

EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

For

**Proposed 0.72 MTPA (Throughput) Wet Type Coal Washery
at Village Siltara, Tehsil & District Raipur, Chhattisgarh**

Project Proponent



**M/S. SKS ISPAT AND POWER
LTD.**

At

Village Siltara, District Raipur, Chhattisgarh

Environmental Consultant



M/s Anacon Laboratories Pvt. Ltd., Nagpur

QCI-NABET Accredited EIA Consultant for Coal Washeries (Sector 6)

MoEF&CC (GOI) and NABL Recognized Laboratory

ISO 9001:2015, ISO 14001:2015, BS OHSAS 18001:2007

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Project No.: ANqr /PD/20A/2016/51

AUGUST 2020



EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s SKS Ispat & Power Ltd., a company incorporated on April 17th 2000, with registrar of companies, Mumbai, Maharashtra to carry out the business of manufacturing and trading of all kinds of steel alloys.

SKS Ispat & Power Ltd are committed to be part of Chhattisgarh state for industrialization progress undertaken by the Government of Chhattisgarh for optimum utilization of natural and human resources available in the state.

The group is specialized in manufacturing & marketing of “long products” and over the period and has emerged as one of the leading traders in structural steel in India.

The project proponent has following facilities at their existing integrated steel plant with an investment of around Rs.1000 Crores at Village- Siltara, Tehsil & District Raipur, Chhattisgarh.

- Sponge Iron plant - 2, 70,000 TPA (2x100 TPD and 2x350 TPD).
- Captive power plant - 85 MW (25 MW Waste Heat Recovery Boilers (WHRB) and 2x30 MW CFBC & AFBC boilers),
- Steel Melting Shop (SMS) – 3,31,500 TPA
- Ferro Alloy plant (29,400 TPA).
- Rolling Mill (4 Nos.) - 3, 84,000 TPA.
- Gasifire (5 Nos.) - 5 x 8000 Mm³/Hr.
- Oxygen/Nitrogen Plant – 170 NM³/Hr.

M/S SKSIPL is situated inside the plant boundary of around 190.76 Acres of land. Now this is the proposed project to operate a wet type coal washery plant of capacity 0.72 MTPA. The land identified for the proposed coal washery will be 6.42 acres (2.60 ha) within existing plant premises. .

SKS Ispat & Power Ltd. is under the process of getting Environment Clearance for a coal washery plant at the existing plant premises and SEAC-CG has recommended Terms of Reference (ToR) for 0.72 MTPA (washed coal capacity) to meet the requirement of the coal for the existing sponge iron plants and 60 MW Coal based captive power plant.

1.1 Identification of Project

M/s SKS Ispat & Power Ltd., intends to operate a wet type coal washery plant of capacity 0.72 MTPA output. The coal will be sourced from SECL mines & open market. The project will be developed on 6.42 acres (2.60 ha) of land at Village- Siltara, Tehsil & District Raipur, Chhattisgarh.

The project falls under Sector 2 (a) in Category B as per the EIA Notification 2006, based on the capacity of the project. The capital cost of the coal washery project is estimated to be Approx. Rs.14.5 Crore.

Proposed coal washery project of **M/s. SKS Ispat & Power Ltd.** is classified as “Category B” as per the EIA notification dated on 14th September, 2006. Baseline environmental monitoring was conducted in line with the ToR during the period **March – May 2019** for determining the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area. The observations of the studies are incorporated in the draft EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the



draft EIA/EMP report along with the proposed management plan to control / mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control measures in the project. The details of environmental setting are given in **Table 1.1** and study area of 10 km radius is given in **Figure 1.1**.

TABLE 1.1
DETAILS OF ENVIRONMENTAL SETTINGS

Sr. No.	Particulars	Details
1.	Project Location	Village: Siltara, (Near Industrial Growth Centre Siltara) Tehsil-Raipur , Dist.- Raipur (Chhattisgarh)
2.	Co ordinate	Latitude : 21 ⁰ 23'9.37"N To 21 ⁰ 23'47.68"N Longitude: 81 ⁰ 38'25.40"E To 81 ⁰ 39'0.04"E
3.	Toposheet No.	64 G/11
4.	Climatic Conditions	Mean annual rainfall : 1252.8 mm Temperature : Pre monsoon 20.6 ⁰ C (Min.) 41.7 ⁰ C (Max.) : Winter 13.3 ⁰ C (Min.) 31.0 ⁰ C (Max) : Post monsoon 17.3 ⁰ C (Min.) 31.8 ⁰ C (Max.) Source: IMD, Raipur (From Climatological Normals Book of 1981-2010)
5.	Nearest IMD station	Raipur ~24.28 km, SE
6.	Land Form, land Use and Ownership	Private Industrial Land
7.	Site topography	Project site located at 272 m above MSL Flat Terrain
8.	Nearest roadway/ Highway	Raipur-Bilaspur-Kolkata Highway (NH-200) about 1.89 km, E
9.	Nearest Railway Station	Mandhar, 08km (SE) & Raipur, 12 km (E)
10.	Nearest Air Port	24.28 km (SE)
11.	Nearest Port	NA
12.	Nearest lake	NA
13.	Nearest State / National Boundaries	NA
14.	Nearest major city with 2,00,000 population	Raipur, 11 km (nearest city)
15.	Distance for sea coast	NA
16.	Hills / valleys	NA
17.	Nearest Reserved / Protected forests	--
18.	Nearest water bodies	River Kharun – 0.88 KM (W) Chokra Nala – 1.03 km (SW) River Lor – 8.43 km (WNW)
19.	Seismic zone	Project site falls in zone-II as per IS 1893 (Part-I):2002 classification. Hence, seismically it is a stable zone.
20.	Areas already subjected to pollution or environmental damage	Siltara, Urla, Rawabhata industrial area are falls within 15 Km which are severally polluted (air regime).

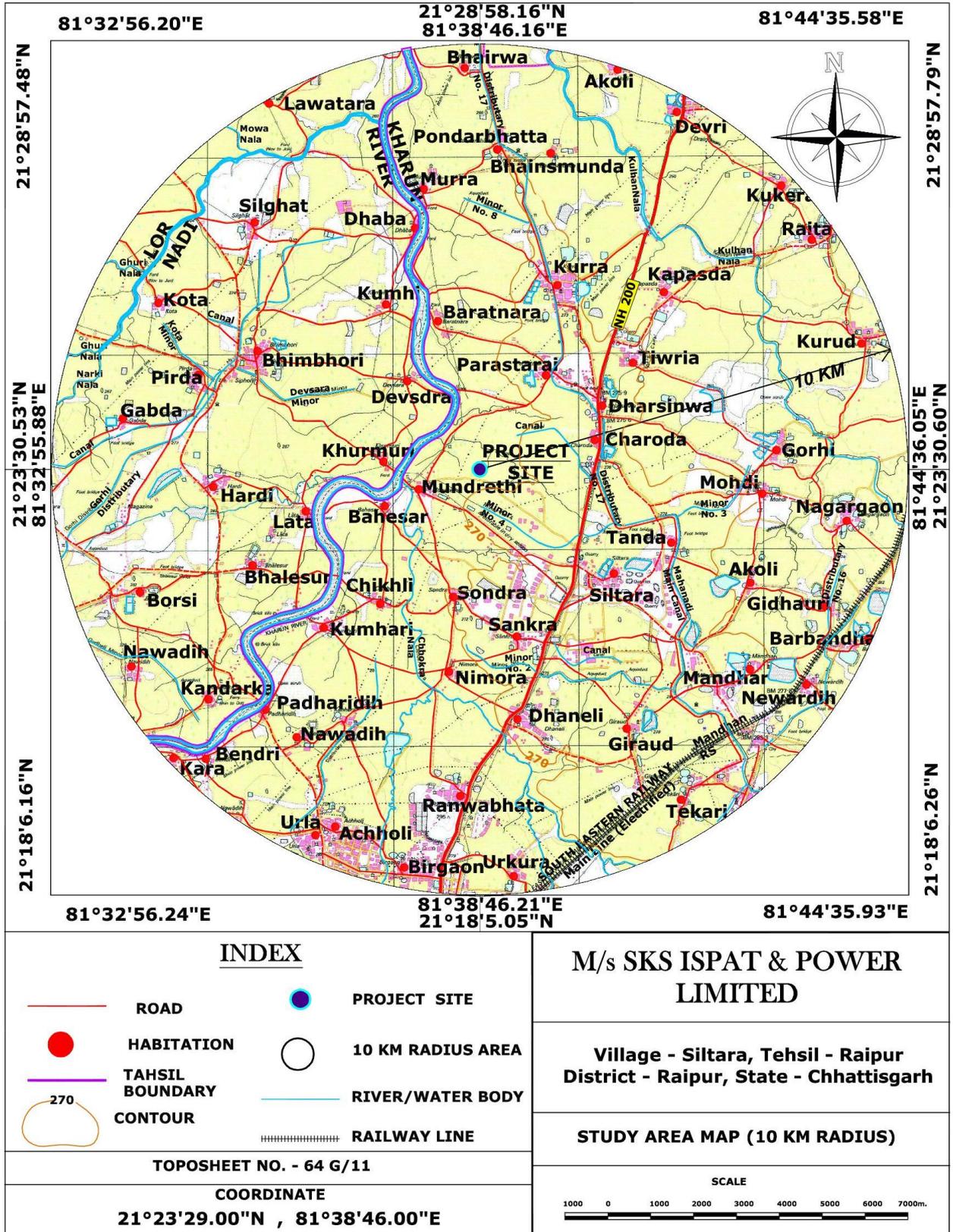


FIGURE 1.2: STUDY AREA MAP (10 KM RADIAL DISTANCE)



2.0 PROJECT DESCRIPTION

2.1 Process Description

1. Raw coal will be crushed from 250 mm to less than 20 mm and screened and recirculation of oversize to give finished size of 0-20 mm to coal washery. The raw coal crusher screened at 0 – 20 mm shall be supplied by the customer through belt conveyor to the feeding chute of the Alljig. The jig will process raw coal and shall produce two products i.e. clean coal and rejects.
2. The clean coal produced in the Alljig shall be dewatered in an affixed screen and then further dewatered in double deck dewatering screen.
3. The clean coal (10 – 20 mm) shall be dewatered from the first deck of double deck dewatered screen and shall be discharged on the clean coal belt conveyor to be conveyed to the clean coal storage yard.
4. The clean coal (10 – 20 mm) shall be dewatered from the second deck of double deck dewatered screen and shall be fed to the centrifuge through belt conveyor. The filtrate from the centrifuge is added with underflow of dewatering screen.
5. The under flow of double deck dewatering screen shall be pumped to the hydrocyclone, overflow from the hydrocyclone shall be taken to the high rate thickener. The underflow from the cyclone shall be discharged to the centrifuge. The clean coal from the centrifuge shall be conveyed by clean coal conveyor to clean coal storage yard. The rejects shall be taken out from the jig through a pinch valve and vibro feeder and dewatering shall take place in the vibrating dewatering screen. The overflow from the screen shall be discharged on to the reject belt.
6. Conveyor for dumping in the reject stock yard. The underflow of the dewatering screen shall be pumped to the thickener.
7. The thickened underflow from the thickener shall be pumped to horizontal belt filter. The filtrate from the belt filter shall be fed to thickener. The product of the belt filter shall be discharged to refuse storage yard by refuse belt conveyor.
8. The overflow of the thickener shall be re-circulated back to the jig sump from where it shall be pumped to Alljig.
9. Make up fresh water shall be pumped to the jig sump from the fresh water reservoir. SKSIPL shall have to make this arrangement of pumping fresh water to jig sump.
10. Push water shall be fed to all jig sump via pump.
11. Emergency slime pond has been provided for emergency draining in case of breakdown. A sump and pump has to be provided by the SKSIPL along with this slime pond for recovery of clarified water.
12. The circuit proposed is a totally closed circuit with zero effluent discharge.

2.2 Land Requirement

The proposed activities will be within the existing integrated steel complex. M/s. SKSIPL is already situated inside the plant boundary of around 190.76 Acres of land. The land identified for the proposed coal washery will be 6.42 acres (2.60 ha) within existing plant premises.

2.3 Raw Material Requirement

Raw coal will be received from SECL and open market. Presently SECL is adopting Coal Auctions as per new policy. Washed Coal will be utilized in SKS Ispat & Power Limited plant at Siltara, Raipur for production of sponge iron.



2.4 Solid waste Generation & Management

About 0.18 MTPA washery rejects will be generated from the proposed coal washery, out of which 0.06 MTPA shales will be used in land filling whereas, 0.12 fines and middling will be used in power plants (CFBC).

2.5 Requirement & Source

The total daily water requirement for the proposed coal washery will be 90 m³/day, out of which maximum quantity of water will be recovered and reused in the coal washing process Water will be sourced from Kharun river.

2.6 Power Requirement

The electric power requirement for the project will be fulfilled from 85 MW Captive Power plant. The power requirement for SKSIPL integrated steel plant is being met by the waste heat recovery

2.7 Manpower Requirement

During plant operation phase, the manpower requirement is approx. 50 persons, most of which will be recruited from the nearby villages and they will be trained for the requirement. Skilled & managerial staff will be recruited from nearby towns. Apart from these, some contractual jobs will be given to the local people.

2.8 Site Infrastructure

The coal washery is established within the existing land area of integrated steel plant of M/s. SKS Ispat & Power Ltd., at village - Siltara, Tehsil – Raipur, District - Raipur (Chhattisgarh). Preference in employment will be given to local people. Hence, there is no need for provision of township. For efficient plant operation, infrastructure facilities like office, store, rest area, drinking water facilities, urinals, latrines, canteen, first aid centre, etc. are already present in plant premises. About 98% internal roads are concreted. 02 Nos. of ambulance and fire tender and road sweeping machines along with doctors and trained fire persons are kept ready to attend medical & fire emergency.

3.0 DESCRIPTION OF ENVIRONMENTAL

3.1 Baseline Environmental Studies

Baseline environmental studies were carried out for proposed coal washery within 10 km radius from the proposed coal washery to assess the existing environmental status in the area. For the purpose of EIA studies, proposed coal washery area was considered as the core zone and area outside the proposed coal washery upto 10 km radius was considered as buffer zone. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land was monitored during pre-monsoon 2019.

3.2 Meteorology & Ambient Air Quality

SUMMARY OF SITE SPECIFIC WIND PATTERN

Predominant Wind Direction	Pre monsoon season
First Predominant Wind Direction	W (13.78 %)
Second Predominant Wind Direction	WNW (11.90 %)
Calm conditions (%)	0.46
Avg. Wind Speed (m/s)	2.40

Ambient Air Quality Status

The status of ambient air quality within the study area was monitored during the period of **15th March to 15th June 2019** (pre-monsoon season 2019), at 8 locations including the proposed coal washery



area and in nearby villages based on the meteorological conditions considering. The concentration levels of Particulate Matter (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂) and Oxides of Nitrogen (NO_x) were monitored.

The status of ambient air quality within the study area was monitored for pre-monsoon season for at 8 locations covering project site, Mundrethi, Bhimbhori, Chikhi, Mohdi, Siltara, Charoda and Tekari villages. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind, cross wind directions and reference point. The levels of Respirable Particulate Matter (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and carbon monoxide (CO), Ammonia, Ozone, Benzene and BAP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 3**.

TABLE 3
SUMMARY OF AMBIENT AIR QUALITY RESULTS

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
1.	Project Site	Min	59.0	19.7	11.1	15.8	0.214	11.0	8.7
		Max	96.7	31.4	15.0	23.7	0.319	16.1	16.2
		Avg	73.7	24.8	12.4	19.6	0.282	13.3	12.7
		98 th	92.9	30.8	14.3	22.9	0.318	15.5	15.5
2.	Mundrethi	Min	50.4	17.4	8.0	10.0	0.204	9.2	10.3
		Max	76.6	25.5	15.4	16.5	0.299	16.1	14.7
		Avg	63.9	21.8	10.5	12.7	0.253	12.7	11.6
		98 th	76.5	25.2	13.7	15.7	0.296	15.4	13.7
3.	Bhimbhori	Min	47.6	17.1	10.5	16.3	0.181	7.9	9.0
		Max	64.0	23.4	21.4	25.7	0.257	17.2	15.4
		Avg	55.7	20.0	14.2	19.9	0.218	12.7	11.6
		98 th	62.7	23.0	19.2	24.2	0.255	17.0	14.8
4.	Chikhi	Min	44.5	20.3	10.1	10.1	0.238	12.1	10.1
		Max	68.5	29.1	15.5	19.8	0.324	20.7	18.7
		Avg	59.6	25.7	12.0	13.8	0.279	15.9	14.4
		98 th	67.6	28.5	14.7	18.7	0.323	19.7	17.8
5.	Mohdi	Min	48.2	17.3	9.8	11.5	0.176	8.4	10.5
		Max	67.8	24.7	13.5	17.8	0.243	13.6	16.8
		Avg	58.5	20.9	11.8	14.5	0.214	11.2	13.0
		98 th	67.8	24.3	13.5	17.5	0.239	13.4	16.2
6.	Siltara	Min	82.9	28.7	12.5	13.0	0.231	10.6	11.0
		Max	112.6	39.1	23.1	28.0	0.307	15.4	16.4
		Avg	104.7	35.8	20.4	20.8	0.273	12.6	13.4
		98 th	112.0	38.5	22.5	27.4	0.300	14.7	15.7
7.	Charoda	Min	62.1	20.7	12.0	19.6	0.203	11.5	10.1
		Max	76.5	26.3	16.4	28.1	0.258	18.3	17.8
		Avg	70.4	23.8	13.7	23.4	0.236	14.8	12.6
		98 th	76.0	26.0	15.7	27.6	0.257	18.1	16.8
8.	Tekari	Min	42.0	15.0	8.1	12.1	0.257	8.3	9.5
		Max	65.2	22.8	11.6	18.6	0.314	14.9	15.9
		Avg	49.1	18.4	9.5	15.2	0.284	11.2	11.6
		98 th	64.3	22.8	11.2	17.8	0.313	14.3	14.8
CPCB Standards			100 (24hr)	60 (24hr)	80 (24hr)	80 (24hr)	2 (8hr)	100 (8hr)	400 (24hr)

From the above results, it is observed that the ambient air quality at all the monitoring locations except PM₁₀ value at Siltara (Max. 112.6 µg/m³) was within the permissible limits specified by CPCB.

3.3 Ambient Noise Levels

Ambient noise level monitoring was carried out at the 08 monitoring locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 4**.



**TABLE 4
NOISE LEVELS IN THE STUDY AREA**

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq Day	Leq Night
Residential Area			
1.	Mundrethi	54.2	41.3
2.	Charoda	51.5	43.0
3.	Devsdra	53.0	41.5
CPCB Standards dB(A)		55.0	45.0
Commercial Area			
4.	Parastarai	53.2	46.2
5.	Sondra	55.6	45.1
CPCB Standards dB(A)		65.0	55.0
Silence Zone			
6.	Khurmuri	49.8	38.2
CPCB Standards dB(A)		50.0	40.0
Industrial Area			
7.	Project Site	73.6	61.4
8.	Siltara	62.1	50.3
CPCB Standards dB(A)		75.0	70.0

Source: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur

3.3 Surface and Ground Water Resources & Quality

3.4.1 Geology, Hydrology and Hydrogeology

Site Specific Geology

The 10 km study area falls in two districts i.e. Durg & Raipur District. Kharun River marks the boundary of Raipur district in the West of project area.

The study area is monotonously plain with very scanty exposures and covered by the rocks of Chandi Formation. Lithological boundaries are concealed under laterite or soil cover. On correlating subsurface exposures seen in well cuttings, it is observed that the Raipur limestone - shale belonging to Chandi Formation of Chhattisgarh Supergroup occupies the whole area of Samoda nala basin. The Chandi limestone showing stromatolitic form, at places, occurs along with dolomites. Apart from Chandi Formation rocks of Chopardih Formation belonging to the Chandrapur Group also present. The Chopardih Formation mainly consists of reddish-brown and olive-green sandstone

Hydrogeology

The study area comes under Mahandi river basin. Sedimentary rocks (cavernous Limestone, fractured, shales and weathered Sandstones) of Chandi & Gunderdehi Formation form the principal aquifer system within study area. As per CGWB, data, the study area falls in "Semi critical" category of Non-Notified area with groundwater development of 36.7%. However, no ground water would be utilized for project related activity. Dendritic type of drainage pattern is observed in study area which usually follows the regional slope towards North.

Pre-monsoon water levels range from: 9.5 -13.88 mbgl

Post-monsoon water level range from: 2.32- 3.59 mbgl

(Reference: WRIS portal data)

Hydrology of the Area



The area as a whole represents a gentle slope, drained by a number of North-West to North East flowing rivers which debouche into the one major river i.e. Kharun River flowing in Western direction of the project site which is about approx 3.5 km. The area as a whole is the basin of Seonath catchment and maximum flow of the water is going towards the Seonath River and again the Seonath confluence into Mahanadi River.

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (Borewell/ handpump) locations in different villages and 5 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged between 7.55-7.94. The TDS was ranging from 392-1026 mg/l. Total hardness was found to be in the range of 196.4-607.3 mg/l. The fluoride concentration was found in the range of 0.12-0.24 mg/l. The nitrate and sulphate were found in the range of 6.32 - 96.02 mg/l and 16.28-88.92 mg/l respectively. Heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Mn, Zn and Hg) were found to be bellow detection limit and within specified standards.

Sr. No.	Locations	WQI	Quality	Remark
1	Project Site	49.92	Good	Water quality assessed based upon above physico-chemical parameters and most samples are physico-chemically good
2	Munderthi	85.38	Good	
3	Khurmuri	54.51	Good	
4	Charoda	84.44	Good	
5	Siltara	58.58	Good	
6	Parastarai	48.79	Good	
7	Nawadih	46.78	Good	
8	Bendri	81.30	Good	

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.35 - 7.77 which are well within the specified standard of 6.5 to 8.5. pH is a measure of the hydrogen ion concentration of the water. The pH of water indicates whether the water is acid or alkaline. The TDS was observed to be 476-492 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 154.38-174.61 mg/l as CaCO₃ which is also within the permissible limit of 600 mg/l. The levels of chloride and sulphate were found to be in the range of 122.74-146.53 mg/l and 20.44-26.83 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O₂) dissolved in water. Because fish and other aquatic organisms cannot survive without oxygen, DO is one of the most important water quality parameters. The reported value of range of 5.9-6.1 mg/l. Phosphorus (as PO₄) is an important nutrient for plants and algae. Because phosphorus is in short supply in most fresh waters, even a modest increase in phosphorus can cause excessive growth of plants and algae that deplete dissolved oxygen (DO) as they decompose.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. Bacteriologically, all surface water samples were contaminated and water treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose whereas groundwater samples were not bacteriologically contaminated.

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor- LISS-3 having 23.5 m spatial resolution and



date of pass 27 Nov 2015 satellite image with reference to Google Earth data and the Cartosat-I data having 2.5 m spatial resolution and date of pass Jan 2014. In order to strengthen the baseline information on existing land use pattern, the following data covering approx. N 21°23'09.6" to N 21°23'47.6" latitude and E 81°38'25.4" to E 81°39'07.02" longitude and elevation 240-275 meter are used as per the project site confined within that area. The Land Cover classes and their coverage are summarized in Table.

LU/LC CLASSES AND THEIR COVERAGE IN SQ. KM OF 10 KM RADIUS

LU/LC Classification System				
S. No.	Level-I	Level-II	Area (Sq.Km ²)	Percentage (%)
1	Built-up land	Settlement	51.52	16.41
		Railway	1.58	0.50
		Industrial Infrastructure	21.98	7.00
		Road Infrastructure	8.16	2.60
2	Agricultural Land	Cropland Barren Land	186.52	59.40
4	Scrubs	Open Scrub	30.29	9.65
5	Water bodies	Canal/River/Pond/ Tank	9.84	3.14
6	Others	Brick Killn	2.87	0.91
		Mining Area	1.24	0.39
	Total		314	100

3.6 SOIL QUALITY

For studying soil quality of the region, sampling locations were selected to assess the existing soil conditions in and around the proposed project site representing various land use conditions. The physical, chemical properties and heavy metals concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 30 cm. Total 8 samples within the study area were collected and analyzed.

Physical Characteristics of Soil

From the analysis results of the soil samples, it was observed, Bulk density of the soil in the study area ranged between **1.41-1.61 g/cc** which indicates favorable physical condition for plant growth. The water holding capacity is between **21.32-24.21 %**. Infiltration rate, in the soil is in the range of **18.57-30.76 mm/hr**.

Chemical Characteristics of Soil

pH is an important parameter indicative of alkaline or acidic nature of soil. pH is found to be neutral to moderately alkaline (**6.85-7.73**) in reaction. Electrical conductivity, a measure of soluble salts in the soil is in the range of **91.34 - 409.0 µS/cm**. The important soluble cations in the soil are calcium and magnesium whose concentration levels ranged from **245.98 - 508.69 mg/Kg** and **200.74 - 408.69 mg/Kg** respectively. Chloride is in the range of **402.71 - 913.24 mg/Kg**.

3.7 BIOLOGICAL ENVIRONMENT

Floral survey

Floral study survey was made to assess the existing plant species in all accessible areas within the 10 km radius by crisscross method of field exploration. The local flora was identified by their morphological observation, such as its size and shape of the leaf, flowers, fruits and their bark features of stem and also documented their habitat viz. Trees, Shrubs, Herbs, Grasses and Climbers etc.



COMPARATIVES SPECIES DIVERSITY IN CORE AND BUFFER AREA

Habit	Core	Buffer-I	Buffer-II
Tree (T)	20	45	48
Herb (H)	6	19	19
Shrub (S)	4	10	10
Grass (G)	3	9	9
Climber (C)	1	3	3

Rare and Endangered Flora in the Study Area

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. **Among the enumerated flora in the study area, none of them were assigned any threat category, by RED data book of Indian Plants.** (Nayar and Sastry, 1990) and Red list of threatened Vascular plants (IUCN, 2010; BSI, 2003).

Fauna in the study area

As per Indian Wild Life (Protection) Act, 1972

Wild Life (Protection) Act, 1972, as amended on 17th January 2003, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country.

Some of the sighted fauna were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedules. Among the Avifauna in the study area, all birds observed in the study area are protected in schedule IV as per Wild life protection Act (1972) and subsequent amendments thereof.

Among mammals; *Presbytis entellus* (Hanuman/Common Langur), *Herpestes edwardsi* (Common Mongoose) are protected in schedule –II, *Lepus nigricollis* (Black-naped hare), are protected under Schedule IV and *Funambulus pinnatii* (Palm squirrel) protected in Schedule IV and Rats are protected in Schedule V

Among the reptiles, Indian Cobra (*Naja naja*), and Common Rat Snake (*Ptyas mucosus*), Russell's Viper (*Daboia russelii*) were provided protection as per Schedule-II of Wild life protection act, (1972) and Common Indian Krait (*Bungarus caeruleus*) were provided as per Schedule – IV of Wildlife protection act.

3.8 Socio-economic Environment

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data collection from census 2011 & District Census hand book 2011. Summary of the socio-economic status of the study area is given in Table 6. Details regarding education and infrastructure facilities 2011 are presented in Table 7 respectively

TABLE 6

SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA

No. of villages	49
Total households	42803
Total population	104755
Male Population	97356
Female population	33168
SC Population	24778



ST Population	7803
Total literates	131579
Total Illiterates	70532
Total workers	76162
Total main workers	65294
Total marginal workers	12903
Total non-workers	123914

Source: Primary census abstract 2011, District Raipur and Durg, state Chhattisgarh

TABLE 7
INFRASTRUCTURE FACILITIES AVAILABLE IN THE STUDY AREA

Educational	Medical	Drinking water	Drainage	Communication	Transportation	Bank	Recreation	Electricity
100	57.45	100	59.57	93.62	85.11	14.89	93.62	100

Source: District Census handbook 2011, District Raipur and Durg, state Chhattisgarh

Salient Observations of socio-economic Survey in the Study Area

3.7.1 SALIENT OBSERVATION OF THE SURVEY / STUDY AREA

- **Employment:** Main occupation in the study area was agriculture and Labor Work its allied activities eg. Cattle rearing, dairy farming etc. Other income generation sources of the area, small business; private jobs etc. The labors were getting daily wags in the range of 300-350 Rs, depending on type of work they set. It is observed that the Raipur District is having huge scope for employment as industrialization is more in this area. But due to lack of Vocational training centers in the area the Industries are outsourcing some of the key employees from other areas.
- **Agriculture Labour and wage rates:** The wages of agriculture labour are varied from Rs. 100 (2010) to Rs. 235 (2011). The prevailing labour charges of agriculture operations are varied with the operations of cultivations of crops i.e. ploughing, leveling, weeding, transplanting, harvesting and winnowing. The actual wage rates of agriculture labour varied from Rs. 252 to 270 per man day in different operations of the crops. The rates are higher in peak operation periods i.e. ploughing of seeds and harvesting of crops.
- **Fuel:** The primary sources of cooking fuel were LPG, cow dung and coal etc.
- **Major crops of study area, production & yield:** The various crops are grown by the cultivators in Study area. The paddy (70.8%) was found to be major crop of the state. The cultivators are also found to be tivra (pulse) (6.5%), gram (4.6%), and wheat (6.5%). The soybean, arhar, groundnut are grown in small proportion by the cultivators in the Study Area.
- **Migration from other states:** During survey it was found that local population were not migrating for employment purpose, they prefer only local employment
- **Language:** Official language Hindi As well As Hindi is spoken and understood by most of the population. Chhattisgarhi is also widely spoken here by the locals.
- **Sanitation:** Toilet facility is one of the most basic facilities required in a house. There was no proper drainage line in the villages, open and kachha drainage which was not working properly seen in most of the villages. Various villages in study area now actively involved in open defecation free (ODF) in the community level under which toilet facilities developed within several villages. The overall position of cleanliness was near to satisfactory
- **Drinking water Facilities:** During study area it has been observed that, the water supply in this region is mostly through taps, wells and hand pumps. For drinking purpose people are using Tap water and



water tanker is also provided by panchayat in summer, but supplied water quantity is not sufficient. For treating water, the Panchayat of village does not take any actions. Overhead Water Tanks are also installed in few villages.

- **Education facilities:** Educational facilities are available of the villages in the study area. Literacy rate of the study area is quite good that is about 80%. Primary, schools are available in the villages whereas College facility is available in nearby town i.e. Raipur. Female literacy is also good; In terms of female education, the villagers has positive attitude.
- **Transportation facility:** For transportation purpose auto, jeep and private bus services were available in the study area; however villagers reported that transportation facilities were not frequently available. Private vehicles like bicycles & motor cycles were also used by villagers for transportation purpose.
- **Road connectivity:** It was observed that only 27 villages have Pucca Road facilities. It means nearly 75 % of the villages have road facility.
- **Communication facilities:** For communication purpose mainly mobile phones, newspapers & post offices were present in the villages.
- **Medical facilities:** There were healthcare facilities available in the study area. The Primary & secondary data reveals that there are only 13 nos. of Maternity And Child Welfare Centre, 12 nos. of Sub Health Centers & 01 nos. of PHC's in the Study area. Hospitals and other better health centers were available in the range of 5-10 km at town/city place.. No major diseases were reported by local people in the study area except routine cough, cold and fever etc. Local people mentioned about the lack of equipment's, infrastructure and poor coverage of the existing health services. The PHCs in the study area are lack of basic equipment's and trained staffs and hence people are expecting health infrastructure with adequate staff.
- **Electricity:** All villages were availing electricity facility for domestic and agriculture purposes. Solar Street lights were seen in some of the villages.
- **Market facility:** Study area was predominantly rural. In villages, small shops were available for daily need things. Weekly market facility was available in some villages. Wholesale market was available Siltara .
- **Banking facility:** The study area has almost all the schedule commercial banks with ATM facility at urban areas and the district HQ.
- **Recreation facilities:** Television and radio were the main recreation facilities in the study area. Newspaper/magazine facilities were also used by villagers. Internet based Mobile usage has gained the highest popularity. Most of the youth are found to be using the Mobile based applications. At some places video parlors are also seen. Cinema houses are not found in the rural area. It is only found in Raipur City which is also one of the main sources of recreation. It is observed that there is no encouragement for sports as there are less Schools & Colleges in the Study area. Raipur is the only place where Sports training facilities are available in entire District.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Identified Impacts during Operation phase and proposed mitigation measures

4.1.1 Impacts on Ambient Air Quality

Emissions from the coal washery project generate from unloading of raw coal at railway siding, coal transport from railway siding to ground hopper, coal crushing and screening, stacking of raw coal, washed coal and rejects, transportation of raw coal, washed coal and rejects by 21 tonne capacity trucks, loading of washed coal in railway wagons, use of DG sets etc. Ambient air quality modeling



was carried out to assess the impacts on air quality due to proposed 0.72 MTPA coal washery activates. ISCST3 Dispersion Model was used for assessing air pollution load from washery operations and coal transportation through road.

• **Incremental Rise in Concentrations due to transportation of Raw Coal**

Incremental rise in concentrations due to various activities in the present case, a model simulation was carried out for study period for incremental rise of ground level concentration (GLC). The maximum incremental rise of ground level concentration (GLC) for particulate matter generated from the transportation, Loading/unloading activities in the areas is carried out. The predicted 24 hourly maximum concentrations for loading/unloading, transportation with control and without control, was found to be $4.6 \mu\text{g}/\text{m}^3$ & $10.5 \mu\text{g}/\text{m}^3$ in the E & ENE directions respectively and resultant (maximum baseline + incremental) concentration was found to be $81.1 \mu\text{g}/\text{m}^3$ (with control), $87 \mu\text{g}/\text{m}^3$ (without control).

Air Pollution Control Measures

- Plantation of tall trees along haul road and periphery of the project location in order to reduce the impact of dust in the nearby villages;
- Planning transportation routes so as to reach the nearest paved roads by shortest route (minimize transportation over unpaved road). Concreting of unpaved roads will be adopted to avoid generation of dust due to transportation.
- Permanent water sprinklers have been installed at railway sidings where unloading / loading of raw coal will be carried out. Continuous water sprinkling will be applied to cover railway wagons width during unloading.
- Continuous water sprinkling will be applied at all plant areas where materials are loaded / unloaded and on unpaved roads to avoid dust generation during transportation;
- The speed of dumpers plying on the unpaved roads will be limited to avoid generation of dust;
- Provision of bag filters of adequate capacity for coal crushers.
- Use of covered conveyors for internal transport of coal.
- Provision of dust extraction / water sprinkling arrangement at all transfer points.
- At locations, where water sprinkling is not possible, dust mask shall be provided to the workers. Regular trainings shall be imparted to workers to improve awareness about usage of dust masks.
- Gloves and full sleeve uniform shall be provided to workers;
- Transportation of graded coal / rejects shall be carried out during day time only;
- The material shall be covered with tarpaulin sheet during transportation by road. Overloading shall be avoided.

Regular maintenance of trucks shall be carried out and Pollution Under Control Certificate (PUC) shall be obtained as per Govt. norms for vehicles.

- A log book of maintenance / PUC certification shall be maintained and will be made available for inspection. High polluting vehicles / machinery shall be discarded and replaced with new vehicles / machinery having improved technology.
- Ground stocks of coal, rejects will be covered with tarpaulin during heavy winds.
- Periodic maintenance of equipment & machinery involved at project site.



- Ensuring valid PUC certificate for coal transport vehicles.
- Wagon loading of washed coal through closed conveyor system.
- When transportation is not possible by railway wagons, transportation of washed coal & coal rejects will be done through trucks covered with tarpaulin.
- Periodic monitoring of ambient air quality in plant premises and in nearby villages to assess efficacy of adopted air pollution control measures and adoption of additional air pollution control measures, if required.

4.1.2 Impact on Traffic Density

Raw coal from SECL mines & from railway siding will be transported upto to the plant by road in covered trucks. Washed coal and middling's from coal washery will be used in the existing steel plant & power plant. Since most of the raw coal will be transported through rail, no major transportation will take place from public roads. However, occasionally in case of non-availability of rail wagons, raw coal will be transported by road. The transport will take place through highway. The overall scenario pertaining to utilization of trucks for transportation of raw coal, washed coal and coal rejects considering the traffic load on road/rail due to proposed coal washery is presented in **Chapter 4**.

Proposed Traffic Control Measures

- Transportation of coal only through trucks covered with tarpaulin
- Overloading and over-speeding will be strictly prohibited
- Batch transport of coal to avoid traffic jams.
- Conducting coal transport during day time only.
- Periodic maintenance of public roads used for coal transport
- Periodic water sprinkling on roads used for coal transport
- Plantation along both the sides of village road used for coal transport
- Periodic maintenance of vehicles used for transportation of coal
- Provision of speed breakers, traffic signals, etc. at strategic locations
- Posting of Traffic sentries at strategic junctions, near schools, etc.
- No transport during school start and closing time.
- Widening of village road where necessary.
- Conducting awareness programs for traffic safety

4.1.3 Ambient Noise Levels

For predicting the impacts on ambient noise levels, 'DHWANI' Noise model, was used. The location of various noise sources along with their noise levels were used to plot the predicted noise isolines around the plant premises.

From the modeling results, it was observed that the resultant noise levels at the plant boundary was about 45 dB(A), which will further reduce over short distance. The resultant noise levels due to plant operations could be seen that no significant impact will take place on the ambient noise levels due to the proposed coal washery plant operations.

Proposed Noise Control Measures

- Design and layout of building to minimize transmission of noise;



- Periodic maintenance of equipment and machinery;
- Provision of acoustic enclosures to stationary equipment like crushers, DG sets, etc.;
- Provision of enclosures to conveyor belts;
- Provision of ear muffs/ear plugs to workers exposed to high noise generating areas;
- Development of thick green belt & plantation covering about 33% of the plant area.
- Periodic maintenance of plant machinery and loading and transportation vehicles;
- Periodical monitoring of noise in the plant premises and in nearby villages;

4.1.4 Water Resources & Quality

Impact on Water Resources & Quality

There is no surface water stream flowing within the applied project site. However, since no ground water drawl is proposed in the project. Hence, no impact is envisaged on the ground water. About 90 m³/day make up water is required for industrial, dust suppression and domestic use during the operation phase of the proposed coal washery project. The water is proposed to be obtained from Kharun river. Necessary permission for drawl of water has been received.

The potential sources of wastewater / effluent generation in the proposed coal washery project are Storm water run-off carrying coal particles & silt, Coal washery effluent and domestic effluent from plant premises. These effluents / wastewater, if discharged to environment (surface streams / land), will not only increase the plant water requirement, but will also cause significant pollution of the receiving water bodies / land surfaces.

Proposed Water Conservation & Water Pollution Control Measures

- **M/s. SKS Ispat & Power Ltd.** will implement water recovery system involving high speed thickener coupled with belt press for maximum recovery of water and recirculation of the recovered water in process, thereby making the plant a zero discharge unit. This will drastically reduce the fresh water requirement in the plant and will also protect the water quality of surface water resources flowing outside the plant area.
- Apart from this, **M/s. SKS Ispat & Power Ltd.** has implemented rainwater harvesting measures at administrative building and at other areas inside the plant premises. This involve collection of the storm water run-off from the plant premises to a settling tank and use of the settled water in coal washing process, dust suppression and plantation in the plant premises.
- Domestic discharge from rest shelters, canteens and toilets will be channeled through proper sewage drains connected to Septic tanks followed by soak pits.
- Storm water run-off from the plant area and parking premises will be collected in a series of settling tanks and will be utilized for coal washing, dust suppression and plantation.
- Wash water from workshop will be treated in oil & grease trap and treated water will be used for sprinkling at coal stack yard.

4.1.5 Impacts on Land use Pattern

The proposed activities will be within the existing integrated steel complex. M/S SKSIPL is situated inside the plant boundary of around having 190.76 Acres of land. The land for the proposed coal washery will be 6.42 acres (2.60 Ha) within existing plant premises. It is a private land already developed for industrial activities.



However, due to establishment of the coal washery project, some ancillary businesses like garages, hotels, housing facilities, lodges, etc. may be developed in the vicinity of the project. This may result in the change in the existing land use pattern in the buffer zone.

Following control measures will be adopted to minimize impacts on the land environment.

- Additional Green belt development and related activities will be taken up so that plantation grows to adequate height. Thus, green belt will be effective in containing the soil stabilization;
- Entire plant area will be aesthetically landscaped and natural gradient will be maintained as much as feasible;
- Stacking of raw coal, washed coal and coal rejects will be carried out at designated areas within the plant premises. No coal stacking will be carried out outside the plant premises (excluding at railway siding).
- Internal roads and public roads used for coal transport are already concreted and will be maintained periodically.
- Plantation will be developed along the village roads used for coal transport.
- Suitable air pollution control measures will be adopted, as suggested in previous sub-chapter, to control dust emission and deposition on the agriculture crops / land surrounding the plant premises.
- No effluent will be discharged outside the plant premises on any land or in any water body

Solid Waste Generation & Management

- About 0.18 MTPA washery rejects will be generated from the proposed coal washery, out of which 0.06 MTPA shales will be used in land filling whereas, 0.12 fines and middling will be used in power plants (CFBC).
- All rejects and sludge will be used in own AFBC/ CFBC Boiler.
- Biodegradable solid wastes from canteen and office will be used for composting.
- Spent oil & grease will be collected & stored in separate leak proof bins and used as lubricant in Rolling Mill.

4.1.6 Impact study on Biological Environment

M/s. SKS Ispat & Power Ltd. proposed to install 0.72 MTPA coal washery within the existing plant premises. The unit lies near to the Siltara Industrial Area. Major nearby industries are mainly belonging to the primary and secondary metallurgical (ferrous) industries & power generation, etc. Naturally, there will be cumulative pollution load at higher side but on the other side, there will not be any ecological sensitive area like national park, sanctuary, biosphere reserve, wetland, forest, etc. within 15 km radial distance from the project site. No rare or endangered flora/fauna were recorded in the study area. Thus, the impact on local ecology in surrounding area would be minimum.

An area of around 70 Acres of land (more than 33%) is dedicated for green belt development. The existing green belt is having 32 different species including trees, shrubs, herbs and climber. The overall plantation carried out by M/s. SKS Ispat and Power Ltd. at inside the plant premises, labour colony, bachelor's hostel along with approach road from Bilaspur-Raipur road to SKS plant, etc. Plantation also carried out at Bana Village, nearby villages, approach road from Bilaspur-Raipur road to SKS plant etc. No major wild fauna were observed in the vicinity of proposed washery site.



4.1.7 Socio-economic Environment

- Land for the proposed coal washery is already owned by M/s. SKS Ispat & Power Ltd. There is no rehabilitation and resettlement involved in the project.
- The proposed coal washery will require about 50 workers as direct employees. This will provide employment opportunities to the local people as most of the workers will be recruited from nearby villages.
- Due to coal washery activities, vehicular movement will increase in nearby villages.
- The establishment of coal washery will also result in improvement in the existing infrastructure facilities like roads, electricity, communication facilities, etc.
- Under the Corporate Social Responsibility of the company, M/s. SKS Ispat & Power Ltd. will take up various socio-economic development programmes in the nearby villages, which will improve socio-economic status of the nearby villages.

5.0 ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

No alternative site has been selected for the proposed project. The proposed plant will be in the existing premises of the company.

In the coal washing process, there are various technologies available in India. Wet process will be adopted for proposed 0.72 MTPA (throughput) coal washery project.

6.0 ENVIRONMENTAL MONITORING PROGRAM

Being existing running plant a Environmental Management Cell (EMC) is already established which will also look over the proposed coal washery project under the control of Unit Head (Coal washery).

The EMC is headed by an Environmental Manager having adequate qualification and experience in the field of environmental management. Environmental monitoring of ambient air quality, surface and ground water quality, ambient noise levels, etc. will be carried out inhouse as well as through MoEFCC accredited agencies regularly and reports will be submitted to CECB/MoEFCC.

7.0 ADDITIONAL STUDIES

Public Consultation

The EIA-EMP report for proposed 0.72 MTPA Coal washery project located at village Siltara, Tehsil Raipur, District Raipur in Chhattisgarh state is prepared as per the TOR issued by SEAC, Chhattisgarh and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the points raised and commitment of Project Proponent during the public hearing will be incorporated in the final EIA/EMP report.

Risk Assessment & Disaster Management Plan

The assessment of risk in the proposed coal washery project has been estimated for fire, explosion and toxicity and corresponding mitigation measures are suggested in the Draft EIA/EMP report.

A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons, is prepared and incorporated in the draft EIA/EMP report for ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, Procedures, Duties and responsibilities, Communications, etc. are considered in details in the Disaster Management Plan.



8.0 PROJECT BENEFITS

The proposed project of coal washery at Siltara village would provide development of area and consequent indirect and direct job opportunities which would finally result in improvement in the quality of life of people in the central region and especially in the area around the coal washery site. In line with this CSR policy, M/s. SKS Ispat & Power Ltd. will carry community welfare activities in the following areas:

- Community development
- Education
- Health & medical care
- Drainage and sanitation
- Roads
- Drinking water supply occasionally through tankers
- Water conservation

Adequate budget has been proposed for implementation of Socio-economic welfare activities in the nearby villages.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprises of following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.
- Control of waste generation and pollution.

The capital cost of the proposed project is approx. Rs 14.5 cores. It is proposed to invest an amount of Rs. 112 Lakhs as capital cost and Rs. 50 Lakh/annum as recurring expenses towards implementation of Environmental Management Plan. As per CER 1% of project cost i.e. 14.5 lakhs will be spent for the Improvement of Environment. In addition to this, budgetary provision towards ecological damage Assessment remediation plan, Natural Community resources augmentation plan is estimated of Rs. 57.116 Lakhs.

10.0 CONCLUSION

The proposed 0.72 MTPA coal washery project of M/s. SKS Ispat & Power Ltd. will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater generation, traffic density, etc. will have to be controlled within the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like bag house,



water sprinklers, enclosures, thickener, etc., will form integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment and socio-economic environment of the area. Measures like development of thick green belt and plantation within plant premises and along transport road, adoption of rainwater harvesting in the plant and in nearby villages, etc. will be implemented. The CSR and CER measures proposed to be adopted by the company will improve the social, economic and infrastructure availability status of the nearby villages.

The overall impacts of the proposed coal washery will be positive and will result in overall socio-economic growth of nearby villages.