1.0 Introduction

Sarda Energy Minerals Limited proposes to setup an Iron Ore Beneficiation Plant of 1.2Million TPA capacity along with the expansion of existing Iron Ore Crushing & Screening unit from 0.6 Million TPA to 1.2 Million TPA. The proposed project will be located at Village – Dhuruwatola (Near Kusumkasa), Tehsil – Balod, District – Durg (C.G.).

The proposed project of 1.2 Million TPA capacity is categorized as Category - A project as per Environmental Impact Assessment (EIA) Notification SO 1533, of 14-09-2006 which necessitates obtaining the Environmental Clearance from Ministry of Environment and Forests (MoEF).

As per the requirement of EIA notification, SEML had submitted the necessary application to MoEF for approval of Terms of Reference (TOR). The Terms of Reference approved by MoEF for carrying out the Environmental Impact Assessment study vide letter No **J-11015/300/2009- IA II (M)** dated **18.12.2009**.

Salient Features of the Proposed Project

The proposed beneficiation plant at Dhuruwatola is 3 km from Kusumkasa village and situated in Durg district of Chhattisgarh.

Salient Features of the Project & Study Area:

District & State	Durg, Chhattisgarh
Tehsil	Balod
Village	Dhuruwatola (Near Kusumkasa)
Land Availability	55 acres of land is already with the company. Out of which 35 acres of land will be utilized for the proposed project.
Nature of the Area	The area comes under Pediplain/pediment, structural plain, structural hills and valleys and denudational slope.
Toposheet No	64H/2
Latitude	$20^0$38'47.37"N to $20^0$39'04.52" N
Longitude	$81^0$04'27.19" E to $81^0$04'45.40" E
GENERAL CLIMATIC CONDITIONS (As per IMD, Raipur data between 1980 to 2007)	
Average Annual Maximum Temperature	42.0°C
Average Annual Minimum Temperature	13.0°C
Relative Humidity	30-80.1%
Total Annual Rainfall	40”-60” (June-September)
Predominant Wind direction during study period	From Northeast
Elevation of the project site	400m-420m above MSL

2.0 Project Description

The requirement of iron ore fines for the proposed beneficiation is proposed to be met from Dongarbore / Narangsur Iron Ore Mines of SEML.

ROM ore is screened to separate the ore from fines and + 20mm / 40 mm, depending up on the size of iron ore required for sponge manufacturing, over size is put to the crusher hopper for further size reduction by crushers.

The sized ore with fines is washed & screened to separate sized ore & sent to product Hopper and oversize to crusher.

The undersize & fines are sent to fine master where by the help of cyclones washed fines of -4 & -1 separated by screen. Below – 70 meshes is pumped to Thickener and dozing of flocculants helps to clear the water for reuse.

The screen has been provided with bag filter top to collect dust generated during the process and disposed off, preventing its becoming air-borne.

At all the transfer point of conveyor belt water sprinkling in adequate quantity is done. The hopper where lump / ROM is fed is also provided with sprinkler to prevent dust dispersion

The calibrated iron ore is dispatched to sponge iron plant at Siltara, Raipur, fines are sent for palletization to Mandhar Plant. The -70 fraction containing gangue material shall be belt pressed for squeezing water and used for brick making.

Water Requirement:

The water requirement of 200 KL/Day will be met from adjacent Jhujara Nala. 76 KL/ Day will be lost in the process and 114 KL/Day will be the wastewater. The wastewater will be recycled back to be utilized in the process.

The total power requirement for the project about 1000KVA will be made available from CSEB Grid / DG set.

Tailings generated in Beneficiation plant are thickened in Thickener & sent to Tailing Pond. Three (3) tailing ponds are proposed for the project. The capacity of each is given below:

1) Tailing pond-1 size (50x25x5) Mtr.
2) Tailing pond-2 size (50x40x4) Mtr.
3) Tailing pond-3 size (60x40x5) Mtr.

The tailings from tailing pond will be used for backfilling of mines and also used in brick making.

3.0 Baseline Environment

The baseline data was collected during winter 2009-10 (December – February 2010).

Meteorological parameters i.e. wind speed, direction, relative humidity, temperature, rainfall etc. on hourly basis have been generated from December' 09 to February'10, which are also used in Predominant wind direction at the project site was from North- East followed by North and East. The maximum temperature recorded was during February '10 as 34.6^0 C and the minimum temperature as 10.6^0 C. The maximum relative humidity recorded during December'2009 – February 2010 was 98%.

Air Quality:

Air quality was monitored at 8 locations in the study area. PM10 ranged between 31.0 and 48.2 µg/m^3 and $PM_{2.5}$ ranged between 7.1 and 10.6 µg/m^3. The concentrations of SO_2 were in the ranged between 7.0 and 11.9 µg/m^3 and NO_X ranged between 8.5 and 14.2 µg/m^3 during the study period. The ambient air quality results were found within the standards prescribed by CPCB for Residential area

Noise Levels:

Ambient noise monitoring was carried out in the study region at 8 locations. In the study area maximum value 54.1 dB (A) was observed near Kusumkasa and minimum value 41.9 dB (A) was observed at Chipra. All values are well within the permissible limits of CPCB.

Water Quality:

To assess the water quality, 7 ground water samples 2 surface water samples were collected. Water samples were analysed for physio-chemical and bacteriological characteristics. Values of physico-chemical parameters for surface and ground water were observed to be below the stipulated standards. The surface water resources are compared with the standard for drinking water standards (IS10500). The samples collected from the study area were found to be within the permissible limits. Most of the heavy metals in all samples were found to be below detectable limits.

Land Use & Soil Quality

The land use survey was carried out on the basis of interpretation of Survey of India Toposheet (64 H/2 & 64 D/14) in the scale of 1:50,000 and field survey. The entire land of 55 acres for plant is private land and it is already in the possession of the company. In this 35 acres of land will be utilized for proposed plant.

There are no existing/proposed National Parks/Wildlife sanctuaries in the study area of beneficiation plant i.e., within 10 km radius of the project. This area is nominal as compared to

the total land area. Hence the impact on land use in future scenario may be considered as insignificant.

A study of assessment of the baseline soil quality has been carried out. A detailed examination of soils for five (5) locations has been carried out to know the quality of soil around the study area. The soil samples in different areas have brown color. Texture of soil varies from clay, sandy clay to sandy loam.

Ecology

Following patches of forest exist within the study area:

Daihan RF, Dondi PF, Gidhali South PF, Gidhali East PF, Jamhi East PF, Jamhi West PF, Arjal PF,Fagunda RF, Putarwahi PF, Junwani PF

Secondary data are collected with respect to the project. There is no National Park or Wild Life Sanctuary within the study area.

Socio-economic Environment:

A detailed socio-economic survey was conducted in the 10 km radius from the project site. The 10 km radius area is a part of Durg district. The information on socio-economic aspects has been compiled from various secondary sources including various government and semi-government offices.

Demographic Structure of the Study Area:

- Population: 1,07,791
- Sex Ratio: 980 females to 1000 male
- Literacy Rate : 66.67 %
- Scheduled Caste: 10.46 % of the total population
- Schedule Tribe : 32.96 % of the total population
- Working Population : 39.2 %
- MEDICAL : 1 Villages - Primary Health Centre
  2 Villages – Maternity and Child Welfare Centre
- EDUCATION : All Villages have Primary Schools
- ELECTRICITY : All the Villages are electrified

4.0 Identification of Impacts

Air Environment:

The major units of emission from the proposed activity are:

- Transportation of Raw Material
- Up-gradation of iron ore
- Loading and unloading of iron ore

The emissions from transportation of Raw Material and processed material within the study area have been considered as line source emissions all along the road. For calculation of emission factors, the roads have been considered as asphalted.

Incremental ground level concentrations (GLCs) of PM are predicted using Industrial Source Complex AERMOD View model. Predicted maximum ground level concentrations considering micro meteorological data of winter season 2009-10 season are superimposed on the maximum baseline concentrations obtained during the study period to estimate the post project scenario. The details are given in the following table:

Period	Maximum GLCs ($\mu g/m^3$)
Winter season	0.11026

Maximum baseline concentration of NO_X in the study area is 48.2 $\mu g/m^3$. The resultant concentration of PM will be 48.31 $\mu g/m^3$. The resultant concentrations are below the CPCB prescribed air quality standards.

Following mitigation measures are proposed during the operation stage of the proposed Iron Ore Processing and Beneficiation Plant:

- All vehicles will be regularly and properly maintained.
- The junction / transfer points of material will be provided with adequate capacity of de-dusting system (Bag filters and cyclones) to control the fugitive emission.
- Internal haul roads shall be water sprinkled at regular intervals so that free dust does not become air-borne. In processing plants, water sprinklers and misters at different transfer points will be installed and operated during working of the plant.
- Closed circuit conveyor system, closed silos are proposed.

Noise Quality

Noise pollution control measures will be provided in respective departments by way of providing silencers, soundproof cubicle / covers & proper selection of less noise prone machinery and by development of green belt all along the plant boundary wall. Engineering controls will be developed to reduce noise at the source.

Water Environment

The water required for the proposed Beneficiation Plant will be met from adjacent Jhujara Nala. The process water will be continuously recycled and overflow from the tailing pond will also be brought to the Plant for reuse. This will significantly reduce the fresh water consumption in the Plant. The total make up water requirement for the project is 200 KL/Day i.e. 60000 KL /year.

Following measures will be implemented to prevent the impacts on water environment:

- Suitable lining will be provided to percolation to groundwater.
- Tailings dam overflow will be recycled and used for dust suppression.
- Wastewater generated from the proposed facilities, will be treated and reused for dust conditioning purposes in the dust handling systems.
- The domestic effluent shall be disposed off in the septic tank with soak pit.

There is no effluent let out from the iron ore beneficiation plant. Water from the tailings is also reclaimed and reused in the process.

Soil Quality

As this is a wet Beneficiation Process, where no toxic chemicals are used and no mining activity is involved, no long term impact on soil contamination is predicted with implementation of EMP.

Solid Waste Management

400TPD waste (Tailings) will be generated from the proposed Iron Ore Processing & Beneficiation Plant. Three tailing ponds are proposed for this project. The tailings dam will be constructed as per design prescribed by the Bureau of Indian Standards (BIS), (Tailings Dam Design, Technical Bulletin No.30, Ministry of Steel and Mines. The generated tailings will be used for back filling of mind out area of Narangsur / Dongarbore Iron Ore Mines of the company and also for brick making.

Ecology

As the proposed project area has acquired very less area and since it is a wet process (Beneficiation), chances of dust generation will be low resulting into negligible impacts on flora and fauna.

Green Belt Development

Afforestation programme will be carried out by the Company during implementation of the project i.e. green belt development around the Plant area. It will be ensured that the total area of the green belt is about 25-30% of the total plant area.

SEML will take-up massive green belt development about 11.55 Acres by planting about 2,500 tree saplings per hectare will be planted in consultation with the local Forest Department.

5.0 Post Project Environmental Monitoring

Post-Project Environmental Monitoring Program is proposed in order to maintain the environmental quality within the stipulated norms. There will be an environmental lab for monitoring AAQ, Work Zone Air Quality, water analysis and noise. This project has insignificant

impact on the environmental conditions and has a strong planning for the effective management of environmental concerns.

Monitoring Schedule for Environmental Parameters

Sr. No.	Particulars		Monitoring Frequency	Method of Sampling	Parameter
I	**Air Pollution & Meteorology**				
	A	**Air Quality Monitoring**			
	1	Four locations in and around the plant	Once in month/ as per State Pollution Control Board guidelines	24 hr continuously-Respiratory Dust Sampler (RDS)	PM_{10}, $PM_{2.5}$,SO_2,NO_X
	2	Work zone monitoring	Twice in a month/ as per State Pollution Control Board guidelines	RDS	-do-
	B	**Fugitive Emissions**			
		Raw material handling, feed area, and other areas specified by SPCB	Twice in a month/ as per State Pollution Control Board guidelines	8-hour basis with RDS, Fine particulate samplers	PM_{10}, $PM_{2.5}$
II	**Water and Wastewater Quality**				
	A	**Water Quality**			
	1	**Ground Water**	Once in a season/ as per State Pollution Control Board guidelines	Grab	Parameters specified under IS:2296 (Class C) and IS:10500, 1986
	B	**Industrial Effluents**			
		Treated waste water, if to be discharged outside the plant during monsoon	Once in 15 days/ as per State Pollution Control Board guidelines	24 hr composite	pH, SS, and O& G
III	**Ambient Noise Levels**				
	1 2.	On the Plant Boundary at three locations Surrounding Area	Once in three months for the various plants / as per State Pollution Control Board guidelines Once in each season for ambient noise levels / as per State Pollution Control Board guidelines	24 hr continuous with one hr interval 24 hr continuous with one hr interval	Noise levels in dB(A) Noise levels in dB(A)
IV	**Soil Quality**				
		In and around the plant	Once in Pre-Monsoon and Post Monsoon season / as per State Pollution Control Board guidelines	Grab	Physio-chemical parameters and metals

6.0 Environmental Management Plan

Environmental Management Plan is made with specific action-led pointers. The management of the SEML has planned to take necessary steps to control and mitigate the environmental pollution in the designing stage of the project itself. The environmental management plan describes briefly the action plans to be implemented during the post project monitoring stage as per the Ministry of Environment and Forest, Central and State PCB guidelines.

The various components addressed in the management plan are Air Environment, Noise Environment, Water Environment, Land Environment, Socioeconomic Environment, Biological Environment, Safety and Health, Solid waste management and Green Belt Development.

The total investment on environmental management plan will be Rs. 70 lakhs and recurring expenditure during the operations is Rs. 8.40 lakhs per annum.

7.0 Corporate Social Responsibility

The proposed project would aid in the overall social and economic development of the region. About 63 persons will get direct employment where as it is expected that hundreds of persons will get opportunity as indirect employment. The company is committed to developing its business towards ecological, social and economic sustainability. Community development and upliftment of the marginalized section have been identified as the focus areas. The company will work extensively with the communities on broad range of issues, including health, education, strengthening of community based organization and village panchayat system through training of members on issues related to governance, development etc.

- Maintenance of schools
- Distributing books to poor children
- Community development

Annually Rs. 2.31 lakhs will be allocated towards CSR activities. The item wise breakup of CSR activities is shown in the following table:

S.No.	Description	Amount in Lakhs
1	Maintenance of schools	0.5
2	Distribution of Books	0.31
3	Community Development	1.50
Total		**2.31**

8.0 Conclusion

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