

ENVIRONMENTAL IMPACT ASSESSMENT

for

THE PROPOSED COAL WASHERY OF 5.0 MTPA CAPACITY
AT BHENGARI VILLAGE, GHARGHORA TEHSIL,
RAIGARH DISTRICT, CHHATTISGARH

EXECUTIVE SUMMARY

Sponsor :



Mahavir Coal Washeries Private Limited (MCWPL)
Bhengari Village, Gharghora Tehsil,
Raigarh District, Chhattisgarh

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December, 2016



1.0 Introduction

M/s Mahavir Coal Washeries Pvt. Ltd. (MCWPL) proposes to set up a new coal washery of 5 MTPA capacity at Bhengari Village, Gharghora Tehsil, Raigarh District, Chhattisgarh State.

As per the Environment Impact Assessment (EIA) Notification dated 14th September 2006 as well as its amendments dated 1st December 2009, new projects or activities, or the expansion or modernization of existing projects proposed in any part of India shall obtain prior environmental clearance from Ministry of Environment Forest and Climate Change (MoEF&CC). The proposed coal washery project falls under "**Category-A**" of activity type 2(a) as per the EIA Notification dated 14th September 2006 issued by MoEF&CC, New Delhi.

The project was considered during the Expert Appraisal Committee (EAC) meeting held on 28th November, 2011 and the Terms of Reference (TOR) were issued vide MoEF letter no. J-11015/117/2011-IA.II (M) dated 9th February 2012. The copies of the MoEF letters along with compliance to the conditions are enclosed in **Annexure-I**. Subsequently modifications to TOR were made by MOEF vide their letter no J-11015/117/2011-IA.II (M) dated 16th December 2013.

The EIA report has been prepared based on the Terms of Reference (TOR) prescribed by MoEF&CC and an address the environmental impacts of the proposed coal washery project and proposes the mitigation measures for the same. Detailed field studies were conducted during study period from 1st March 2015 to 31st May 2015 representing pre-monsoon season.

1.1. Justification for Implementation of the Project

The Coal India Limited and its subsidiaries are the major domestic producers and suppliers of coal in India. The annual requirement of non-coking coal for various industrial sectors like power, steel and cement is increasing day by day. Due to higher demand, selective mining is not possible. Raw coal of around 40 to 50% ash will be washed in the coal washery plant to produce washed coal having around 34% ash. The primary discards will be subjected to secondary washing to produce middling at around 58% ash and rejects at around 86.5% ash. Hence, proposal of MCWPL to set up a 5 MTPA coal washery at Bhengari in Raigarh District, Chhattisgarh State is considered justified.

1.2 Environmental Setting of Study Area

The study area covers 10 km radius around the proposed coal washery plant. The environmental setting of the proposed plant site is as follows:

- The proposed coal washery site located at Latitude N 22°08'5.7" N to 22°08'19.40" N and Longitude 83°14'21.2" E to 83°14'49.4" E.
- The proposed coal washery is at a distance of 3.6 km from Kurket River and 13.6 km from Mand River. Site elevation is about 300 m above MSL;
- Present land use at the proposed plant site is mostly agriculture area not under cultivation;



- There are no protected areas, ecological Sensitive locations, archaeological monuments, places of tourist interests and defence installations within 10 km radius;
- There are 14 major forest blocks including protected forest, reserved forest and open mixed forest exists within 10 km radius.

2.0 Project Description

The salient features of proposed coal washery like Capacity, process technology, source of resources & its requirement, manpower and project cost etc. are given below in the **Table-1** and study area map of 10 km radius is shown in **Figure-1**.

TABLE-1
SALIENT FEATURES OF THE PROPOSED COAL WASHERY PLANT

Sr. No.	Parameter	Description
1	Capacity/annual through put	5 MTPA (Two identical modules of 2.5 MTPA in two phases) $1000 \times 18 \times 330 \times 0.85 = 50,49,000$ Tonnes
2	Washing Technology	Heavy Media Cyclone
3	Processing Rate	2 X 500 TPH
4	Process	Wet process comprising crushing, screening, washing and handling
5	Source of coal	SECL mines – raw coal will be lifted on behalf of the clients as well as own purchase through e-auction.
6	Coal Ash content	
	a Input raw coal	45-50%
	b Throughput (washed coal)	34%
	c Middling	58%
	d Rejects	86.5%
7	Land Requirement	17.48 ha (43.18 acres) excluding about 10 acres for railway siding
8	Water Requirement & Source	59 m ³ /hr (1062 m ³ /day), Tube wells
9	Water Treatment	
	a) Wastewater Generation and Wastewater Treatment	There will be no industrial waste water discharge as the plant will be designed on zero effluent discharge principle
10	a Power Requirement	5 MVA and DG set of 125 KVA (standby)
	b Source	Chhattisgarh State Electricity Board (CSEB)
11	Coal Transportation	Transportation of washed coal, middling & rejects will be by rail, once own rail siding is established. Till such time rail link is established, transportation will be by existing road network.
12	Manpower Requirement	Construction–100 nos; Operation–70 nos
13	Operating hours	3 shifts daily of 8 hours each (Effective 18 hrs a day) 330 days in a year
14	Plant utilization	85%
15	Project Cost	Rs. 56.18 crores excluding Rs. 15 crores for railway siding. For EMP measures, a Capital investment of Rs. 1.55 crores and a recurring cost of Rs. 0.12 crores per annum



Towns or Villages: inhabited/deserted Forts	
Huts: permanent/temporary; Towers; Antiquities	
Temple, Chhatra, Church, Mosque, Idgah, Tomb, Graves	
Lighthouse, Lightship, Buoy, lighted/unlighted Anchorage	
Mine, Vine or trellis, Grass, Scrub	
Palm; palmyra; other Plantain, Conifer, Bamboo, Other trees	
Boundary, International	
state demarcated, undemarcated	
district, sub-division, tahsil or taluk forest	
Boundary pillars: surveyed, unlocated; village trijunction	
Heights: triangulated; station, point; approximate	
Bench-mark: geodetic; tertiary; canal	
Post office, Telegraph office, Combined office, Police station, PO, TO, PTO, PS	
Bungalows: for travellers, inspection, Rest-house	
Circuit house, Camping ground, Forest, reserved, protected	
Spaced names: administrative, locally or tribal	

Roads: metalled, according to importance; distance stone		20
unmetalled; do		bridge
Cart-track, Pack-track and pass, Foot-path with bridge		
Bridges: with piers, without, Causeway, Ford or Ferry		
Streams: with track in bed, unflooded, Canal		
Dams: masonry or rock-filled earthwork, Weir		
River banks: shelving; steep, 3 to 5 metres; over 5 metres		
dry with water channel; with island & rocks; Tidal river		
Submerged rocks, Shoal, Swamp, Reeds		
Wells: lined, unlined, Tube-well, Spring, Tanks; perennial, dry		
Embankments: road or rail, tank, Broken ground		
Railways: broad gauge; Double, single with station, under construction		
other gauges; do; do with distance stone; do		
Mineral: lode or tramway, Telegraph line, Cutting with tunnel		
Contours with sub-features: Rocky slopes, Cliffs		
Sand features (flats) (D) sand hills and dunes (surge) shifting dunes		

Latitude : 22°08'5.7" N to 22°08'19.40" N
Longitude : 83°14'21.2" E to 83°14'49.4" E

FIGURE-1
STUDY AREA MAP OF THE PROJECT (10 KM RADIUS)



3.0 Baseline Environmental Status

The baseline data monitoring studies have been carried out for three months covering pre-monsoon season (March 2015 to May 2015).

3.1 Landuse

IRS-R2 Geo-Coded FCC of LISS-IV FX satellite imagery dated 1st January, 2016 was used for the mapping and interpretation. The landuse details of study area is given below:

- The built-up area constitutes 5.7 % of the total study area. It comprises 4.1 % of the settlements and 1.6 % of industrial areas;
- The scrub forest constitutes about 35.9 % of the study area;
- The agricultural area covers is about 24.0 % of the study area. The single crop is about 19.3 % of the study area. The double crop is 4.7 % of the study area;
- The land with scrub constitutes about 22.1 % of the study area; whereas the land without scrub is 5.7 %; and
- The total area of water body is about 6.6 % of the study area.

3.2 Meteorology

Maximum temperature of 43.6°C and minimum temperature of 21.5°C was recorded during the study period. Maximum temperature was observed during May and the minimum temperature was observed during March of the study period. During the period of observation, the Relative Humidity recorded ranged from 22.1% to 59.4%. Maximum humidity was observed during the month of January and 43.1 mm of rainfall was observed during the study period.

3.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) was carried out at eight locations with a frequency of two days per week for three months during pre-monsoon season 2015. The minimum and maximum values of PM₁₀, PM_{2.5}, SO₂, NO₂ and CO were given in below **Table-2**. The results thus obtained indicate that the concentrations of PM₁₀, PM_{2.5}, SO₂, NO₂ and CO in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

**TABLE-2
AMBIENT AIR QUALITY LEVELS**

Season / Parameters	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
Pre-monsoon, 2015	31.7-72.2	15.2-23.0	6.8-13.0	7.8-15.5	240-390
CPCB Standard	100	60	80	80	2000

All values are given in µg/m³

3.4 Water Quality

To assess the physical and chemical properties of water in the region, water samples from eight ground water and two surface water locations were collected and analyzed from various water sources around the project site.



- **Ground Water**

The pH and conductivity vary from 7.1 to 7.8 and 238 $\mu\text{S}/\text{cm}$ to 912 $\mu\text{S}/\text{cm}$ respectively. Total Dissolved Solids ranged between 145 mg/l to 595 mg/l. Sodium and Potassium contents were found to be in the range of 12.8 mg/l to 52.3 mg/l and 2.8 mg/l to 19.4 mg/l respectively. Calcium and Magnesium content vary between 19.2 mg/l to 83.3 mg/l and 9.3 mg/l to 25.9 mg/l respectively.

Total hardness expressed as CaCO_3 and alkalinity ranges between 86.0 mg/l to 315.0 mg/l and 75 to 350 mg/l respectively. Chlorides and Sulphates were found to be in the range of 19.5 mg/l to 65.8 mg/l and 3.4 mg/l to 16.2 mg/l respectively. Nitrates and Fluorides were found to be in the range of 4.4 mg/l to 40.3 mg/l and < 0.1 mg/l to 0.2 mg/l respectively.

The heavy metal contents were found to be well within the limit. Pesticides and E.coli were found to be absent. The physico-chemical and biological analysis revealed that most of the parameters are well within the prescribed limits of IS: 10500:2012.

- **Surface Water**

The pH and conductivity varies from 7.5 to 7.8 and 285 $\mu\text{S}/\text{cm}$ to 420 $\mu\text{S}/\text{cm}$ respectively. The dissolved oxygen levels ranged from 5.8 mg/l to 6.2 mg/l and the total dissolved solids ranged from 180 mg/l to 260 mg/l.

Sodium and Potassium content were found to be in the range of 13.6 to 15.1 mg/l and 1.9 mg/l to 3.5 mg/l respectively. Calcium and Magnesium content varies in between 23.0 mg/l to 47.8 mg/l and 9.6 mg/l to 12.3 mg/l respectively.

Total hardness expressed as CaCO_3 and alkalinity ranges between 97 mg/l to 170 mg/l and 66 mg/l to 124 mg/l respectively. Chlorides and Sulphates were found to be in the range of 39.7 mg/l to 47.6 mg/l and 8.1 mg/l to 8.3 mg/l respectively. Nitrates and Fluorides were found to be in the range of 3.1 mg/l to 4.4 mg/l and 0.1 mg/l to 0.2 mg/l respectively.

The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 10500 limits.

3.5 Soil Quality

Eight soil samples were collected and analyzed in and around the proposed coal washery area to assess the present soil quality of the region. It has been observed that the texture of soil is mostly sandy clay in the study area. The pH of the soil indicating that is slightly alkaline to moderately alkaline in nature; the electrical conductivity was recorded as 102 $\mu\text{S}/\text{cm}$ to 344 $\mu\text{S}/\text{cm}$. The organic carbon content in the study area observed as 0.29 % to 0.59 %, it shows the soil falls under less to an average sufficient category. Available potassium was observed as 68.3 kg/ha to 298.0 kg/ha in the study region indicating that the soil falls under very less to average category. Available nitrogen was observed as 40.4 kg/ha to 103.6 kg/ha, the soil falls under very less to good category of nitrogen. Available phosphorous was observed as 48.7 kg/ha to 81.6 kg/ha in the study region. It shows the soil falls under medium to more than sufficient



category. The soil analysis revealed that the soil quality in the study area is not having any in industrial contamination.

3.6 Noise Levels

Ambient noise levels were measured at eight locations around the project site.

a) Day Time Noise Levels (L_{day})

The day time (L_{day}) noise levels at all the locations are observed to be in the range of 43.9 dB (A) to 49.0 dB (A). It is observed that the day time noise levels are in accordance to the prescribed limit of 55 dB (A) for Residential areas.

b) Night Time Noise Levels (L_{night})

The night time (L_{night}) noise levels at all the locations were observed to be in the range of 40.1 dB (A) to 44.7 dB (A). It has been found that the night time noise levels are in accordance with prescribed limit of 45 dB (A) for Residential areas.

3.7 Ecological Environment

Based on the field studies and review of published literature, it is observed that there are no endangered and protected flora and fauna in the core zone.

As per forest records and review of literature, there are no sanctuaries, biosphere reserves or national parks including tiger or elephant reserves within 15 km radius from the plant boundary. Also, there is no notified elephant corridor in the study area.

288 plant species were identified which are mainly composed of phanerophytes and therophytes, hemicryptophytes. 87 animal species were recorded/ observed during study period. Out of 87 animal species 7 animals species belongs to Sch-I, 8 species belongs to Sch-II and rest of species belongs Sch-III, Sch-IV and Sch-V of Wildlife Protection Act, 1972.

3.8 Social Environment

The study area within 10 km radius has a total population of 34,825 according to 2011 census. Total male population is about 49.75% and total female population is around 50.25%. The data of study area reveals that literacy rate of 70.58% as per 2011 census, which is found to be less than Raigarh district rate of literacy (Raigarh district 73.3%). In comparison with study area proportion of SC population is less than the district and ST population is more than the district. The proportion of SC and ST population in Raigarh district is SC 15.1% and ST 33.8%. Total work participation rate in the project study areas is 51.92% and the non-workers constitute 48.08% of the total population respectively.



4.0 Anticipated Environmental Impacts and Mitigation Measures

4.1 Topography

The proposed site for the coal washery unit is fairly flat. There will be minimum leveling during the construction of the plant. This will not cause any significant topographical changes in the area.

Similarly, there will not be any micro or macro climatic changes as there will not be any thermal imbalance. It can be concluded that the coal washery unit will have no adverse impacts on the topography and climate due to its operation.

4.2 Air Environment

The raw coal will be transported to the washery from Chhal mines and Jampali and Baroud mines. There will be increased vehicular traffic on connecting roads. Generation of particulate emissions due to the vehicular movement. The material transfer will be done by road network for a period of about 5 years. By this time, railway siding will be established.

Air pollution modeling has been carried out for proposed project considering the point source emissions, fugitive / area source emissions and line source emissions. The observation from predictions reveal that the maximum incremental concentrations of PM₁₀, PM_{2.5}, NO_x and CO due to the presumed additional traffic are 7.7 µg/m³, 1.9 µg/m³, 2.43 µg/m³ and 3.76 µg/m³ respectively. The maximum incremental concentrations of PM₁₀ and PM_{2.5} due to proposed plant activities with implementing pollution control measures is 7.67 µg/m³ and 1.78 µg/m³ respectively. The resultant concentrations of PM₁₀, PM_{2.5} and CO and NO_x after implementation of the proposed project will remain within the NAAQ Standards for industrial/ rural/residential and other areas;

Consequently the proposal is unlikely to have major impacts on local or regional air quality or to adversely affect human health or status of pollution-sensitive vegetation, either locally or on nearby terrain.

4.3 Water Environment

The quantity of water required for the proposed plant including domestic use is 59 m³/hour (1062 m³/day). The water requirement for the proposed unit will be met from groundwater through bore wells;

The coal washing circuit will be a closed one with appropriate fines management system and the washed water will be reused for coal washing. Only make-up water will be added for coal washing. The plant will operate on Zero discharge principle;

Sanitary wastewater generated from the plant will be treated in through an elaborated network of septic tanks followed by soak pits. Treated wastewater will be utilized for green belt development and tertiary uses.



The storm water in the project area will be collected through storm water drains and will be suitably diverted to rainwater harvesting pits. Hence, impact on the water quality is not envisaged.

4.4 Solid Waste Management and Land Use

0.45 MTPA rejects will be generated from the proposed coal washery plant which will be sold to prospective buyers. Efforts will also be made to supply rejects to brick kiln manufactures in the region. Solid waste in the form of sludge is generated from septic tank connected with series of soak pits. This waste will be used as manure for greenbelt development. The coal reject will be transported in covered trucks. Insignificant impact is likely to occurs, when the Environment Management Plan is followed. Spent oil and lubricants will be collected in leak proof drums and stored in earmarked area, which will be sold to authorised vendors.

4.5 Noise Environment

The most common noise generating sources are screens, crushers, blowers and dryers. These noise sources are generating noise continuously as well as intermittently. Workers exposed to high noise levels will be provided with earplugs/ear muffs.

The increment noise levels are about 28 dB (A) at all the surrounding habitations. It is seen from the simulation results that the incremental noise levels are confined to factory premises only and do not contribute to violation of CPCB standards. Hence, the impact of noise on the human habitation and surrounding environment is likely to be insignificant.

4.6 Flora and Fauna and Greenbelt Development

An ecological survey in the study area was conducted to assess the existing floristic structure and to record the biological resources. Seven Schedule-I species are found in the forests in the study area. The conservation measures with special context to the existing wildlife in the study area are as follows:

A detailed wildlife conservation plan was prepared and submitted to PCCF (WL), Raipur office for 12 MW additional Biomass power plant of M/s Mahavir Energy & Coal Beneficiation Pvt Ltd, Bhengari. The proposed 5 MTPA coal washery site in near the power plant site. The same plan would be applicable in the present case as well. A budget of Rs. 10 lakhs is proposed for conservation of said species prior to commencement of project activities. MoEF&CC has granted environmental clearance to the said 12 MW power plant.

Conservation plan for the Schedule-I species have been proposed. More important, among the schedule I species is the elephant. Conservation efforts for elephants require, simultaneously, dense forest as well as grassy patches. Grassy patches are used as grazing places. Although, food plants should be enforced both in the dense forest as well as grassy areas but should be planted more in the later area. With the food plants, water sources and salt licks are other important requirements of the elephants. Suggestions have been made also to



reduce man-elephant conflicts. Some of the methods to escape damage by elephants are: Two doors in a house, timely information of their approach and elephant torch, if possible in every village in the area.

The proposed coal washery unit area is about 43.18 acres. The plantation proposed will be about 14.25 acres. Adequate attention will be paid to the plantation of trees, their maintenance and protection.

4.7 Socio-Economics

The major economic impacts, which will accrue to the region, during the construction phase and operation of the Power Plant, will be an increased availability of direct and indirect employment. Local people will be benefited after commissioning of the proposed project in terms of petty to major contractual jobs and associated business establishments. MCWPL will take steps for development of education, health and sanitation, community infrastructure development, sports and women empowerment in the nearby villages.

It is proposed to invest an estimated amount of Rs. 15 Lakhs, for various social welfare and community development activities in the region as discussed above.

5.0 Health and Safety Monitoring Plan

All the potential occupational hazardous work places such as fuel storage area, coal handling area shall be monitored regularly. Occupational safety and health is very closely related to productivity and good employer-employee relationship. The main factors of occupational health are fugitive dust and noise. Safety of employee during operation, maintenance and handling of coal will be taken care of as per company regulations. PPEs such as Dust masks, ear plugs/earmuffs will be provided to workmen. Hence, no significant impact on health of workmen is envisaged.

6.0 **Conclusion**

The proposed project will have marginal impacts on the local environment with proper mitigation measures and effective implementation of the environment management measures as suggested in the EIA/EMP report and as may be recommended by MoEF&CC and the State Pollution Control Board. The negative impacts will be minimized to a great extent. However, development of this project has beneficial impact/effects in terms of growth in regional economy, transform the region's economy from predominantly agricultural to significantly industrial, increase Government earnings and revenues and accelerate the pace of industrial development in the region.

The proposed project will provide direct employment to a large number of personnel. This project will also generate indirect employment to a considerable number of families, who will render their services for the employees of the project.

The project will also encourage ancillary industries in the region, which will not only increase the employment potential but also the economic base of the region will be further strengthened.



Environmental Impact Assessment for Proposed Coal Washery of 5 MTPA at Bhengari Village, Gharghora Tehsil, Raigarh District, Chhattisgarh

Executive Summary

Beneficiation of low grade non-coking coal is an important area both from the economic and the environment point of view. Thus, in view of considerable benefits from the project, the proposed project is most advantageous to the region as well as to the nation.