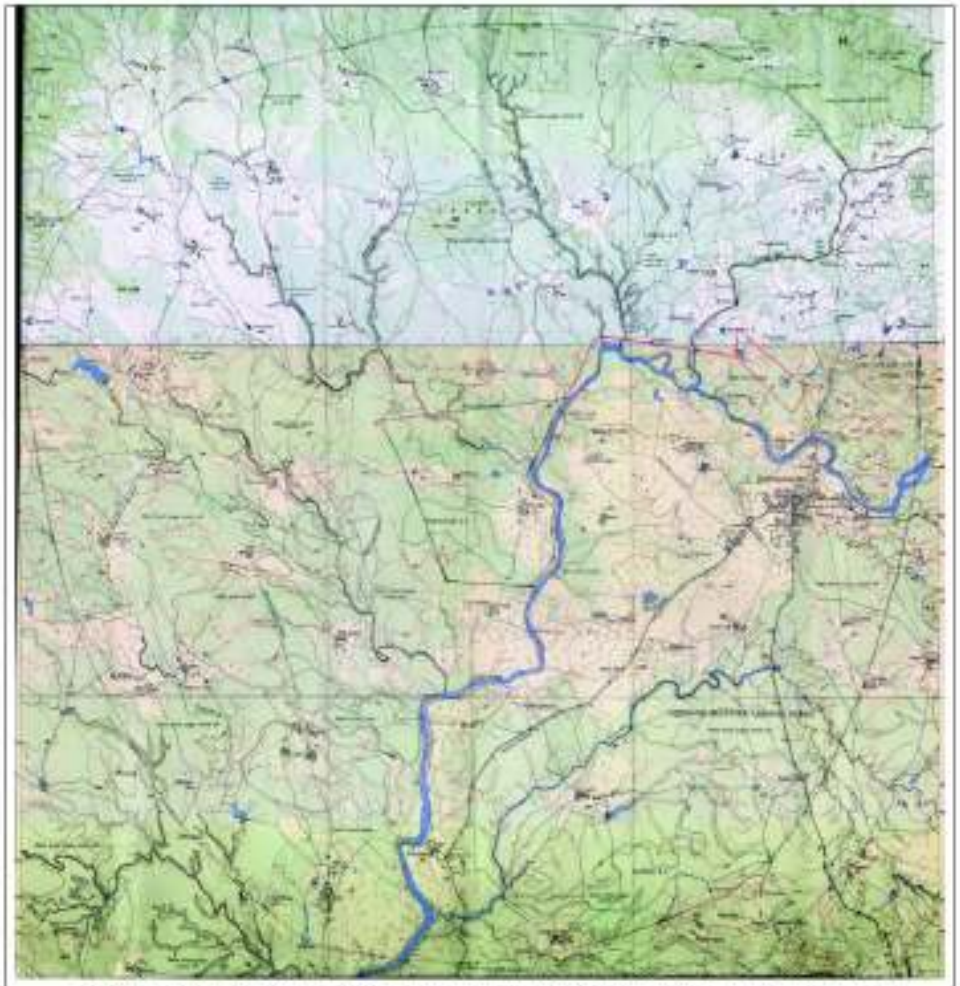

Fig. 2 Study Area Map of the Core Zone and 10 km area Buffer Zone (1:50000 scale) showing all the Physiographical Features (BIG MAP IS KEPT IN THE BACK POUCH)

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SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Opencast Fatehpur East Coal Block

Mining Lease Area: 1728.208 ha

(Project Area: 1913.208 ha)

Coal Production: 10.0 MTPA

at

Mand-Raigarh Coalfields

(Vill: Fatehpur, Rupunga, Narkalo, Ududa and Amlitikra)

Tehsil : Dharamjaigarh, District : Raigarh

(CHHATTISGARH)

by

Fatehpur East Coal Private Limited

January 2013

CONTENTS

1.0 Project Description

Ministry of Coal allotted Fatehpur East Coal Block (FECB) jointly to five power developing companies for captive use of coal in their proposed coal based Thermal Power Plants. The name of five companies is M/s RKM Powergen Pvt. Ltd., M/s Visa Power Ltd., M/s Athena Infra Projects Private Ltd., M/s JLD Yavatmal Energy Ltd. and M/s Vandana Vidhyut Ltd. The five companies formed a Special Purpose Vehicle named Fatehpur East Coal Private Limited (FECPL). FECPL will carry out 10.0 MTPA coal mining from FECB.

All the proposed Power Plant units are located in Chattisgarh State and thus entire coal produced from the block will be utilized in the state itself for Power generation.

Terms of Reference (TOR) for EIA have been approved by MoEF vide letter No. J-11015/315/2010-IA.II (M), 9th February 2012. This draft EIA/EMP report has been prepared according to the Terms of Reference (TOR) for Public Hearing. The mining lease area and total project area is given below:

Mining Lease Area	1728.208 ha
Ext OB Dump	155 ha (Outside lease area)
Haul Road	30 ha (Outside lease area)
Total Project Area	1913.208 ha

Location: The 1728.208 ha area of mining lease is bounded by latitude 22°26'42" to 22°29'18" N and longitude 83°05'40" to 83°08'59" E. The external Overburden Dump covering an area of 155 ha is bounded by latitude 22°29'03" to 22°30'18" N and longitude 83°11'36" to 83°12'45" E. The dump yard is located on non-forest land; on a non-coal bearing area. Dharmjaigarh is the nearest town located 7.2 km away from proposed mine boundary in east direction. Kharsia is the nearest railway station at a distance of about 61 km from FECB. FECB is accessible from Dharamjaigarh by 5 km metaled road upto Bayasi village and further 5 km west of Bayasi village by cart road. Fatehpur and Rupunga villages fall within the FECB area (Location Map, Core Zone Map, Buffer Zone Map and detailed Site Plan provided in Figure, 1, 2, 3 and 4). Mand

River is located 60 m on east side of FECB. Amlitikra village is located about 0.3 km west of OB dump site. Mand River is located 60 m on east side of FECB. The north, west and south area around FECB is coal bearing area. The neighboring coal blocks proposed around FECB are as follows: Fatehpur Coal Block on west side. Chira South-East and Chira South-Central coal Block on north side. East of Basin Fatehpur coal Block on south side.

Land Details: Fatehpur and Rupunga villages falling inside the coal block will be resettled. Land of other three other villages, Ududa, Narkalo and Amlitikra will be acquired. The land type for the project is shown below.

Land Class		**Mining Lease Area (ha)**	**External Dumping & Haul Road (ha)**
Private Land	Adivasi	303.261	16.333
	Non-adivasi	113.300	6.691
Govt. Land		218.162	161.976
Protected Forest		673.772	0
Revenue Forest		419.713	0
Total land		**1728.208**	**185.00**

Private and Government land will be taken on lease. Forest Clearance will be obtained.

Rehabilitation & Resettlement: The number of displaced persons from the project site is as follows: Rupunga village: 170 Households, 1071 population; Fatehpur village: 145 Households, 551 population.

Resettlement colony shall be established for the displaced persons near Laxmipur village, 6 km northeast of FECB. 25 ha land has been selected for constructing the resettlement colony. The resettlement colony will be developed with all the basic infrastructural facilities. The displaced persons will be provided with job in the project, as per R&R Policy of Chhattisgarh Government. FECPL will provide amenities and benefits as per the Chhattisgarh Model R&R Policy 2007 (as amended) the resettlement will be carried out as per the norms of the policy.

FECPL will also undertake community development under CSR program; such as tribal development schemes, education and health facilities, promoting sports and cultural activities, developing infrastructural facilities (roads, drinking water, street lights etc.).

Rs.96.36 crores has been earmarked as budget for the R&R Plan that includes the reimbursement of cost of land and making the resettlement colony. Rs.1.3 crores has been earmarked for developing infrastructure facility for the resettlement colony.

Water and Power: Total water requirement for the mines is 1373 m^3/day. Mine water shall be used for the open cast project. 100 m^3/day groundwater shall be used for drinking purpose. The project site falls in Safe Zone as categorized by the Central Ground Water Board, where the drawl is less than 30% of the annual recharge. Application has been submitted to Central Ground Water Board for permission to draw groundwater. 10 MW power for the project shall be sourced from Chhattisgarh Power Distribution Company Limited.

Mining Process: Coal mining will be done by opencast system of mining. Shovel-Dumper combination shall be used. Large capacity (40 m^3) Excavator with 230 tons Rear Dumper shall be used for overburden removal. Small capacity (18 m^3) Excavator with 100 tons Rear Dumper shall be used for coal extraction. From mine face to the pit surface coal shall be hauled by dump trucks. The dump trucks shall feed the coal to the Coal Handling Plant (CHP) for crushing. The crushed coal shall be stored in silos. From silos the crushed coal shall be loaded into railway wagons. The rail network is proposed to be developed by a consortium of coal miners of the region. Indian Railways is also planning to develop rail network connecting the coal mines. The state government has also planned to develop the infrastructure for coal transport. All proposals are in planning stage. Till the time railway network is developed, FECPL partners will transport coal using the available road network after suitably augmenting it. 30 tons trucks shall be used for carrying coal from mine to the respective power plant.

Stripping ratio of the mine is 1 : 8.6. Ultimate working depth of the mine is 285 m. Available coal resource in the mine is 298 million tons. The life of the mine shall be 27 years. Almost 95% of OB shall be reused for reclamation of mined out voids and convert the area into green area. Wet drilling shall be done. Site Mix Slurry explosives shall be used for blasting. Workshop, Coal Handling Plant, administrative building, canteen etc. has been planned inside the mining lease area.

2227 Mbcm (Million bank cubic meter) overburden shall be generated during the 27 years (mine life). 283 Mbcm shall be dumped on-pit from 1st to 5th year. This OB shall be rehandled back to the decoaled area from 16th year onwards.

Only 85 Mbcm OB shall be placed for external dumping for 4 years, from 5th to 8th year of operation. For developing the external dump, non-forest and non-coal bearing area, 6 km northeast side of the FECB has been selected (near Amlitikra village). The OB dumps shall be physically and biologically reclaimed as Green Land immediately after dumping.

2.0 Description of Environment

Baseline data was generated during the period 9th March 2012 to 10th June 2012. 10 km area around the mines boundary, was considered as study area. Data was generated by following the standard procedures of the Ministry of Environment & Forests and the Central Pollution Control Board. Meteorological data on wind speed, wind direction, relative humidity and temperature was generated at Dharmjaigarh. Baseline ambient air quality was measured at 6 locations within the core zone and buffer zone. Noise levels were measured at 8 locations. Surface water quality of 4 locations, groundwater quality of 8 locations and soil quality of 4 locations was collected and analyzed. Data on plants and animals present in the core and buffer zone was collected from the government documents and checked during field survey. Data on landuse, demography, occupation pattern, cropping pattern, infrastructure facilities were collected from District Statistics Handbook and village profile records. The study area has several types of reserve and protected forests, streams and water bodies.

Meteorology: The predominant wind direction is from northeast direction. The average wind speed ranges from 0.5 to 5.7 m/s. Daily mean temperature varied from 26.5^{0}C to 43.0^{0}C. The relative humidity varied from 39%-62%. The annual rainfall is 1602 mm.

Air Quality: $PM_{2.5}$, PM_{10}, SO_2, NO_2, were monitored at locations selected as per CPCB guidelines. The baseline ambient air quality levels of all parameters were found to be within the National Ambient Air Quality Standards prescribed for residential area.

Noise Quality: The baseline noise levels of all the locations were found to be well within the National Standards for residential area (55 dBA during day time and 45 dBA during night time).

Water Quality: The surface water quality of the study area is found to be satisfactory. The pH of groundwater samples was found to be less than 6.5. Dissolved solids and hardness was also found to be quite low. No metallic or bacterial contamination was found in the water quality.

Soil Quality: The texture of soil is sandy loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are moderate. The pH and conductivity of all the soil samples are within the acceptable range.

Flora and Fauna: Sal, saja, bija, dhaora, haldu, mahua, tendu, seemal, neem, bhelwa, jamun, tinsa, khamar, mundi, seesam, bel, keekat, etc are commonly found in the forests of the study area. Bhurbhuri grass and sawai grass are found in the open land. Bhelwa, safed musli, ramdatun, bantulsi, satawar, kantabahri, bel, amla, neem, etc are the medicinal plants found in the area.

The wild animals commonly found in the study area are sloth bear, wild boar, hyena, fox, hare, squirrel, krait, cobra, mongoose, lizard, myna, parrot, woodpecker, nilkant and koel. Sometimes elephants have been reported to stray in the study area. An Amount of Rs. 8.27 Crores has been earmarked as Budget for Wildlife Conservation.

Landuse: As per the Satellite Imagery, 24.0% land comprises agriculture land, 24.2% land is covered by dense forest,16.8% land by forest, 1.5% land is under water body, 4.9% land has settlements and 26.5% land is open land. Paddy is the main crop grown in the area. Wheat, maize, vegetables, pulses and groundnut are also grown in some part of the study area.

Sensitive Ecosystem: Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. Biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park, wildlife sanctuary are not present within 10 km distance of the project site.

Socioeconomic Data: The proposed mine and external OB dump site is located in Dharamjaigarh tehsil. The 10 km area of the mine site falls in Dharamjaigarh tehsil, district Raigarh and Korba tehsil, district Korba. As per 2001 census the total population of the study area is 61798, comprising 30642 males and 31156 females. There are 1016 females per 1000 males. 61% of the population is Scheduled Tribe and 5.3% is Scheduled Caste. The literacy rate is 52.7%, male literacy is 68.2% and female literacy

is 37.3%. The infrastructure resource of the study area, in terms of roads, hospitals, schools and college, market, etc is poorly developed.

3.0 Environmental Impact and Mitigation Measures

Water Environment: Water accumulated in mine pit shall be used. Groundwater shall be used only for drinking purpose. Pawasi nala flows from the northwest corner of the mine. Mand river flows from the east boundary of the mine. Pawasi nala passing through the mining area shall be diverted along the northern boundary of the mine. Mining will continue till 285 m depth Groundwater at mining site is shallow; it ranges from 4.8 to 7.5 m below ground during pre-monsoon season and 2.85 to 5.3 m bgl during post-monsoon season. Mining will intersect the groundwater. Groundwater availability is 42.5 MCM and the present stage of groundwater development is 18.4%. During mining there will be reduction in drainage flow to the tune of 2.25 MCM. Induced water infiltration into surface will increase to the tune of 2.48 MCM due to increase in porosity, propagation of crcks and shattering of formation due to mining.

Mitigation Measures: Along the eastern boundary of mining lease (Mand river side), earthen embankment (HFL 272.12m + 3 m height and 30 m width) shall be constructed. Detailed scientific study has been done for Pawasi nala diversion. The nala shall be diverted along the northern boundary of mine. Clay compacted garland channel of trapezoidal shape with 4.14 m/s flow shall be adequate to accommodate the runoff discharge. Permission of the Chhattisgarh Government shall be obtained for diverting the Pawasi nala.

60 MCM water shall get accumulated in the mine face. The mine water shall be appropriately treated before use or discharge. Surplus water shall be either given to farmers for irrigation or discharged into the Pawasi Nala.

Garland drains with sedimentation pits at proper intervals shall be made around the overburden dump. Runoff from dump slopes will be passed through coir packed filters to arrest the silt before letting it to the nallas. Gully along the slopes shall be provided with coir packed plugs to arrest the silt. The slopes shall be compacted routinely, and provided with jute geotextile mat and grass seeding on the slopes. Soil will be spread

over exposed dump and stabilized by planting different herbs and shrubs. This will prevent soil and silt erosion.

Domestic wastewater from mine will be treated in septic tanks and disposed in soak pits. Wastewater from workshop shall be treated and reused for dust suppression. All water accumulated inside the mines premises will be checked to avoid breeding of mosquitoes. Gumbusia fish will be cultivated specifically in the water pits that feed voraciously on mosquitoes. The spent oil and lubricants from workshop, vehicles, etc will be given to authorized re-processors.

Air Environment: Dust and vehicular exhaust will be generated during various mining operations, including blasting, haul roads, crusher, loading and vehicular movement. Air quality dispersion modeling for the mines and dump has been done. The ambient air quality of the mines, dump and surrounding area will remain within the national standards. The national ambient air quality standards prescribe level of air pollutants that are adequate to protect the public health and vegetation.

Mitigation Measures: Stable roads will be made inside the mining premises for movement of vehicles. Water sprinkling system (truck mounted) will be applied for dust suppression on haul roads. Regular maintenance of vehicles and equipment will be carried out. Wet drilling and controlled blasting (using latest NONEL technology) will be adopted. Crusher will be provided with fixed type water sprinklers at the unloading hopper and bag filters at the crusher point. All conveyors shall be covered. 7.5 m wide greenbelt will be developed on all side of the mine premises. Sal, saja, bija, dhaora, haldu, mahua, tendu, seemal, neem, bhelwa, jamun, tinsa, khamar, mundi, seesam, bel, keekat, etc shall be planted as greenbelt.

Noise Environment: Material handling, movement of vehicle, crushing, blasting, loading unloading and DG sets are the main noise generating sources in the mine site. Noise modeling has been done. The ambient noise quality of the mines, dump and surrounding area will remain within the national ambient noise standards.

Mitigation Measures: Material handling operations and movement of vehicles will be properly scheduled to minimize noise. Maintenance program for heavy vehicles will be routinely followed. Non-electric delay detonator will be used to minimize the ground

vibrations. Workers will be given ear plugs and ear muffs. Dense greenbelt shall be developed along mines and haul road which will attenuate the noise from mines and vehicular movement.

Land Environment: Details of category of land proposed to be acquired from each village is given below:

	Name of Village	Govt. Land (uncultivable)	Private Land (Agriculture Land)			Revenue Forest Land	Grand Total
			Non Adivasi	Adivasi	Total		
Mining Lease Area (Ha)							
1	Fatehpur	97.401	57.421	56.454	113.875	0	211.276
2	Rupunga	57.806	41.935	160.435	202.370	229.763	489.939
3	Ududa	43.991	13.944	63.459	77.403	139.097	260.491
4	Narkalo	18.964	0	22.913	22.913	50.853	92.73
	Total	218.162	113.300	303.261	416.561	419.713	**1054.436**
External OB Dump and Haul Road (Ha)							
5	Ududa	33.283	3.482	4.724	8.206	-	41.489
6	Amlitikra	128.693	3.209	11.609	14.818	-	143.511
	Total	161.976	6.691	16.333	23.024	-	**185**

673.772 (Protected forests) + 1054.436 + 185 = 1913.208

439.585 ha agriculture land (mostly single crop) shall be converted for mining and making dump. 673.772 ha protected forest land and 419.713 ha revenue forest land shall be diverted for non-forest use. 370.138 ha non-agriculture government land shall be taken on lease and converted for mining use and dump.

Scientific management of OB shall be practiced. The land requirement for external OB dump has been minimized to bare minimum. The on-pit OB shall be rehandled back into the mined out area. OB shall be dumped in external dump only for 4 years. Dump stability study has been done. The slope of OB dump will be maintained at 28^{o}. The dump slopes will be compacted and stabilized with green cover.

A final void of 208 ha area will be created after mining, which will be converted to water body that could be used for fishery activity. The depth of the void would be greatly reduced by backfilling of OB dump, to ensure safety of people. The entire void will be fenced off and beautification will be done with greenery.

At the end of mining operation there will be two flat topped dumps; Dump inside coal block - back-filled mined out area of 1274 ha (rising to a height of 90 m with 28^0 slopes on three faces and 16^o on one face, and external OB dump over an area of 155 Ha (rising to a height of 90 m above ground level having overall slope of 28^o). The OB dumps will be flat topped with a cover of topsoil, where afforestation will be done.

Post-mining land use of the area is given below: Plantation on 1705 ha (including the undisturbed 95 ha protected forest), water body on 208 ha.

Garbage will be collected in containers and segregated at source itself. Recyclable materials will be sorted out and sold to kabadis. Inert material will be reused as landfill. Organic and other green waste will be taken to compost pit. Use of plastic inside mine area will be strictly prohibited.

Summary of Important Mitigation Measures

For reducing adverse environmental impacts, following mitigation measures are recommended in the EIA report:

- Wet drilling will be practiced. The drilling machine will have inbuilt water sprinkling arrangement and dust extraction system.
- Controlled blasting technique will be followed wherever required. The site will be wetted before blasting. Blasting will be done around noon.
- Non-electric shock tube initiating system and Noiseless Trunkline Delay detonators will be used to keep the air blast levels to the lowest possible limits and minimize noise and vibration. IKON (Digital Electronic System) will be used wherever required.
- Ground vibrations to be continuously monitored during blasting using Minimate Seismograph, through study of the peak particle velocity (ppv) at different distances. The ppv will be kept below the DGMS limit.
- Hydraulic rock breaker will be used to eliminate the use of secondary blasting.

- Chemical binders / wetting agents/ surfactants will be used on haul roads to reduce water consumption during sprinkling for dust suppression. Compaction, gradation and proper drainage will be provided for haul roads.
- Road side plantations (along haul roads) will be developed to arrest fugitive dust.
- Low sulphur diesel will be used in the Heavy Earth Moving Equipment, trucks, dumpers, other vehicles and DG sets.
- Haul roads will be stabilized. Vehicular speed in mines area and haul roads will be restricted to 30 kmph.

Workers Health and Safety: Exposure to dust and respiratory disorders, noise induced hearing loss, mechanical injury to body parts are the identified occupational hazards. Diesel and Explosives will be stored as per approval obtained from DGMS and Chief Controller of Explosives. The workers will be checked during employment and then routinely checked for any clinical complaints and abnormal symptoms by the medical team. Workers will be given personal protective equipment like nose mask, ear plugs, safety boots, gloves, goggles, etc as well as clean drinking water and toilet facility. Drivers and their attendants will be given rest room facility, complete with toilet, bathroom and recreation facility. Canteen facility will be provided for all workers and drivers. Regular training and awareness programs will be conducted for the workers so that they are aware of the work hazards, vector borne diseases, HIV, etc and inculcate the behavior of using Personal Protective Equipment (PPEs).

4.0 Environmental Monitoring Plan

Environmental monitoring inside the mines and its surrounding area, area along the haul road, and area surrounding the external OB dump shall be done by the Environmental Management Department of FECPL. The monitoring plan is shown below.

I. Regular monitoring of –

1. Ambient air quality at upwind & downwind direction inside mine and OB dump and at three nearest villages around mines throughout the year. Around external OB dump the monitoring shall be done from 5^{th} to 10^{th} year of operation.

2. Fugitive dust emission monitoring at 200 m upwind and 200 m downwind direction of the fugitive dust generation source.
3. Collect and analyse the ground water quality of mine site, and all villages surrounding the mine and OB dump. The depth of the groundwater in surrounding villages of mine and OB dump shall be checked every year during June and October.
4. Collect and anlayse the water quality of Pawasi nala and Mand river, surrounding nalas and village ponds, once during June and October.
5. Noise monitoring inside the mines, mines and OB dump boundary and villages outside the mines and dump.
6. Coordinate with Occupational Health Department and keep records of health status of workers.

II. Development and maintenance of greenbelt along the mining boundary, haul road and OB dump.

5.0 Additional Studies

Risk Mitigation Measures: Explosion / fire in explosive storage (magazine) and diesel storage tank and road accidents are the main hazards. The diesel tank will be designed as approved by Chief Controller of Explosives. The location and design of explosive storage area will be got approved by Chief Controller of Explosives . All safety measures recommended by theDGMS/Regulatory Authority will be implemented. Ambulance and first aid boxes will be made available at mine site. An effective communication system comprising landline and mobile phones facilities will be maintained at the mine site.

6.0 Project Benefits

Coal mining will generate substantial revenue for the government, through optimal utilization of natural resource and royalty. The existing royalty is Rs.109/- per ton of coal, which amounts to Rs.109 crores per annum.

Apart from above the project will contribute Rs.5/- per ton of coal produced as Environment Cess and Rs.5/- per ton of coal produced as Development Cess to the CG Government. FECB will contribute Rs.5/- per ton of coal produced as CSR Fund. At full

production the amount shall be Rs. 5 crores per year. This amount will be spent for developing the social infrastructure and community level development of the area. The CSR activity includes construction of community centers and schools, maintaining roads, rain shelters, providing drinking water facility, making toilets in schools and for community, providing free medical camps, providing scholarships to bright students and sportsperson. Income generating schemes that will be implemented for upliftment of poor sections of the society includes vocational training in the field of bee keeping, mushroom cultivation, growing fruits and vegetables, development of fodder farms, etc.

About 1280 people will get direct employment in the mining project. Local people will be preferred for jobs, depending upon their skill and experience. Transport business, vehicle drivers and attendants, repairing workshops, grocery and retail stores, school, coaching centers, restaurants, self employed persons like tailors, carpenters, plumbers, electricians, etc will get indirect employment / livelihood opportunity from this project.

7.0 Environmental Management Plan (EMP)

EMP for effective management of environmental impacts due to the mining activity and ensuring overall protection of the surrounding environment through appropriate management procedures has been prepared.

Environmental Management Department (EMD) will be established to undertake routine environmental monitoring, evaluate performance of pollution mitigation measures, ensure compliance with the prescribed standards and report the results to regulatory agencies. Qualified scientists and engineers will be recruited to manage the EMD. Pollution monitoring laboratory will be established for regular monitoring of environment inside and outside the mines. EMD will supervise and implement various air, noise and water pollution mitigation systems, top soil conservation and dump reclamation / stabilization. Labour officer of FECB will look after the labour welfare schemes. Safety department of FECB will look after the implemention and functioning of risk mitigation systems.

EMD will ensure that all pollution control devices function effectively. EMD will supervise disposal of spent oil and lubricants and used batteries to the authorized vendors. Plantation will be started from day one and continue throughout the life of the project.

Schemes for resource conservation, rainwater harvesting and social forestry development will be taken up. Regular environment, safety and health awareness programs for the workers will be conducted by the EMC.

The capital cost for environmental management of the proposed mine is estimated to be Rs.5.0 Crores. This amount shall be used for procurement of pollution control devices, monitoring devices, making environment management cell, occupation health centre, and safety department, greenbelt and greenery development, risk mitigation measures, etc. Rs.2.5 crores would be required as annual recurring expenses to meet the EMP of mines (including plantation on OB dump area).

EMD will also interact with the regulatory authorities, submit the monitoring reports and consent applications. The implementation of EMP would ensure that all elements of project comply with relevant environmental legislation throughout its life cycle.

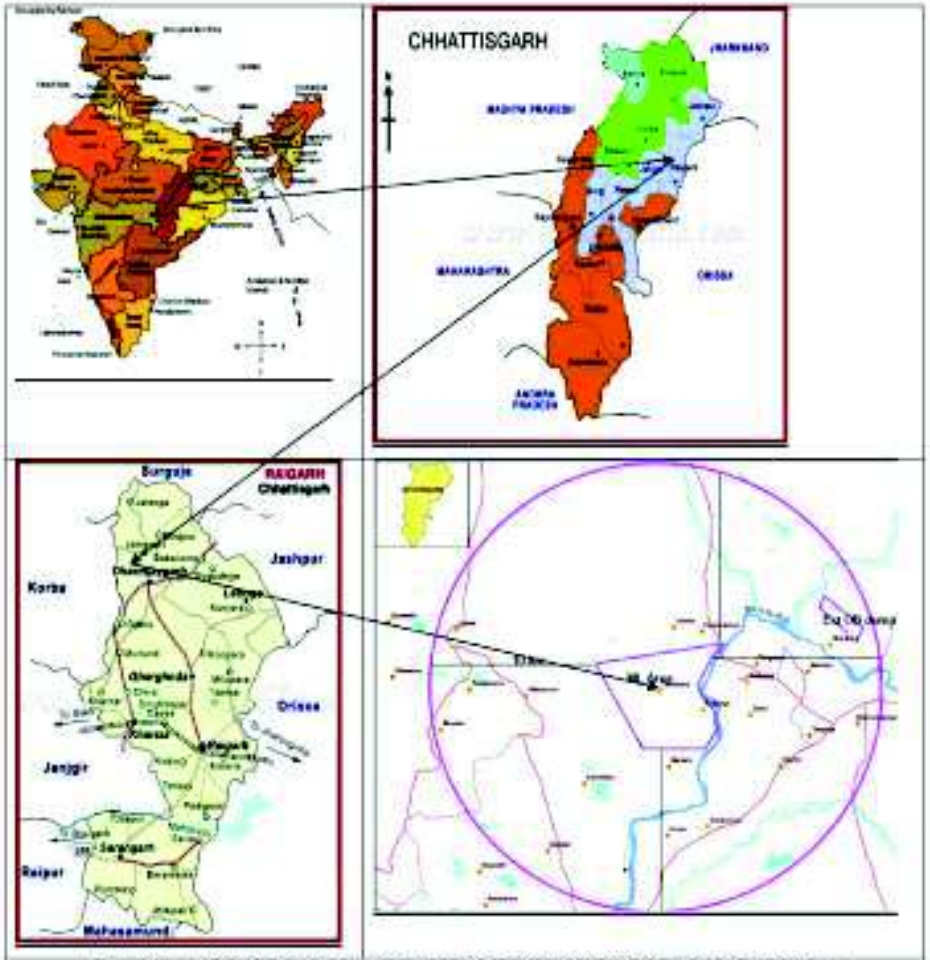

Figure 1 Location Map specifying the State, District & Project Location (TOR iii)

Figure 3 Map Showing the Core Zone and the Physical Features of ML Area (TOR vi)

Figure 4 Detailed Site Plan (TOR viii)