SUMMARY ENVIRONMENT IMPACT ASSESSMENT REPORT

Expansion of Integrated Steel Plant at Jamgaon, Raigarh (Chhattisgarh)

by

MSP STEEL & POWER LIMITED

RAIGARH , CHHATTISGARH

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1.0 Project Description

MSP Steel & Power Limited (MSPL) is one of the largest manufacturers of iron and steel in the country. MSPL is operating an Integrated Steel Plant at Jamgaon in Raigarh District, Chhattisgarh. MSPL proposes to expand the steel plant by installing new units. The name and production capacity of expansion units are mentioned in following Table

S. No	Name of Unit	Installed Capacity (TPA)	Expansion Proposed (TPA)	Name of the Product
1.	Iron Ore Beneficiation & Pellet Plant	12,50,000	----	Pellet
2.	DRI Plant	3,75,000	9,53,000	Sponge Iron
3.	Sinter Plant (new)	----	7,20,000	Sinter for BF
4.	Blast Furnace (new)	----	4,50,000	Pig Iron
5.	Steel Melting Shop	3,84,000	11,71,000	Billet/ Slab/Strip
6.	Rolling Mill	4,80,000	10,20,000	Hot Rolled Product
7.	Oxygen Plant (new)	----	220 TPD	Oxygen
8.	Coal Washery	3,60,000 x 2	----	Washed Coal
9.	Captive Power Plant	72.5 MW	123.5 MW	Electricity

The activity falls under Category A Serial 3 (a) of EIA Notification 2006. The Terms of Reference for the EIA study was approved by the Ministry of Environment, Forests& Climate Change, Government of India (MOEF) vide letter No. J.11011/178/2010/IA-II (I) dated 8th September 2020. The draft EIA report has been prepared for public hearing as per the TOR prescribed by MOEFCC.

Project Cost: The estimated cost of expansion project is Rs.2045 crores.

The plant will employ 2000 persons during operation (400 Engineers, 1000 skilled workers and 600 semiskilled workers). Daily 200 people will get job for 84 months during the construction of the project.

Land Requirement: The existing integrated steel plant is located on 68.4 hectares land. 29.6 hectares additional land will be acquired or the expansion pojects. Land acquisition will be done as per the policy of Chhattisgarh Government.

Water Requirement: 3050 kl/day water will be required for the expansion project. Water will be taken from Kur Nala. Water is transported by means of pipelines. No underground water shall be taken for the expansion project.

Raw Materials requirement:

	Name of Raw Materials	Quantity, TPA	Source
1	Iron Ore Lumps	303,600	Purchase from open market (Odisha)
2	Iron Ore Fines	500,000	Purchase from open market (Odisha)
3	Coal - Indian	1005,000	Purchase through e-auction, SECL mines
4	Coal Imported	471,000	Imported from South Africa
5	Coke	174,000	Import from South Africa
6	Dolomite	29,000	Purchase from Bilaspur, CG
7	Lime	50,000	Purchase from Bilaspur, CG
8	Quartzite	4500	Purchase from Bilaspur area, CG
9	Ferroalloys	7500	From Ferroalloy Plants in Raigarh, CG
10	Sodium Hydroxide	100	From Retailers
11	Hydrochloric acid	100	From Retailers

Brief Manufacturing Process

Technology: Best Available Technology has been selected for the steel & power making process. The selected units are based on environment friendly technology, having low pollution intensity. Internationally applicable pollution discharge standards have been proposed for the steel and power plant. The air pollution control systems shall be designed to meet particulate matter emission norms of 30 mg/Nm^3.

Sponge Iron Plant: Crushed raw materials (Iron ore, coal & dolomite) are fed to the kiln. Coal provides the source of heat and also acts as reducing material to turn iron ore into iron. Sponge iron produced is separated from waste materials in magnetic separator, screened and sent to steel making shop.

Blast Furnace: It is a vertical furnace. Pellet, iron ore, coke and limestone are fed from the top of the furnace that slowly travels down and comes in contact with upcoming hot air. Coke reduces iron ore to iron and also supplies heat. Iron ore gets converted to iron and impurities are converted to slag, which is taken out at regular intervals. Blast furnace gas is reused as fuel in the blast furnace stoves and other reheating furnaces of the mills. The molten metal is either converted to pigs or directly taken to steel melting shop for steel making.

Steel Melting Shop: Molten iron and ferroalloys are charged into Oxygen Furnace to obtain steel. Oxygen is blown into the furnace. Steel is tapped and send to Laddle Refining Furnace, Vacuum Degassing Unit for reduction of gases such as hydrogen, nitrogen and oxygen. Liquid steel is casted into billets / slabs in continuous casting machines. Slag is taken out from slag tap hole.

Pig iron, sponge iron, and scrap is charged from the top of Induction Furnace. Oxygen blowing is done. Steel is tapped and chemistry correction is done in Laddle Refining Furnace. Liquid steel is casted into billets in continuous casting machine. Slag is taken out from slag tap hole.

Rolling Mill: Steel from BOF is converted into various types and grades of steel products in Rolling Mill. BF Gas is used as fuel in the reheating furnaces of the mill.

Coal Washery: Coal is crushed and washed using water in dense media bath. Clean coal gets separated from middlings. Washing is done in closed water circuit. Water generated after washing contains coal fines. Thickener is used to separate the coal fines from water.

Sinter Plant: Sintering process utilizes iron from waste materials that would otherwise be dumped as wastes. Iron ore fines and dust containing iron, mill scales, limestone, coke and coal fines are mixed, converted to nodules and sintered in sintering furnace.

Oxygen Plant: Air separation is done cryogenically. Nitrogen, oxygen and argon from air is separated. Oxygen is used in SMS and Blast Furnace.

Power Plant: Blast furnace gas, convertor gas from Basic oxygen furnace and hot gas from DRI kilns will be used to produce steam in waste heat recovery boilers that will produce 75 MW electricity.

2.0 Description of the Environment

Baseline environmental data generation of study area was carried out during the period 1st October 2020 to 31st December 2020. Data was generated by following the standard procedure of the Ministry of Environment & Forests and the Central Pollution Control Board. Study area of 10 km radial distance around the site has been considered for environmental baseline data generation.

Meteorology**:** Met station is installed at MSPL plant premises. Wind speed, wind direction, temperature and humidity levels were recorded. Historical met data was collected from India Meteorological Department. The predominant wind direction is from northeast sector throughout the year, except monsoon. During monsoon the predominant wind direction is from southwest direction. The area is characterized by hot summer and mild cold winter. The annual rainfall at site is 1400 mm. About 90% rainfall occurs during the period July to September. Humidity levels are about 80% during rainy season.

Air Quality**:** $PM_{2.5}$, PM_{10}, SO_2, NO_2, benzene, ozone, ammonia, carbon monoxide as well as Benzo(a)pyrene, As, Ni and Pb in PM_{10} were monitored at eight locations in the study area. The locations were selected as per CPCB guidelines. Monitoring was done at upwind direction and various downwind directions of the project. The baseline air quality levels of all parameters at all locations were found to be within the National Ambient Air Quality Standards prescribed for residential area. Benzo (a) pyrene, As, Ni and Pb in PM_{10} are found to be within the National Ambient Air Quality Standards prescribed for residential area. PM_{10} concentration in the study area varied from 24 to 65 µg/m3, $PM_{2.5}$ concentrations in the study area varied from 9.0 to 32 $\mu g/m^3$. SO_2 concentration in the study area varied from 4.0 to 9.0 $\mu g/m^3$. NO_2 concentration in the study area varied from 9.0 to 14.5 $\mu g/m^3$. Ambient air quality of all the eight locations is meeting the national standards.

Noise Quality: Ambient noise levels were monitored at 8 locations in the study area, covering various area categories. The noise levels are well within the National Standards for residential, industrial and commercial area. Day time noise level was found between 49.4 to 56.4 dB(A). Night time noise levels was found between 42.2 to 48.2 dB (A). The noise level meeting the national standards in all the eight locations.

Water Quality: Eight surface water samples and eight groundwater samples were collected from the area for chemical and biological analysis. Surface water samples were collected from upstream and downstream point of Kur nala and Sapnai river,. The surface water quality of streams meets the designated use criteria. The surface water is fit for irrigation and industrial use. The surface water quality is fit for drinking only after conventional treatment. Eight groundwater samples were collected from handpumps and tubewells of villages around the project site. The pH level in groundwater of study area is found to be alkaline. The groundwater quality meets the standards prescribed by Bureau of Indian Standards (BIS 10500 - 1991).

The surface water quality of the streams is fit for drinking after conventional treatment followed by disinfection. Analysis results reveal the following: -

- pH varies from to 6.80 to 6.97.
- Dissolved Oxygen varies from 6.5 to 7.2 mg/l.
- BOD varies from 1.4 to 1.8 mg/l
- COD varies from 6 to 10 mg/l
- Total Dissolved Solids varies from 35 to 60 mg/l.
- Total coliform varies from 80 to 140 MPN/100 mg/l

Groundwater quality: The groundwater quality of villages around the study area is fit for drinking. Analysis results of ground water reveal the following: -

- pH varies from to 6.52 to 7.06
- Total Dissolved Solids varies from 290 to 790 mg/l.
- Total Hardness varies from 70 to 370 mg/l.
- Calcium varies from 20 to 68 mg/l
- Magnesium varies from 4.9 to 63 mg/l
- Chloride varies from 20 to 120 mg/l
- Fluoride varies from 0.62 to 1.14 mg/l
- Nitrates varies from 5.8 to 9.5 mg/l
- Sulphates varies from 8.2 to 7.8 mg/l
- Toxic Metals:<0.5 mg/l
- Total coliform: Absent

Soil Quality**:** Eight soil samples were collected from the agriculture fields around the project area and analyzed for relevant physico-chemical parameters. The texture of soil varies from sandy loam to clayey loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are found to be in moderate amount. The pH and conductivity of all the soil samples are well within the acceptable range.

Quality of Biodiversity: Reserve and protected forest are present in the study area. The reserve forests harbors variety of flora and fauna. The study area has plenty of water bodies. Main tree species found in the study area are sal, mahua, tendu, bamboo, neem, seesam, bargad, papal, saja, semal, babul, siris, palas, gulmohar, nilgiri, karanj, etc. Bear, fox, bison, deer, wild dog, hyena, wild pig, mongoose, porcupine, jungle cat, langur, monkey, cobra, krait, rat snake, chameleon, and variety of birds are the common wildlife of the study area. No endangered species of plants and animals are found in the study area. Biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park and wildlife sanctuary are not present within 10 km distance of the project site.

Socioeconomic Pattern: Raigarh is an important centre for trade and commerce in Chhattisgarh. State. Raigarh has become an important industrialized area in India. It is also important for agriculture production, forest products and tribal handicrafts and culture. Sponge iron plants, induction furnaces, rolling mills, ferroalloy plants and power plants are present in the study area. The male female ratio is almost 1:1. Literacy rate is about 75%. Agriculture and industrial workers dominates the occupation structure of the study area. Paddy is the main crop grown in the area. Other crops grown in the area are maize, kodokutki, arhar, chana, soyabeen, groundnut, etc. Several ancient rock paintings / cave paintings are found in Raigarh. Road accidents have increased as a result of industrialization and urbanization.

3.0 Anticipated Environmental Impact & Mitigation Measures

Air Quality: Particulate Matter emissions from the new units will be controlled using Electrostatic Precipitators, Bag House, Bag Filters, Scrubbers, Dry Fogging Systems, Fume Extraction System and Water Sprinkling System. The outlet emission from all sources will be restricted within 30 mg/Nm^3. Particulate Matter emissions from Blast Furnace will be controlled using dust catcher followed by ESP and the outlet emission will be restricted within 10 mg/Nm^3. Gaseous pollutants will be discharged using tall stacks as per CPCB norms. 25 m wide dense greenbelt shall be developed around the plant, which will prevent any fugitive dust from going outside the washery premises. Greenery development around the existing plant shall be made dense.

Water spraying will be done to suppress the dust generated during construction activity. All internal roads of the plant will be made concrete. All roads and shop floors will be cleaned regularly. Fugitive dust from all sources like stock house, day bins, material handling, crushing, screening, etc will be controlled using plant deducting systems comprising suction, ducting and bag filters.

Unit-wise name of air pollution section, name of air pollution control equipment and stack height is given in Table below:

	Name of Unit	Air Polluting Section	No of Stack & Stack Height	Air Pollution Control Equipment
1	DRI Plant	RMH, Day Bins, Kiln, Product Separation	30 m 55 m	Bag Filters ESP
2	SMS I SMS II	Induction Furnace & Dephos Casting Machine LD Convertor -LRF-VDU	30 m 30 m 45 m	FES & Bag Filters FES & Bag Filters FES & Gas Cleaning Plant
3	Rolling Mill	Reheating Furnaces	30 m	Use of BF Gas
4	Sinter Plant	Sinter Machine Crushing Screening	30 m 30 m	ESP FES & Bag Filters
5	Blast Furnace	Stock House & Caster Furnace	30 m 30 m	FES and Bag Filters Multiclone and ESP, Bag Filters
6	Coal washery	Crusher	30 m	FES, Bag Filter, Covered conveyors

Mathematical modeling study proved that the maximum incremental ground level concentration of PM_{10}, $PM_{2.5}$, SO_2 and NOx from the plant will not violate the residential ambient air quality standard. The maximum impact of the air emissions will be observed between 1.0 to 2.0 km from site in southwest direction of plant. The ambient air quality will

remain well within the prescribed National Ambient Air Quality Standard (NAAQS). Hence, it will not create any adverse impact on human health and ecology.

Impact Prediction on Ambient Air Quality due to the Expansion Project (24-h avg in μg/m³)

Parameter	Background level, in d/w, Maximum	Predicted Max Ground Level Conc	Total Concentration after new projects	NAAQS (Nov 2009)
SO_2	7.2	12.1	19.3	80
NO_X	10.8	6.1	16.9	80
PM_{10}	48.0	6.2	54.2	100
$PM_{2.5}$	23.0	4.6	26.6	60

Noise Quality: Unloading and hauling operations and movement of trucks and dumpers will be properly scheduled to minimize construction noise. The air compressors, rotating machines, pumps, ID fans, air blast, blowers, mill operations, turbines, will be the major sources of noise. All activities will be carried out inside sheds and maintenance program for equipment will be routinely followed.

Sound absorbing materials will be provided in the room where both the source and receiver are present so that the reflecting sound is absorbed. 33% land shall be developed as greenbelt, which will further reduce the noise level. In noisy work areas soundproof duty rooms will be provided. Workers working in noisy areas will be given ear plugs. In this manner the noise level will be restricted within the plant boundary to meet the industrial area standards of 75 dBA during day time and 70 dBA during night time.

Water Quality: Sedimentation pits with oil separator will be constructed to trap the silt-laden water arising from site offices, canteens and other washing facilities at the construction site. The overflow will be reused for dust suppression. Cooling tower blow down water generated during the plant operation will be reused for slag granulation and dust suppression. Domestic wastewater will be treated in Sewage Treatment Plant and reused for gardening. No wastewater will be discharged outside the plant premises (under normal operating conditions).

The storm water drain will be kept separate from wastewater drains. The storm water drain will have sedimentation pits and oil-water interceptors, before discharging into outside nalla. During rainfall, the treated wastewater shall be discharged onto nearby nalla.

Spent oil and lubricants will be collected in drums and given to authorized recyclers. The quantity of water required for various units, unit-wise wastewater generation and scheme to achieve complete recycling is shown in Table below:

Unit-wise liquid effluent generation quantity and management scheme is given below:

Liquid Effluent Management for Zero Discharge from Expansion Project (kl/day)				
	Name of Units	**Requirement**	**Generation**	**Treatment & Management Scheme**
1	DRI Plant	95	15	Recirculated via settling ponds
2	SMS	460	46	Treated in ETP and Recirculated
3	Rolling Mill	200	15	Treated in ETP and Recirculated
4	Coal Washery	120	112	Treated in ETP and recirculated for coal washing
5	Blast Furnace	1400	140	Recirculated for slag granulation via settling tank
6	Sinter Plant	25	0	100% evaporated
7	Power Plant	600	60	Recirculated for ash handling via settling pond
8	Utilities & Misc	100	25	Treated in Neutralising tank and ETP
9	Domestic Uses	50	75	Treated in STP and reused for gardening
	TOTAL	3050	488	Zero discharge will be maintained through treatment and reuse

Rainwater harvesting structures shall be constructed for water conservation. Rooftop rainwater is diverted towards these structures. Surplus runoff will be collected and stored in water reservoirs.

Solid Wastes: The solid wastes like slag will be granulated and sold for cement making. SMS slag will be reused for road making. Sinter plant dust will be recycled. DRI plant char will be mixed with coal fines and middlings and used for power generation. Ore fines, dust from air pollution control devices and mill scales will be reused in sinter plant. Middlings and fines from coal washery shall be used / sold for power generation. Unutilized solid wastes, if any, shall be stored in dump yard. The solid waste utilization scheme is shown below:

	Name of Unit	**Quantity, TPD**	**Utilization / Disposal**
1	DRI Plant Dust	114420	Reused in Sinter Plant
2	DRI Dolochar	232480	Dolochar will be used as fuel in power plant.
3	DRI Kiln Accretions	680	Used as sub-base material for road. used for civil construction as filler material
4	SMS slag	109200	Slag will be crushed and metal content will be recovered, then sold to civil contractors.
5	SMS dust	15000	Reused in Sinter Plant
6	BF dust	6750	Reused in Sinter Plant
7	BF slag	144000	The slag will be granulated sold to cement plants

Soil Quality: The soil quality of the site and surroundings is sandy loam to clay loam. The infiltration rate of the soil is moderate. Air pollution control devices will be installed at all points to trap the dust. Solid wastes generated from the air pollution control devices and process will be reused. Unutilized solid wastes shall be stored in dump yard with pucca floor and scientifically designed landfills / dump yards.

Ecology: Dust emission from the plant will be controlled using scrubber, ESP, bag filters, water sprinklers, etc. Flue Gas will be dispersed using tall stacks. All air emissions will be kept much below the prescribed standards. Wastewater will be reused in the plant. Solid wastes will be utilized as per norms. 33% area of the coal washery will be made green. Such measures will be adequate to protect the surrounding ecology.

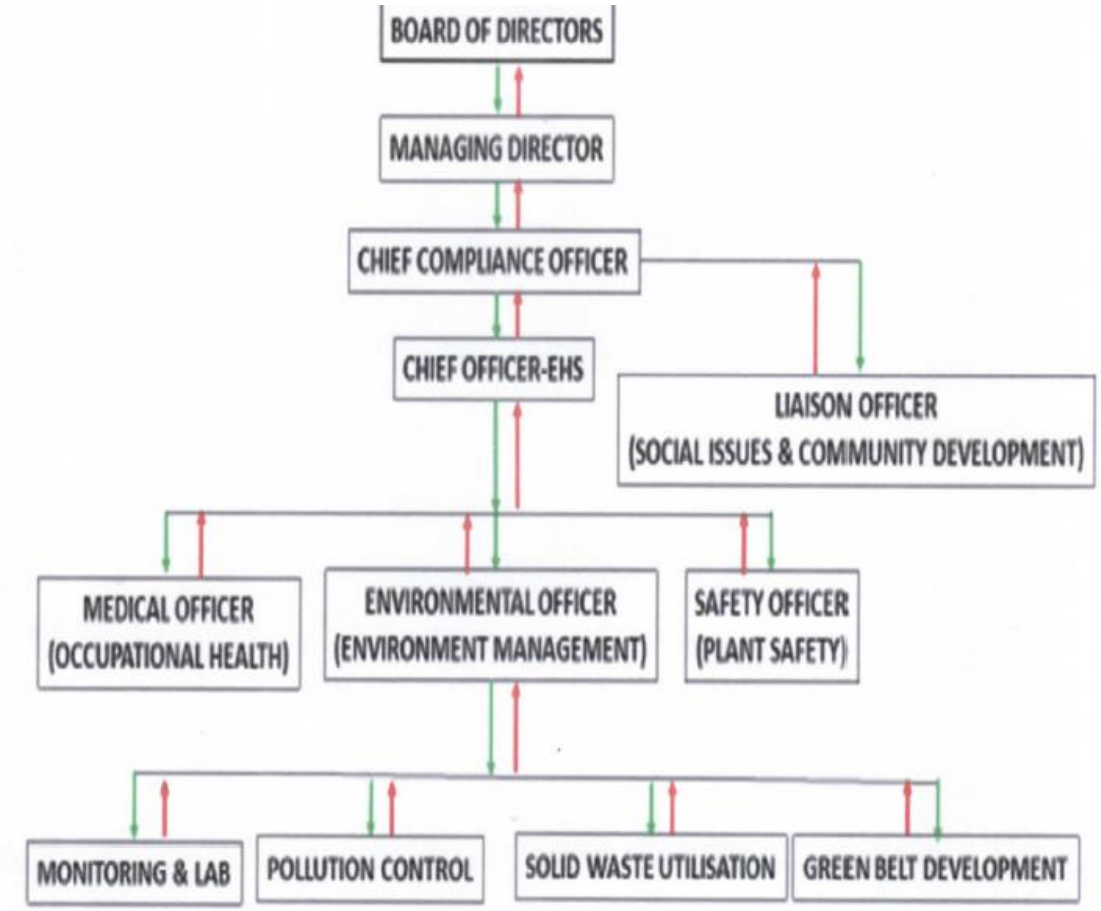
Public Health**:** The national ambient air quality standards prescribe level of air pollutants that will protect public health and vegetation. Air quality dispersion modeling study proved that the ambient air quality of the area will remain within the national air quality standards. Wastewater generated from the plant will be utilized. No toxic chemicals or hazardous wastes will be handled in the plant. Solid wastes will be utilized as per norms. Hence there will be no risk to public health.

Landform**:** No building materials will be extracted from the project site. Excavated earth will be used for leveling and backfilling of civil foundations. It will be ensured that drains and garland drains are constructed conforming to the existing drainage pattern so that alteration is kept to the minimum and flooding does not occur.

Impact on Road Transportation: Raw materials and finished products shall be transported by rail using the railway siding. Some raw materials and finished product shall be also transported using road. Daily expected movement is additional 10 trucks/trailers/bus, 200 cars and 400 motorcycles. The existing road will be strengthened in consultation with the District Administration.

4.0 Environmental Monitoring Plan

Environmental Management Department (EMD): Full-fledged EMD exists under the direct control of Chief Executive of the plant. Full fledged environmental laboratory also exists. Qualified and experienced Scientists and Engineers exist in the EMD. The structure of the EMD is shown below:



Activities of EMD: EMD performs the following activities:

1. Regular monitoring of stack emissions, fugitive emissions work environment and report any abnormalities for immediate corrective measures.
2. Regular monitoring of ambient air quality at plant boundary and outside the plant in upwind and downwind direction.
3. Regular monitoring of re-circulating water quality, ground water quality and surface water quality.
4. Regular noise monitoring of the work zone, equipments and outside the plant.
5. Green belt plantation, maintenance, development of other forms of greenery like lawns, nursery, gardens, etc. in the plant premises.
6. Regular monitoring of quantity and quality of solid waste and their reuse options.
7. Development of schemes for water conservation, rainwater harvesting and reuse of treated wastewater.

5.0 Additional Studies

Risk Mitigation Measures: Necessary risk mitigation measures, including firefighting measures will be implemented. Hazards due to mechanical injury will be reduced by use of

standard design and operating procedures. All necessary safety measures shall be provided. Disaster Management Plan shall be modified in consultation with the District Administration to take care of health and safety during any untoward incident.

Rehabilitation Plan: Rehabilitation of project affected persons will be done as per the Policy of Chhattisgarh Government. Financial compensation as per Chattisgarh Government rate shall be paid to land losers. Preference will be given to land losers for employment in the project (for operation as well as for construction of the plant). They will be recruited as per their skill and experience.

6.0 Project Benefits

Direct Benefits: The project will overcome the demand and supply gap of steel product in the country. The project will also generate additional revenue for the State Government. The additional steel availability will boost the infrastructure sector and the overall economic scenario of the country. The project will create direct employment for 500 people during the construction phase of 84 months. About 2000 people will be employed in the plant (1000 direct by MSPL and 1000 for various contractual jobs). Local people will be given employment during the construction and operation stage, depending upon the rules of MSPL. About 200 people are expected to get indirect employment from the project. Skill development program shall be implemented to train the local people and employ them in the project. Activity-wise budget will be earmarked after knowing the demands of the public present during the Public Hearing. Details will be submitted in Final EIA report as per the provisions of MOEFCC Notification dated 30-9-2020.

Community Development Spending Benefits: MSPL shall spend funds for various socio-economic and community development activities in surrounding villages. The activities cover education, health, infrastructure, culture and sports, skill development and training and women empowerment.

7.0 Environmental Management Plan

Environment Management Department will implement the EMP of this project. All recommendations given in the EIA report including that of occupational health, risk mitigation and safety will be implemented. The capital cost required to implement the pollution control systems and EMP for the expansion project is Rs.6.6 crores. The annual recurring expenses for the expansion project will be Rs.3.0 crores. EMD will ensure that all air pollution control devices, effluent treatment plant and water re-circulating systems function effectively. Schemes for resource conservation (raw materials, water, etc), rainwater harvesting and social forestry development will be taken up by EMD. Greenbelt and greenery

development inside and outside the plant premises will be intensified by the EMD. Greenery on 33% land will be ensured. Environmental awareness programs for the employees will be conducted. EMD will also ensure cleanliness inside the plant. All records shall be submitted to the regulatory authorities, displayed at relevant places like company gate and website and maintained by the EMD.