MARUTI CLEAN COAL & POWER LTD.

EXECUTIVE SUMMARY

OF

RAPID ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN

FOR

2 x 135 MW WASHERY REJECTS AND COAL BASED THERMAL POWER PLANT
AT
VILLAGE BANDAKHAR, DISTRICT KORBA, CHHATTISGARH

ISSUE 01 REV 0 MAY, 2008

Prepared by:

MIN MEC CONSULTANCY PVT. LTD.
A-121, Paryavaran Complex, IGNOU Road, New Delhi – 110 030
Ph : 29534777, 29532236, 29535891 ; Fax: +91-11-29532568
Email :min_mec@vsnl.com; Web site : http://www.minmec.co.in
Estb. 1983
An ISO 9001:2000 approved company

EXECUTIVE SUMMARY FOR REIA/EMP FOR 2 X 135 MW WASHERY REJECTS BASED THERMAL POWER PLANT AT BANDHAKHAR, TEHSIL PALI DISTRICT KORBA, CHHATTISGARH

1.0 INTRODUCTION

Maruti Clean Coal & Power Limited (MCCPL) is the project company which is setting up a 270 MW (2 units of 135MW each) Washery Rejects Based Thermal Power Station at Bandakhar Village, District Korba, Chhattisgarh. The primary fuel will be coal (40%) + washery rejects (60%) with a daily consumption of approximately 6800 tonnes per day having effective GCV of 2500 kcal/ kg. It is envisaged to set up the thermal power plant over around 449 acres land. Area for raw water reservoir has been provided. Ash will be dumped in 90 acres. The estimated investment in the project will be approximately Rs. 1258.75 Crores

1.1 General background

MCCPL has started commissioning a coal beneficiation plant with a capacity of 10 million TPA near Village Ratija, Korba in the proximity to the Dipka-Gevra coalfields of SECL. In the process of coal washing large amount of coal rejects and fines are generated. To effectively utilize the coal rejects and fines, a power plant of 2 X 135 MW capacity is proposed near the washery at about 6 km distance. This will result in savings in the cost of rejects & fines transportation and enhance solid waste utilisation.

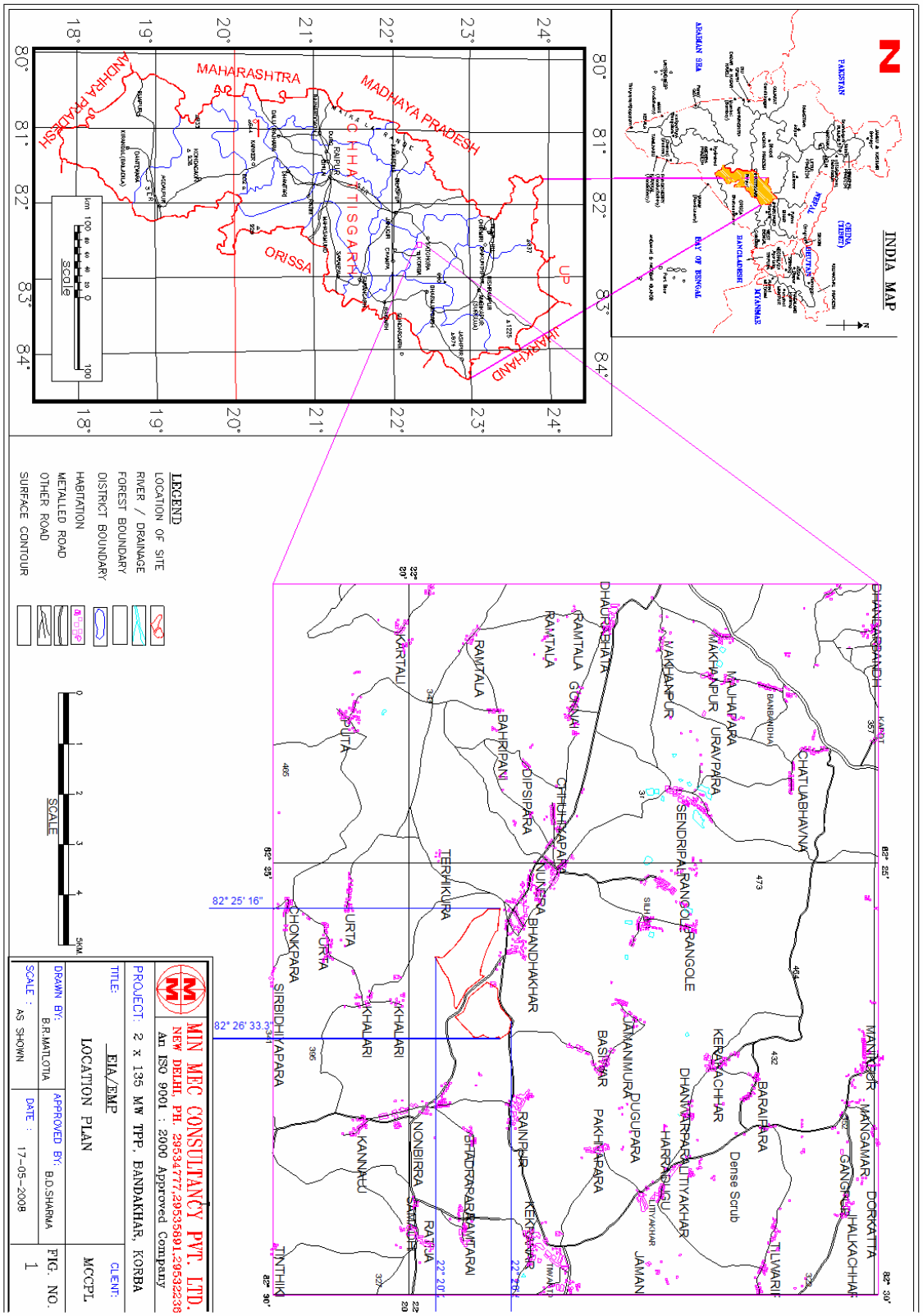
1.2 Location and communication

The proposed power plant is located in village Bandakhar, tehsil Pali of Korba district in Chhattisgarh state. The study area is covered in Survey of India topo-sheet No. 64 J/7 and 64 J/11. The location of the proposed project can be seen in Fig.1. Plant is located between Latitude 22°20'23.5" to 22°20'59.7" N and Longitude 82°25'16" to 82°26'33.3" E. The proposed power plant is accessible by all weather road from the district head quarter Korba, which is approximately 30 kms from the plant site. The nearest National Highway is the Bilaspur to Raigarh route which is 57 km from the project site. The Nawapara- Katghora road is approximately 8 km from the project site. The nearest railway station is Korba at distance of approximately 20 km. Bilaspur railway station is at 130 km. The nearest airport is at Raipur.

2.0 PROJECT DESCRIPTION

2.1 Project site

The land required for the project will be approximately 449 acres. Land for raw water reservoir has been provided while ash dyke will not be there as ash will be dumped in 90 acres. Ash will be dumped in ash disposal area spread over 90 acres. No displacement of population is proposed due to this acquisition.


INDIA MAP
MAHARASHTRA
MADHAYA PRADESH
CHHATTISGARH
ORISSA
ANDHRA PRADESH
UP
JHARKHAND
scale
LEGEND
LOCATION OF SITE
RIVER / DRAINAGE
FOREST BOUNDARY
DISTRICT BOUNDARY
HABITATION
METALLED ROAD
OTHER ROAD
SURFACE CONTOUR
SCALE
82° 25' 16"
82° 26' 33.3"
22° 20'
Dense Scrub
MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH: 29534777,29535891,29532238
An ISO 9001 : 2000 Approved Company
PROJECT: 2 x 135 MW TPP, BANDAKHAR, KORBA
TITLE: EIA/EMP
LOCATION PLAN
CLIENT: MCCPL
DRAWN BY: B.R.MATLOTIA
APPROVED BY: B.D.SHARMA
SCALE : AS SHOWN
DATE : 17-05-2008
FIG. NO. 1

2.2 Process description

In a reject or coal fines based thermal power station, the heat of combustion is first converted into mechanical and then to electrical energy. The main units of a thermal power plant are steam generator, steam turbine and electrical generator.

2.3 Facility proposed

It is proposed to install 2 X 135 MW power station. Major auxiliaries of a power plant are discussed in brief in subsequent paragraphs below:

Steam Generators and Accessories : The steam generators for the proposed unit shall be Circulating Fluidized Bed Combustion (CFBC) boiler which is the most suitable and proven design of the boiler available today for utilizing rejects for power generation purpose. The complete furnace section will be of welded wall type, arranged as a gas and pressure tight envelope.

Ash Handling System/Solid Waste Management : The project proponent proposes to collect the fly ash as well as bottom ash coming out of the boiler in dry form and after suitable mixing with water in a high concentration mixer the resulting fly ash paste (high concentration slurry) shall be disposed in the ash pond area.

Chimney / Stack: The detail of the stack is given Table 1.

TABLE 1 : DETAIL OF STACK

S.No.	Details/Particulars	Quantity	
1.	No. of stack	1 for 2 X 135 MW	
2.	Height of the stack	175 m	
3.	No. of flues in each stack	2	
4.	Internal diameter of each flue	3.86 m	
5.	Flue gas exit volume	258 m^3/s	
6.	Exit flue velocity	22 m/s	
7.	Flue gas temperature	137.5 ℃	
8.	Pollutants emission from stack	Flue 1	Flue 2
	SO_2 emission (µg/s)	533400	533400
	NO_x emission (µg/s)	400000	400000
	Particulate matter emission (µg/s)	3928537	3928537
	CO (µg/s)	250000	250000

Condensers Cooling Water System

Independent and dedicated Air cooled condensers with auxiliary system will be provided for each turbine unit. The condensing plant will convert the exhaust steam to condensate in the air cooled condenser and then deliver the condensate to feed water cycle.

Coal handling and Transportation

Coal will be transported from the beneficiation plant of MCCPL to the project site by pipe conveyor and alternatively by trucks. A part of the coal is also required from the SECL coalfields and that coal will be transported to the site by road. The coal will be unloaded on coal yard in case of road transport or in case of conveyors

with the help of suitable stacker reclaimer system and fed to the in-plant belt conveyor by plough feeders or vibrating feeders.

2.4 Raw material quality

Coal rejects generated from coal washing plant will be used as primary fuel obtained from the washery of MCCPL near Dipka coal mine. The coal available in the mine has weighted average GCV of about 3600 Kcal/ Kg, ash content about 42.0% and moisture content about 6%.

2.5 Fire protection system

For protection of the plant against fire, all buildings / equipment, storage yards and plant would be protected by any one or a combination of Hydrant System, Medium velocity water spray system, High velocity water spray system, Low expansion foam system, Mobile & portable fire extinguishing equipment, Fire alarm & detection system.

2.6 Manpower

The total manpower requirement during the construction phase is estimated as 400 persons while that during operation phase will be 200 persons of which skilled will be 50 and unskilled will be 150 persons

2.7 WATER REQUIREMENT

The total make up water requirement of the proposed power plant will be 3.09 MCM per annum (@ 353 cum/Hr). This water will be taken from a dam constructed proposed to be constructed on Lilagarh river at about 5 km from the proposed plant site.

3.0 PRESENT ENVIRONMETNAL SCENARIO

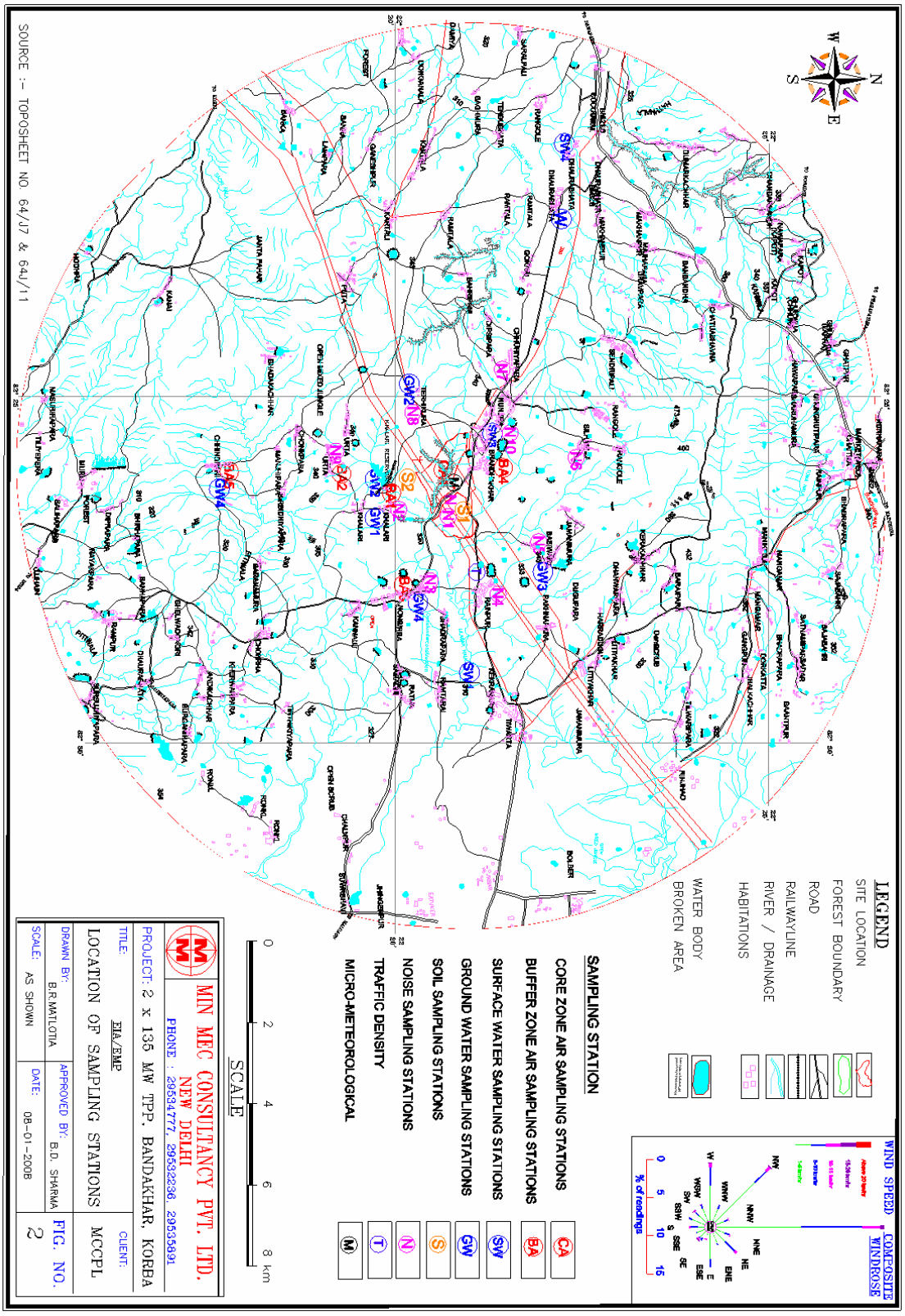
The project site is referred to as the “core zone” and the area within 10 km of its radius a “buffer one”. Together, they are referred to as “study area” i.e. the anticipated area of impact. The study area can be seen in Fig. 2.

3.1 Topography and drainage

The proposed project site is flat with gentle slope towards east. The elevation of the proposed plant site is 317-335 m RL. The study area is undulating and hilly. There are some hills in the southern and south western part of the study area while one hill is present in the northern part. The elevation of the study area varies from 641 m AMSL on the southern hill top to 300 m AMSL in the south eastern planes of the study area. . Drainage pattern of the study area is dendritic. The major drains in the study area are Lilagarh river, Pitni nala, Goknai nala, Ganjar nala, hathi nala, Karra nala, Tuma nala and Sundhara nala. All the nalas discharges their load into the Hasdo river in the east and Kurung river in the west.

3.2 Long term Climate

The year may be divided into four seasons. The summer season lasts from March to the middle of June, and the period from June to September is the south west monsoon season. October and November constitute the post monsoon season and the winter season is from December to February. Tha annual temperature fluctuations are in the range of 12.31℃ to 41.89℃ . Relative humidity varies


LEGEND
SITE LOCATION
FOREST BOUNDARY
ROAD
RAILWAYLINE
RIVER / DRAINAGE
HABITATIONS
WATER BODY
BROKEN AREA
SAMPLING STATION
CORE ZONE AIR SAMPLING STATIONS
BUFFER ZONE AIR SAMPLING STATIONS
SURFACE WATER SAMPLING STATIONS
GROUND WATER SAMPLING STATIONS
SOIL SAMPLING STATIONS
NOISE SAMPLING STATIONS
TRAFFIC DENSITY
MICRO-METEOROLOGICAL
WIND SPEED
COMPOSITE WINDROSE
% of readings
SCALE
0 2 4 6 8 km
SOURCE :- TOPOSHEET NO. 64/J7 & 64J/11
MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI
PHONE : 29534777, 29532236, 29535691
PROJECT: 2 x 135 MW TPP, BANDAKHAR, KORBA
TITLE: EIA/EMP
LOCATION OF SAMPLING STATIONS
CLIENT: MCCPL
DRAWN BY: B.R.MATLOTIA
APPROVED BY: B.D. SHARMA
SCALE: AS SHOWN
DATE: 08-01-2008
FIG. NO. 2

between 43-86% in the morning and between 27-81% in the evening. The average rainfall in ten years was observed as 1370.2 mm. The wind speed varies between calm to as much as 19 kmph. Wnd direction is from NE during winter season (October to March) and SW during summer and monsoon seasons.

3.3 Ambient air quality

The air sampling stations were established at 6 locations including 1 in core zone during winter season using Respirable Dust Sampler to study the present ambient air quality. The sampling locations were the plant site, Khalari village, Urta village, Nonbirra village, Bandhakhar village and Chhindapani village. The pollutants RPM, SPM, SO_2 and NOx were sampled 24 hourly, twice a week and analysed. The SPM was found to vary between 118-174 µg/m^3, RPM between 48-71 µg/m^3, NOX between 9.1-17.3 µg/m^3 and SO_2 between 5.9-12.9 µg/m^3 over the six sampling stations.

3.4 Micro-meteorological survey

Micro-meteorological survey was undertaken for monitoring wind speed, wind direction, ambient air temperature and relative humidity during December 2007 to March 2008. The temperature varied between 8.0-29.30℃ with an average of 17.64℃. Relative humidity varied between 25-83% wi th an average of 55.78%. wind speed was varied between calm to 17.40 kmph with an average of 3.86 kmph. The predominant wind direction was North with 25% of occurrence.

3.5 Water resources

Surface water : The storm water generated is carried by innumerable streams, which are seasonal in nature. The study area has large number of ponds which acts as a source to meet the water requirement in the area.

Ground water : The ground water in the area occurs under unconfined state within the secondary porosity of compact formations present at depth or within the primary porosity of fluvial sediments where ever it is found having moderate depth. The depth to water table over the study area ranges between 8 to 10 m during pre-monsoon season. The rainfall is only source to recharge the groundwater storage. The annual water balance has been calculated on the basis of rainfall infiltration method as well as the ground water fluctuation method. The ground water fluctuation method has given a lower figure of 14.74 MCM. The annual groundwater utilisation has been worked out as 3.235 MCM and thus, the stage of groundwater development works out as 21.94%.

3.6 Water quality

3 surface and 5 ground water samples were collected and analysed. Results show that the ground water at most of the places in the study area is potable without treatment while some ground water needs primary treatment before using for drinking purposes.

3.7 Noise level and traffic density

Measurement of noise level were carried out at ten locations on a round the clock basis. During the observation, it was found that noise level in the study area ranged between 43.0 to 54.4 dB(A) during day time while it ranged between 37.0

to 43.6 dB(A) during night. A traffic density survey was conducted round the clock on 11-12/02/2008. The survey was conducted at on Dipka to Bilaspur road. The total observed motorised vehicles were 1717 vehicles/ day while cycles were 406 per day.

3.8 Land use

Core zone : The power plant is proposed to be set up over approximately 449 acres of area. Out of the 449 Acres of land, 343 acres land is Govt. barren land and only 106 acres land is private agricultural land.

Buffer Zone : In the buffer zone irrigated agricultural land is 0.98%m unirrigated agricultural land is 34.68%, culturable waste is 7.78%, area not available for cultivation is 5.58% and forest land is 50.98%.

3.9 Soil quality

Soil samples were collected and characterized. The color of soil in the core zone is yellow, loam and sandy soil, poor in organic contents and have low moisture retaining capacity while that from the agricultural field is mainly brown and pH is 6.0. Conductivity of soil samples is normal.

3.10 Ecology

In the buffer zone, the reserve/protected/ village forest cover is 17886.83 Ha. i.e. about 50.98% of the total area. The study area has few protected forest but there is no any reserve forest found in the study area. The vegetation consists mainly of Sal, Char, Dhawda, Senha, Tendu, Saja, Sarai, Dhui, Bhelwa, Gunja, Neem, Khajoor, Bargad, Peepal, Sagaun, etc.

Fauna found in study area is more than in core zone. Mammals are Hyena, Monkey, Indian Wild boar, Jackal, Bat, Five striped palm squirrel, Common mongoose, Rabbit, Common langur etc., reptiles are Common Indian Krait, Common garden lizard, Kobra, Common Indian Monitor, Common rat snake etc., and avifauna are Cattle egret, Blue rock pigeon, House crow, Koel, House sparrow, Parrot (Parakeet) and Little brown dove etc.

3.11 Socio economic conditions

There is no habitation within the project area, i.e., the area of land acquired for the project. Bandhakhar and Nunera villages are located near to the proposed plant site. There are 48 revenue villages in the study area of the proposed project. These villages fall in Korba and Bilaspur districts of Chhattisgarh. There are 1004 females per 1000 male population which shows a slight predominance of females over males. Schedule casts and tribes form a major part of the population, about 66.5% of the total population. Total literacy is 44.81 %. 60.82% of total workers are main workers and 51.03% are non workers.

3.12 Industries in study area

The study area is getting developed from the point of view of industrialisation. Besides the proposed 2 X 135 MW power plant, there are two washeries SECL and Dipka and one Dipka Mine.

3.13 Places of tourism / historical / archaeological importance

There are no places of historical/tourist/religious of archaeological importance in either core zone or study area. There are local places of worship at some villages.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

4.1 Climate and meteorology

Impact: During the construction phase the activities will be restricted to construction of roads, buildings, erection of structures, plants and machinery, construction of oil/fuel storage areas etc. Thus, no effect on climate and meteorology of area is expected. The climate is controlled by the pressure depression in the Bay of Bengal and is not anticipated to be affected by local activities under discussion. Therefore no mitigation measures are needed to be taken.

Mitigation Measures: The proposed power plant project will be restricted to different type of activities within core zone covering the land area of 449 acres. Ash will be disposed in 90 acres of land within the plant premises and will be used for fly ash brick manufacturing and also given to cement manufacturers.

4.2 TOPOGRAPHY AND DRAINAGE

Impact: The present topography will be slightly changed due to construction and development of infrastructures. The height at some points will change due to the elevated plinth level, excavations and levelling of site. No change is envisaged outside the plant site. The seasonal nala flowing through the plant site will have to be diverted along the plant boundary to avoid any impact on the downstream flow and drainage pattern**.**

Mitigation : Greenbelt and plantation will be carried out in the plant area to enhance the aesthetic value of the plant. Also plantation will be done along the transportation roads to the plant.

4.3 Air quality

Impact: Sources of air pollution, during the construction phase will be vehicle exhausts for transport of materials dust generation due to excavation work, shifting of construction materials (cement, sand and gravel), vehicle movement on unpaved roads and concrete preparation plant. During operation, the stacks of the power plant will be continuously emitting combustion product gases into the atmosphere.

Mitigation: The dust created by excavation, levelling and transportation activities will be easily controllable by sprinkling of water. Construction equipment and transport vehicle will be maintained properly to minimize source emissions and spillage. Regular maintenance schedule will be adopted. Pucca road to be constructed. Electrostatic precipitators (ESP) with an efficiency of 99.9% will be installed to control the particulate emission so as not to exceed 50 mg/Nm^3. For dispersal of SO_2, a stack of 175 m height will be constructed as per applicable standards for plant of <500 MW capacity. It has been found that the maximum incremental GLC of SO_2 will be only 0.03 $\mu g/m^3$ at a distance of 2 km measured from the stack of 2 X 135 MW TPS. Stack emission monitoring for SO_2, NOx and particulate matter will be carried out as per frequency mentioned in the consent.

Water spraying system will be provided in washery rejects and coal fines yard to suppress dust at suitable location including transfer points, loading and unloading points. Opacity meter will be installed for continuous monitoring of particulate matter. Bag filters will be installed at silo for dry ash extraction

4.3 Land environment

The proposed plant site is flat with gentle slope towards east. There is not much filling / levelling required in the plant site as the buildings will be built at different plinth levels. As all the activities related to the project will be restricted to core zone, no impact on buffer zone land use is anticipated.

4.4 Water environment

Impact: During construction phase, rain water flowing through the construction area will carry loose soil, thereby increasing suspended solids of receiving water body. However the impact is temporary and reversible. Appropriate control measures are envisaged in management plan to prevent water pollution in receiving streams. A large amount of water is required for the operation of a thermal power plant, which is planed to be sourced from a dam to be constructed on Lilagarh river.

Mitigation: The plant is designed on 100% recirculation and reuse of waste water to prevent wastage of water, hence, no waste water discharge or effluent discharge from industrial activities is anticipated during non-rainy days. Waste water from DM plant will be neutralised and reused in CHP dust suppression and in plant horticulture via CMB. Water from cooling tower blow down will be used for ash disposal. Thus there will be no impact on the surface water from the power plant. The effluent from the industrial activities, after sufficient treatment in oil/grease water separator and sedimentation of SS, will be collected in the central monitoring basin (CMB) and then used for ash disposal.

The domestic effluent from colony and plant will be treated in sewage treatment plant and after treatment water will be used for irrigating green belt while sludge will be used as manure.

4.5 Noise, vibration and traffic

Impact: The noise level during construction will be due to construction machinery, which are of temporary nature, the unpleasant effects of which will be controlled by appropriate mitigation measures. The noise level at sources like the generator are anticipated to go as high as 95 dB (A).

Mitigation: The equipments shall be provided with acoustic shields or enclosures to limit the sound level inside the plant. The proposed green belt will also help to prevent noise generated within the plant from spreading beyond the plant boundary. The present road infrastructure will be sufficient to meet the increase in due to transportation of coal.

4.6 Ecological impacts

No noticeable impact on land and soil is anticipated during the construction of the plant. Excavation and waste disposal will affect the land and soil within core zone only. During the construction period, only pollutants will be dust from earth moving

activities and emission from vehicles etc. With the progressive growth of greenery, biological terrestrial environment will improve in due course of time. A curtain of trees all around the power plant complex will be provided.

4.7 Solid waste generation

Impact: The power plant is being set up to use the solid waste generated from the washery, namely, rejects and fines. The ash content of coal will be about 55.8%, which will be left after combustion. This will be largest source of solid waste. There will be domestic solid waste generated from the plant and colony also which will be predominantly organic and biodegradable in nature and converted into manure using composting or vermi-composting. The manure will be used in own greenbelt.

Mitigation Measures: The ash generated from the plant which is expected to be approximately 3902 tonnes/day will be disposed of partly (20%) as bed ash in dry granular form and partly (80%) by dry ash system, both to be collected in dedicated RCC silos. However, 90 acres of land has been identified at the plant site for ash disposal area through high density slurry system. The ash disposal site will be designed to contain 10 years generation of ash.

4.8 Socio- economic conditions

There is no habitation in the proposed plant site. Therefore, no family is required to be displaced from the core zone. Most of the work force required for construction and operation of the proposed project will be drawn from the surrounding areas. Therefore, no impact on demographic profile of the area is foreseen.

5.0 ANALYSIS OF ALTERNATIVES

MCCPL has set up a coal washing plant which is under commissioning stage. In the process of coal washing, large amount of coal rejects and fines are generated. To effectively utilize the washery rejects and coal fines, this power plant is proposed near the coal washery to save the cost of raw material transportation and to enhance the utilization of washery rejects and coal fines which is otherwise a solid waste.

The CFBC technology has been selected because pulverized fuel fired boilers cannot be installed as high ash content is there which will constantly require oil support for flame stabilization and a lot of maintenance in coal feeding and milling system. AFBC boilers can be installed for high ash content coal, however, due to capacity limitation, AFBC boilers have also been ruled out.

6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANISATION

Environmental Cell is constituted in the industry for effective management of pollution control and environmental protection. It shall consist of following members drawn out of the factory senior staff such as managing director, SHE engineer and plant manager and maintenance engineer. This team will be also responsible for all environment management activities including environmental monitoring, developing greenbelt, ensuring good housekeeping, ensuring statutory compliance as well as creating environmentally aware work forces for proposed plant.

The total capital investment on environmental improvement work is envisaged as Rs 8257.00 Lakhs which is 6.56% of the estimated cost of the project (Rs 1258.75

Crores). The recurring expenditure estimated during the power generation is Rs. 1637.49 lakhs/year.

7.0 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN

All types of industries face certain types of hazards which can disrupt normal activities abruptly and lead to disaster like fires, inundation, failure of machinery, explosion to name a few. Rejects and coal fines based power plant also pose fire, electrocution and explosion hazards. Disaster management plan is formulated with an aim of taking precautionary step to control the hazard propagation and avert disaster and also to take such action after the disaster, which limits the damage to the minimum.

Disaster may occur due to Fire, Explosion, Oil spillage, Acid spillage, Electrocution and Hazardous waste. Design, manufacture and construction of all plant and machineries building will be as per national and international codes as applicable in specific cases and as laid down by statutory authorities. Provision of adequate access way for movement of equipment and personnel shall be kept.