**Ambient Air Quality Monitoring**			
1	Four to Six locations specified by TNPCB	Twice in a week	24 hours continuously	SPM, RSPM, SO_2, NOx, CO, HC

6.2 Monitoring of Water Quality

Samples of ground water will be tested for quality for every season from various locations around the plant to ascertain the trend of variation in the water quality, if any. The blow down quality will also be monitored once a month through laboratory recoganised by CPCB/ MoEF and schedule is given in table 6.2

Table 6.2: Monitoring Schedule for Water Quality Parameters

Particulars		Monitoring Schedule	Duration of Sampling	Important Monitoring Parameters
Water And Effluent Quality				
i)	Boiler Blowdown D.M. Plant Regeneration Waste	Every day	Once in a shift	pH, electrical conductivity, alkalinity
Water Quality in the study area				
i)	Ground Water	Once in 3 months	Grab sampling	Physical & chemical parameters

6.3 Monitoring of Noise Levels

Noise levels will be monitored within the plant premises once in a month. The employees be provided with personal protective equipment like ear plugs/ear muffs. Noise barriers would be provided in the form of trees within the plant and green belt area.

7.0 Environment Management Plan

EMP is necessary to ensure sustainable development and thus needs to be an all inclusive plan aimed at controlling pollution at the source level to the possible extent with the best available technology.

The EIA study has shown that under normal operating conditions the plant is unlikely to have an adverse impact on the environment. All the emissions from the plant are effectively collected, treated and suitably disposed off or recycled.

The mitigation measures to be adopted during the operational phase to control the negative impacts on various environmental components in the study area are given below.

7.1 Management of Air pollution

The proposed enhancement project will involve increased emission from co-gen power plant but there will not be any increased emission from sponge iron plant. The major pollutant expected from the plant is SO_2, NOx RSPM and SPM. About 7 stacks are installed to different units of co-gen power plant. The stack heights vary from 11 to 30 m

height. Moreover there are many air pollution control measures attached to various units of the unit as shown below

- The WHRB boiler is provided with electrostatic precipitator (ESP) with particulate removal efficiency of 99.5%. The flue gases from coal/ dolochar fired FBC boilers (2 nos.) are treated by 2 nos of ESP with particulate removal efficiency of 99.5%.

- The boiler and coal handling area dust separation system will be equipped with continuous SPM monitoring device to check on SPM emission level.

7.2 Management of fugitive emission

- Imported coal with less ash content is used in boiler
- Wind screen in coal storage area will be provided to avoid fugitive dust emission.
- Coal crushing is provided with dry bag filter type dust collector with stack of 18.8 m height.
- Fly ash handling system will be of closed type to prevent fly ash escape.
- Dust suppression system using water through nozzle is provided at unloading area and coal storage for fugitive dust emission control.
- Coal conveyance from coal storage to coal feeding points is carried out through covered mechanical conveyance system with adequate water sprinkling arrangement at all transfer points.
- The fugitive emission of particulates from coal yard will be continuously controlled by dust suppression system - water sprinkling.Proper maintenance and tarring of roads inside the factory.
- Preventive maintenance of valves and other equipments.
- Dust suppression and extraction system at Coal and ash Handling Plant.
- Green belt on all sides within the plant boundary helps in attenuating the fugitive emissions of pollutants from the plant.
- Ambient air quality and stack/fugitive will be monitored regularly.

These Air Pollution and fugitive emission control measures will ensure that there will not be any significant impact on the Air Quality due to the proposed enhancement of power generation

7.3 Management of Water Pollution

Several water conservation and reuse measures are practised by Sabari. One such meaure is usage of air cooled condenser and hence the water requirement for cooling purpose is eliminated.

The total effluent quantity after the proposed enhancement would be 12 KLD, which is from Boiler Blow Down and Reject from D.M. / R.O. Plant. The treated effluent is utilized for gardening.

7.4 Rainwater Harvesting

The rainwater from the roofs of the buildings is collected during rainy days. The rain water is diverted to percolation ponds where it percolates down and recharges the aquifer. Further, storm water drainage system is provided.

7.5 Management of Noise Pollution

During operations, flue gas exhausters (IDFans), boiler feed pump, condenser area, demineralizer, induced and forced draft fans will be main noise sources. Various noise control measures will be taken up.

- Equipments installed will conform to noise levels prescribed by regulatory authorities.
- Provision of acoustic enclosures to noise generating equipments such as pumps
- Thick green belt to attenuate the noise levels
- Provision of earplugs to the workers working in high noise level area.

7.6 Management of Solid Waste Pollution

The solid waste generated from the proposed project is fly ash . Fly ash is recovered from various outlets such as economizer, air preheater and ESP hoppers are stored in silos. Subsequently it will be then disposed for cement and bricks manufacturing units.

7.7 Green Belt Development

The unit has green belt area of about 7.8 acres and the existing greenery will be increased by planting more trees like eucalyptus, subabul etc.

7.8 Risk Assessment

Risk Assessment involves identification of probable potential hazardous events at the industry and categorization as per predetermined criteria. The consequences of major credible events are calculated with different combinations of weather conditions to simulate the worst possible scenario. These consequence predictions are compiled to provide risk mitigation measures for the entire plant and details of study are provided in the EIA report.

7.9 Disaster Management Plan

The disaster management plan will be prepared incorporating accident prevention measures, response planning and recovery procedures.

7.10 Project Benefits

The salient features of the proposed enhancement include:

1. The enhancement project does not require installation of any additional machinery as the existing infrasturucture and machineries will be adequate as it is proposed to use the full installed capacity of plant machinery.
2. There will not be any change in the sponge iron production while there will be an increase in the power production from 4.8 MW to 6 MW using the existing infrastructure and machineries. This will be achieved by the recovery of waste heat generated during sponge iron production is used for steam generation which in turn generates electricity. The enhancement does not require any additional APC measures as the existing high efficiency ESP will be adequate to handle the increased pollution load.
3. Requirement of water is minimal due to the usage of air cooled condenser.
4. The solid waste in the form of ash generated from the unit is sold to cement/ brick manufacturing units.

8.0 Conclusion

The enhancement of co-gen power plant will result in considerable growth of service sector and will also generate new industrial and business opportunities in the

area. The proposed enhancement of co-gen power plant from 4.8 to 6 MW/HR does not have any major impact upon the existing environment since the increase is very minimum. Moreover, Sabari Industries Pvt. Ltd. has adequate mitigation measures to control air, water, soil and noise pollution. Extra care is taken to grow more trees and also maintain the existing green belt.