

ENVIRONMENTAL IMPACT ASSESSMENT
FOR
THE PROPOSED SPONGE IRON PLANT WITH 16 MW POWER PLANT
AT THIRUMALAYAMPALAYAM VILLAGE, COIMBATORE SOUTH TALUK
COIMBATORE DISTRICT, TAMILNADU

EXECUTIVE SUMMARY

Sponsor :



Raja Sponge Iron and Energy Private Limited
Coimbatore

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1.0 BRIEF DESCRIPTION OF THE PROJECT

Raja Sponge Iron and Energy Private Limited (RSIE) proposes to set up a 1.2-LTPA Sponge Iron Plant with 16-MW Captive Power Plant (CPP) at Thirumalayampalayam village of Coimbatore South taluk in Coimbatore district, Tamilnadu.

In order to assess the environmental impacts due to the proposed project, this Environmental Impact Assessment (EIA) report has been prepared. As per the latest EIA Notification dated 14th September 2006, the proposed sponge iron plant project falls under 'Category A' under project category 3a, for which Environmental Clearance (EC) from MoEF is necessary. Inline with new EIA Notification, meeting was held in MoEF for determining TOR on 26th October 2009 for the preparation of EIA report for the proposed sponge iron plant. Based on TOR conditions given by MoEF, this EIA has been prepared.

RSIE proposes to set up a sponge iron plant with 16 MW captive power plant at Thirumalayampalayam village, Coimbatore South taluk, Coimbatore district, Tamilnadu with an estimated capital cost of about Rs.190.0-Crores. The proposed project will have a total installed production capacity of around 1.2 LTPA of sponge iron. A 16-MW capacity CPP shall be installed in the complex using waste gas arising in sponge iron manufacturing process (8 MW) and balance 8 MW shall be generated using char which is a solid waste of sponge iron plant) and coal.

1.1 Land Requirement

The proposed plant will be developed in an area of 22.25 ha (54.97 acres). The total land is available under the ownership of the promoters. An area of 18.35-acres is earmarked for greenbelt development, which is about 33.6% of total plant area. The land use break-up is given in **Table - 1**.

TABLE - 1
LAND USE BREAK-UP

Sr. No.	Plant Facilities	Area (acres)	Percentage (%)
1	Production Plant facilities	8.26	15.03
2	Material storage yard	1.24	2.26
3	Internal Roads	5.88	10.70
4	Green belt area	18.35	33.38
5	Solid waste disposal area	20.0	36.38
6	Vacant land	1.24	2.26
Total Area		54.97	100.0

1.2 Power Requirement and Supply

The power requirement of the proposed project is about 4.6 MW. The entire requirement will be met from the proposed CPP. The 8 MW of the CPP will be based on FBC technology and 8-MW CPP will be based on waste heat recovery boilers connected to sponge iron plant waste heat recovery system.



Two DG sets having capacity of 1010 KVA each has been envisaged to meet the emergency power requirements. In case of main's power failure the diesel generator will automatically start and supply power to the emergency loads using AMF facility.

1.3 Water Requirement

Water is required in the proposed plant mainly for equipment cooling. In addition, it is used for process use, steam rising, for collecting and conveying of scales, dust and debris, for drinking and sanitation, for fire fighting and for other miscellaneous purposes. The total make-up water requirement for sponge iron plant and power plant is 46-m³/hr. The required water will be sourced from Bhavani River through TWAD Board.

1.4 Man Power Requirement

The total manpower requirement during the operation phase of the proposed project works out to be about 500 persons. It is also expected that number of ancillary industries will develop near the proposed site, which will be mutually beneficial.

1.5 Raw Material Requirement

The details of raw materials required for sponge iron and power plant along with its source are given in **Table - 2**.

TABLE - 2
RAW MATERIAL REQUIREMENT

Sr. No.	Raw Material	Quantity (TPA)	Source	Mode of Transportation
	Sponge Iron			
1	Iron Ore	2,40,000	Hospet, Bellary	By Road
2	Coal	1,44,000	Singareni, South Africa & Indonesia	By Ship & Road
3	Dolomite	400	Local Mines	By Road
	Power Plant			
1	Coal	37,740	Singareni, South Africa & Indonesia	By Ship & Road
2	Char	30,940	Indigenous	---

2.0 DESCRIPTION OF ENVIRONMENT

The proposed sponge iron with captive power plant will be established at Thirumalayampalayam village of Coimbatore South taluk in Coimbatore district, Tamilnadu.

Land identified for the proposed project is dry barren land. The current land use of the proposed plant is undeveloped dry barren land and no activities of agriculture. The site is generally a plain land with less undulation.



The study area map covering 10-km radius of the proposed plant site is shown in **Figure – 1**. The details of environmental setting are given in **Table – 3**.

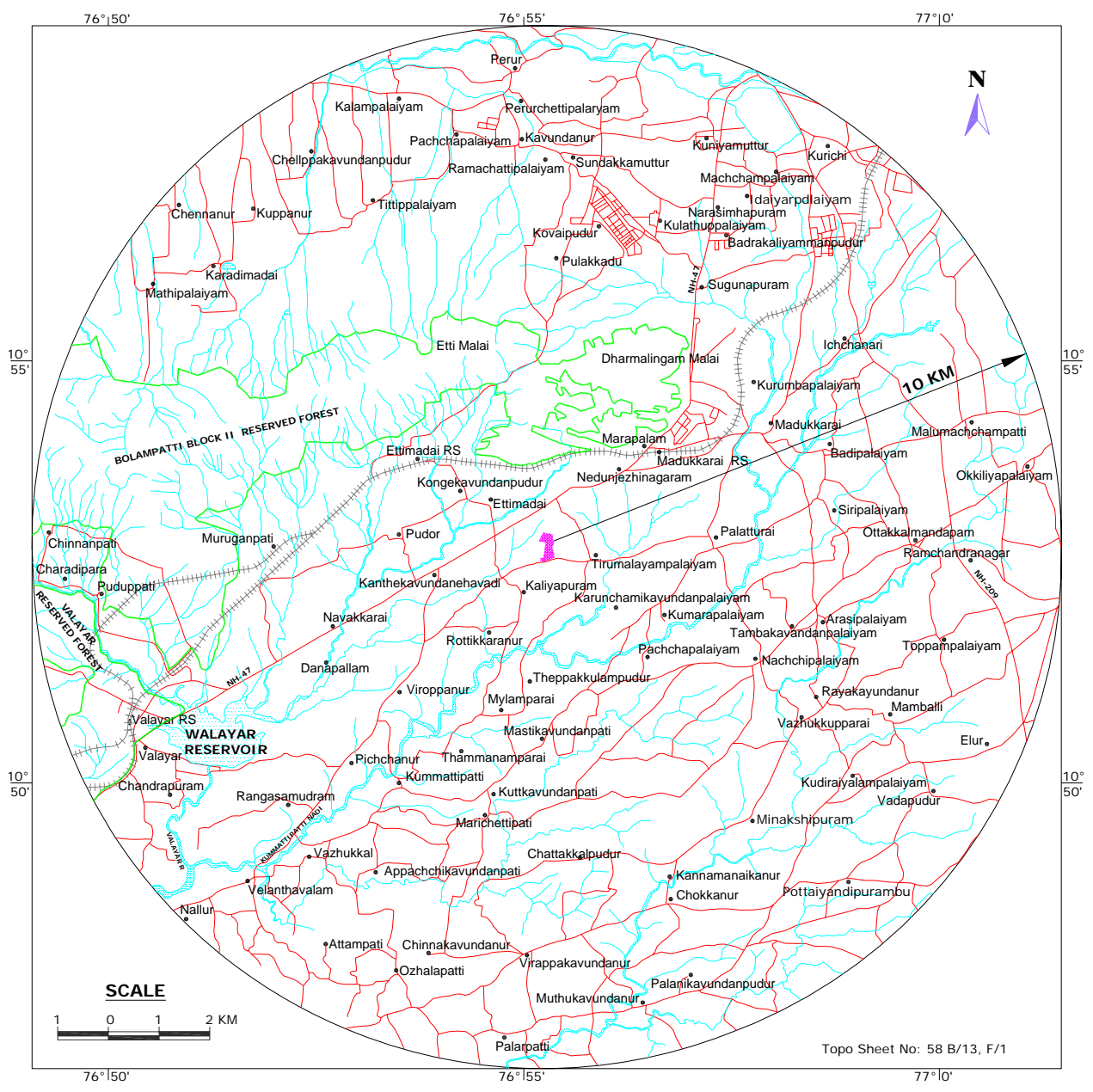
TABLE - 3
ENVIRONMENTAL SETTING IN 10-KM RADIUS

Sr. No.	Particulars	Details
1	Latitude	10°52'45" to 10°53'01" North
2	Longitude	76°55'12" to 76°55'21" East
3	Elevation above MSL	292 to 296-m
4	Climatic conditions (Based on IMD, Coimbatore)	Annual Max Temp – 38.0°C Annual Min Temp – 15.0°C Annual Total Rainfall – 574.3 mm Predominant Wind Direction : NE, NNE & SW
5	Present land use	Dry agricultural land
6	Nearest National Highway	NH-47 connecting Salem-Kochi (0.5-km, NNW)
7	Nearest Railway station	Madukarai R.S. (3.0-km, NE)
8	Nearest Air Port	Coimbatore (15 km, NNE)
9	Nearby village	Thirumalayampalayam (0.75 km , E)
10	Nearest Town	Coimbatore (15 Km, NNE)
11	Forests within 10-km radius	Bolampatti R.F. (2.5-km, N)
12	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius
13	Notified Archaeological Monuments	None within 10-km radius
14	Water bodies	Walayar Reservoir (6.5-km, SW) Walayar River (8.0-km, SW) Noyal River (9.0-km, N)
15	Defence Installations	Madukarai Military Camp (2.0 km, NNE)
16	Socio-economic factors	No Resettlement and Rehabilitation issues
17	Nearest Sea Port	Cochin
18	Seismicity Zone	Zone-III as per IS: 1893 (Part-1) 2002



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Executive Summary



LEGEND

Project Site	Settlements
Highway / Road	Forest Boundary
Railway Line	Nadi Nala

FIGURE-1
STUDY AREA MAP OF THE PROPOSED PROJECT – 10-KM RADIUS



2.1 Meteorology

The maximum and minimum temperatures recorded during the study period are 37.8°C and 20.8°C respectively. The maximum and minimum relative humidity was observed to be 92.5% and 42.5% respectively during the study period. The predominant winds are mostly from NNE and SW followed by WNW direction. Predominant winds from NNE direction were observed for 22.7% of the total time, with wind speeds and frequencies in the range of 1-5 kmph (6.2%), 5.01-11 km/h (11.4%), 11.01-19 km/h (3.1%), and >19 kmph (1.9%). Whereas in SW direction the winds were observed for 14.2% of the total time with wind speeds and frequencies in the range of 1-5 kmph (3.0%), 5.01-11 kmph (6.6%), 11-19 kmph (3.9%) and >19 kmph (0.7%). The calm conditions were observed for 1.1% of the total time.

2.2 Air Quality

Ambient Air Quality Monitoring (AAQM) stations were set up at eight locations. The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB), IS: 5184 and American Public Health Association (APHA).

The maximum value for TSPM was observed at project site as 134.2 $\mu\text{g}/\text{m}^3$ and minimum value for TSPM was observed at Kaliyapuram village as 81.9 $\mu\text{g}/\text{m}^3$. The maximum value for RPM was observed at project site as 40.3 $\mu\text{g}/\text{m}^3$ and minimum value for RPM was observed at Kaliyapuram village as 23.2 $\mu\text{g}/\text{m}^3$. The maximum value for SO_2 was observed at Nedunjezhinagaram as 10.4 $\mu\text{g}/\text{m}^3$ and minimum value for SO_2 was observed at Pichanur village as 4.7 $\mu\text{g}/\text{m}^3$. The maximum value for NO_x was observed at Nedunjezhinagaram as 15.5 $\mu\text{g}/\text{m}^3$ and minimum value for NO_x was observed at Pichanur village as 10.0 $\mu\text{g}/\text{m}^3$. The Benzene soluble fraction of Poly-aromatic Hydrocarbons (PAH) in particulate phase was observed to be <0.01- $\mu\text{g}/\text{m}^3$ in the study area. In RSPM, range of Zinc (0.011-0.064 $\mu\text{g}/\text{m}^3$), Copper (0.010 - 0.024 $\mu\text{g}/\text{m}^3$), Lead (<0.001 - 0.013 $\mu\text{g}/\text{m}^3$), Iron (0.068-0.138 $\mu\text{g}/\text{m}^3$), Vanadium (<0.001-0.002 $\mu\text{g}/\text{m}^3$) and Silica (0.001-0.005 $\mu\text{g}/\text{m}^3$) was observed and the remaining heavy metals to Below Detectable Limits in the study area.

2.3 Water Quality

Water samples were collected from sixteen (16) sampling locations during the summer season of 2009. Eight ground water and eight surface water samples were collected and were analyzed for various parameters to compare with the standards as per IS: 10500 and IS:2296 respectively.

Ground water

The pH and conductivity varies from 7.2 to 7.8 and 760 to 2240 $\mu\text{S}/\text{cm}$. The total dissolved solids ranged between 520 to 1520 mg/l respectively. Calcium and Magnesium content varies between 59.0 to 168.0 mg/l and 25.6 to 106.9 mg/l respectively. Total hardness and alkalinity expressed as CaCO_3 ranges between 252.9 to 859.9 mg/l and 210 to 390 mg/l respectively. Chlorides and Sulphates are found to be in the range of 85.1 to 524.7 mg/l and 5.8 to 57.3 mg/l



respectively. Nitrates and Fluorides are found to be in the range of 11.0 to 42.8-mg/l and 0.4 to 0.8 mg/l respectively. The heavy metal contents are found to be well within the limit. E.Coli, Insecticides and pesticides were found to be absent.

Surface Water

The pH values were observed to be 7.4 to 7.9. Conductivity was observed to be 306 to 2085 μ S/cm. Dissolved oxygen values were observed to be 6.2 mg/l to 6.5 mg/l. Biological Oxygen Demand (BOD, 3 day @27°C) values were observed <3 mg/l. Total hardness values were observed to be 158 and 1139.8 mg/l. Total dissolved solids were observed to be 196 and 1913 mg/l. Chlorides values were observed to be 34.0 to 574.5 mg/l. Fluoride values were observed 0.3 to 1.1 mg/l. Sulphates were observed to be 4.1 to 53.4 mg/l for. Nitrates were observed to be 6.0 mg/l and 34.1 mg/l. Calcium values were observed to be 37.6 to 281.0 mg/l. Magnesium values were observed to be 14.0 mg/l to 132.0 mg/l. Heavy metals were observed to be well within the permissible limits. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 2296.

2.4 Soil Quality

Six locations within 10-km radius from the proposed project site were selected for soil sampling. At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and homogenized. The homogenized samples were analyzed for physical and chemical characteristics. Samples were collected during pre-monsoon season 2009.

It has been observed that the texture of soil is mostly clay in the study area and soil is light brown in colour. It has been observed that the pH of the soil quality ranged from 7.7–8.1 indicating that the soil is usually 'slightly alkaline' to 'moderately alkaline' in nature. The bulk density of soils ranges between 1.0 to 1.2 gm/cc. The electrical conductivity was observed to be in the range of 185 to 315- μ S/cm.

The organic carbon values ranged between 0.03 to 0.05% indicating that the soils, which taken for study have very less organic carbon. The nitrogen values ranged between 25.2 – 49.8 kg/ha and indicating that the soil consists of less quantity of nitrogen. The phosphorus values range between 32.0–64.0 kg/ha and it indicating that the soil has 'medium' amount of phosphorous. The Potassium values range in between 92.9 - 145.2 kg/ha and indicating that the soils in the area have 'very less' to 'less' quantity of Potassium.

2.5 Noise Levels

The noise monitoring has been conducted for determination of noise levels at **ten** locations in the study area. The day time noise level at industrial zone was observed to be 60.7 to 61.3 dB (A) which is within the prescribed limit of 75 dB (A). The day time noise level at all residential zone was observed to be within the prescribed limit of 55 dB (A). The day time noise levels are ranged between of 47.2 to 49.7 dB (A). The day time noise level at commercial zone was observed to be well within the prescribed limit of 65 dB (A) and it was observed as 58.1 dB (A).



The night time noise level at industrial zone was observed to be within the prescribed limit of 70 dB (A), which was 57.1 to 57.5 dB (A) at project site. The night time noise levels at residential locations were found to be within the prescribed limit of 45 dB (A) which is observed as 42.0 dB (A) to 44.8 dB (A). The night time noise level at commercial zone was observed to be well within the prescribed limit of 55 dB (A) which is observed as 48.6 dB (A).

2.6 Ecology

Field survey conducted during the study period revealed a total of 326 species of plants of which 141 were phanerophytes, 115 were therophytes, 43 hemi-cryptophytes, 16 hydrophytes and 11 geophytes. During the present study all the plants observed in the field were recorded but there could be many other plants which have remained unrecorded. As per literature survey of an university in Coimbatore and various departments of forest reveal that there are no wild life sanctuaries or national parks or biosphere or hotspots in 10 km and 25 km radius from the proposed project site.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS & ENVIRONMENT MANAGEMENT PLAN

The anticipated environmental impacts and mitigation measures are presented in Table-5.

**TABLE-5
ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES EMP**

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
Constructional Impact				
Water Quality	Increase in suspended solids due to soil run-off during heavy precipitation	Loose soil at construction site	During monsoon season run off from construction site will be routed to a temporary sedimentation tank for settlement of suspended solids.	-
Air Quality	Increase in dust and NOx concentration	Leveling activity and Heavy vehicular movement	Sprinkling of water in the construction area and unpaved roads. Proper maintenance of vehicles will be done.	The impact will be low, as the main approach road will be tarred.
Noise	Increase in noise level	Construction equipment	Equipment will be kept in good condition to keep the noise level within 90 dB(A).	Workers will be provided with necessary protective equipment e.g. ear plug, earmuffs.
Terrestrial Ecology	Clearing of Vegetation	Soil enabling activities	Landscaping and extensive plantation will be done.	Plantation will be done in consultation with the local forest department.
Socio-economics	Land oustees	Land Acquisition	Land required for the project is available under the ownership of the promoters	No land acquisition involved



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Executive Summary

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Operational Impact				
Water Quality	Deterioration of surface water quality	Discharge from various plant units.	Adequate treatment facilities will be provided so that the treated effluents conform to the regulatory standards.	The plant effluent after treatment will be reused to maximum possible extent.
Air Quality	Increase in SPM, SO ₂ and NO _x levels in ambient air.	Stack emissions and material storage yards.	High efficiency ESPs, Bagfilter, Scrubber, Dust extraction system will be installed to control Particulates. Adequate stack height will be provided as per CPCB guidelines for the proper dispersion of pollutants. Motorable roads in the plant area will be paved to reduce dust emission. Plantation programs will be undertaken around the plant area. Dust suppression measures will be implemented raw material handling area.	The resultant air quality will conform to the stipulated standards. Particulate emission from stack will be kept below 50 mg/Nm ³ .
Solid waste	Char, Gas cleaning plant sludge, ESP /bag filter dust, etc.	From sponge iron Plant & CPP	Char and Coal fines shall be used in captive power plant The sludge, dusts would be used in brick making & road lying.	Efforts will be made to utilize the solid waste to the extent possible.
	Fly ash and bottom ash	From CPP	The ash will be disposed to cement plants & brick manufacturing units	Bottom ash will be utilized as bed material and road construction.
Ecology				
a. Terrestrial	Impact on plant species	Emissions from stack	Emission will be controlled as well as dispersed through appropriate design.	As ambient air quality will be within limits, no active injury to the vegetation is expected.
b. Aquatic	Impact on aquatic life of the sea	Treated waste water from plant	The wastewater will be provided with adequate treatment facilities and reused for the process	As all the effluents will be treated to conform to prescribed limits, no significant impact on aquatic life is expected.
Noise	Increase in noise levels in the plant area.	Equipment in main plant and auxiliaries.	Equipment will be designed to conform to noise levels prescribed by regulatory agencies. Provision of green belt and plantation would further help in attenuating noise.	Employees working in high noise areas would be provided earplugs/ earmuffs as protective device.

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
Demography and Socio-economics	Strain on existing amenities like housing, water sources and sanitation, medical and infrastructure facilities.	Influx of people of proposed sponge iron plant employees as well as contractor's employees/labourers.	No significant impact is envisaged. Additional facilities will be developed by the project proponents.	Overall socio-economic status of the area is expected to improve.

4.0 ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring will be conducted on regular basis by RSIE to assess the pollution level in the surrounding area. A comprehensive monitoring program is suggested in **Table-6**.

TABLE - 6
MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

Sr. No.	Particulars	Monitoring Frequency	Method of Sampling	Important Monitoring Parameters	
I	Air Pollution & Meteorology				
	A	Stack Monitoring			
	1	Sponge Iron Plant	Once in a month	ISO-Kinetic, manual procedure	SPM, SO ₂ , NO _x & CO
	2	Captive Power Plant	Once in a month	ISO-Kinetic, manual procedure	SPM, SO ₂ , NO _x & CO
	B	Air Quality Monitoring			
	1	Five locations in and around the plant	Once in a month	24 hr continuously	SPM, RPM, SO ₂ , NO _x & CO
	2	Work zone monitoring	Once in a month	Low volume sampler	SPM, SO ₂
	C	Fugitive Emissions			
		Raw material handling, feed area, product processing area and other areas	Once in a month	8-hour basis with High Volume Sampler	SPM & RPM
	D	Meteorology			
	Wind speed, direction, temperature, relative humidity, atmospheric pressure, rainfall etc shall be monitored at plant site				
II	Water and Wastewater Quality				
	A	Water Quality			
1	Water Wells in and around plant area	Once in a season	Grab	Parameters specified under IS:10500, 1986	



Sr. No.	Particulars	Monitoring Frequency	Method of Sampling	Important Monitoring Parameters
	B Domestic Wastewater			
1	Sanitary effluents from STP outlet	Once in a month	24 hr composite	As per EPA Rules, 1986
	C Industrial Effluents			
1	After every unit process of treatment plant	Once in a month	24 hr composite	As per EPA Rules, 1986
III	Industrial Noise Levels			
1	Near administrative office	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
2	Process air blower	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
3	Air compressor	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
4	Blower and compressor of oxygen plant	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
5	Turbine generator of WHRB	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
6	DG Set	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
7	Crusher house	Once in 3 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	Ambient Noise Levels			
1	On the plant boundary at ten directions	Once in each season for ambient noise levels	24 hr continuous with one hr interval	Noise levels in dB(A)
V	Soil Quality			
	In and around the plant at five locations	Once in a year	Grab	Physio-chemical parameters and heavy metals

5.0 ADDITIONAL STUDIES

A preliminary risk assessment study has been carried out for the proposed plant and associated facilities like HSD storage and the broad conclusions are as follows:

- There will be no significant community impacts or environmental damage consequences; and
- The hazardous event scenarios and risks in general at this facility can be adequately managed to acceptable levels by performing the recommended safety studies as part of detailed design, applying recommended control strategies and implementing a Safety Management System.



6.0 PROJECT BENEFITS

The proposed projects of RSIE will result in improvement of infrastructure as well up-liftment of social structure in the area. The people residing in the nearby areas will be benefited directly and indirectly as well. It is anticipated that the proposed sponge iron plant with CPP will provide benefits for the locals in two phases i.e., during construction phase as well as during operational phase of the plant.

6.1 Employment

The major benefit due to the proposed project will be in the sphere of generating temporary employment for substantial number of personnel. The construction phase of project is expected to span over 24 months. Employment for about 300 people will be created by the proposed project during the construction phase, which will last for over 2 years from the start of project execution activities at site. These construction workers will be taken from the study area to the extent possible. Hence, the proposed project will benefit locals to a great extent.

The manpower requirement for the operational phase of the proposed plant will be about 500 people. In addition, there will be an indirect employment for about 1000 people with implementation of this project. All attempts will be made to employ locally available skilled personnel from the study area. In case of non-availability of skilled persons, people will be hired from outside the study area. Requirement of un-skilled / semi-skilled people will be mostly met from the local population.

6.2 Community Services

RSIE will employ local people to the extent possible. In addition, RSIE will develop necessary infrastructure like water supply, sewerage, medical facility, etc. for catering to the needs of the project personnel and their families, which will be also beneficial to the locals residing in the area.

6.3 Education

Unskilled people and limited skilled people (depending on availability) will be hired from local population. So, especially skilled people expected to come to the study area from outside are expected to be educated. In addition, some secondary developments like opening of new schools may take place in view of the increased family population due to the proposed employment. These factors will be beneficial to locals residing in the study area.

6.4 Transportation

Construction phase of sponge iron plant, captive power plant and other facilities will involve movement of material of great magnitude. The material to be transported includes earthwork, concrete, steel, equipment and other materials. Transport of construction materials to the project site will result in increased traffic in the area, which will certainly put additional load on the existing road infrastructure.



The major raw materials namely iron ore, dolomite, limestone, coal quartzite and manganese ore will be transported by road and rail to plant site. However, there will also be increase in the vehicular traffic (366 trucks per day) due to material transport. This increase in traffic also will not be of any scale of consequence to warrant special mention. One should expect that the increased material load in the sector would prompt the state government to start new and frequent services to this area, bringing uplift to the whole area.

6.5 Other Benefits

As part of the Corporate Social Responsibility, RSIE proposes to take steps in developing education, health, infrastructure development, women empowerment, sports and vocational training facilities. These will be taken up as part of social development of the neighboring villages.

6.6 Socio-economic Development Activities

The proposed project will provide direct employment to about 500 persons and indirect employment to about 1000 persons. Apart from the employment and business opportunities for the local people, they will also be benefited in the areas such as education, health care, infrastructure facilities and women empowerment. Some of the specific Corporate Social Responsibility activities proposed under this project are listed below:

- Improving the infrastructure facility of the Thirumalayampalayam panchayat school with cost of Rs. 20.0 lakhs
- Additional facilities for the primary health center of Thirumalayampalayam village with cost of Rs. 15.0 lakhs
- Proposed to provide about 1.0 lakh liters per day of fresh water to Thirumalayampalayam from the water to be allotted by TWAD Board to the proposed plant

7.0 CONCLUSION

The proposed projects will have certain level of marginal impacts on the local environment. However, development of this project has certain beneficial impact/effects in terms of providing the employment opportunities that the same will create during the course of its setting up as well as during operational phase of the project.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed project will be beneficial to the society and will help reduce the demand – supply gap of sponge iron and will contribute to the economic development of the region in particular and country in general.