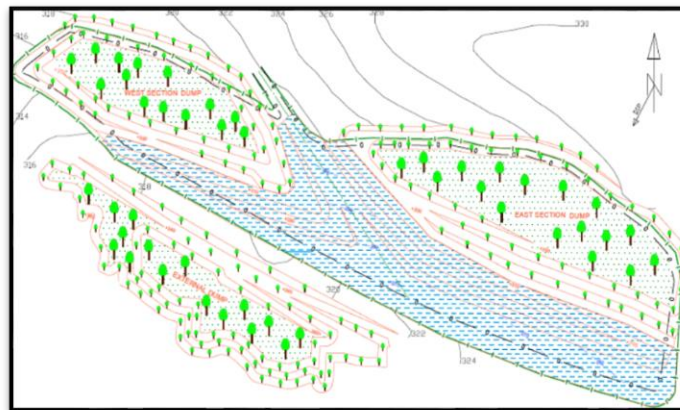




PUBLIC HEARING DOCUMENT OF EIA/EMP FOR AMBIKA OPENCAST PROJECT (Korba Area)

Village: Kartala; Tahsil: Pali
District: Korba; State: Chhattishgarh
Capacity: 1.35 MTY
Project area: 134.192Ha.

South Eastern Coalfields Limited
(A Mini Ratna Company)



MAY -2018

Central Mine Planning & Design Institute Limited
Regional Institute – V
SECL Complex, Post Box No. 22,
BILASPUR (C.G.)

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

1.0 INTRODUCTION

1.01 Purpose of the Project

Ambika OC is a new coal mining project for a normative production capacity of 1.00 MTPA and 1.35MTPA peak capacity. SECL board approved the project in their 156th meeting on 29.06.2006. Later during implementation of the Project the rate of tenancy land has been revised by Govt. of Chhattisgarh, notified in State Gazette vide notification no. F7-97/Punarvas Niti/2007 dated 19.03.2010. The financial provision in approved PR for acquisition of land in comparison to new rates was low. Hence Revised Cost Estimate was formulated and approved by planning committee meeting held on 30th October 2015. This proposed project with Project Report based on the “Geological Report on Kartali Block” prepared in October 1989 by CMPDI falls under the administrative control of Korba Area of SECL.

Total four coal horizons with average thickness varying from 1.80m to 7.25m have been considered in the Project report. Total extractable reserves have been estimated as 7.60 Mt and OB as 24.02 MCum. The average stripping ratio works out to 3.17 Cum/tonne.

To fulfil the countries, need of power generation, CIL has to produce coal of 1 BT in 2019-20 in which the contribution of SECL has been planned as 239 Mte. Based on “Road Map for Enhancement Coal Production of CIL” the target of SECL for the year 2017-18 is 165.00 Mt and for 2018-19 is 193.13Mt. To meet this growth in production of SECL, Ambika OC has been planned for producing 1 MTPA of coal as normative and 1.35 MTPA as peak capacity.

1.02 Location

The Kartali Geological Block is located in the western fringe of the Korba Coalfields in Kartala Village of Pali Tahsil which is in Korba District and at an approximate distance of 3.0 km from the road (in between 46 and 47 kilo meter stone) and 5 km from the famous Pali village which finds a place on the tourist map of India.

North latitudes 22° 19' 47'' and 22° 21' 10''

East longitude 82° 20' 19'' and 82° 22' 16''.

The area is covered in the Survey of India Toposheet No. 64 J/7.

1.03 Communication

There is no proper approach to the block. However, it can be approached by Bilaspur-Ambikapur State Highway, between the kilometer stone 46 and 47. The Tehsil Headquarters Katghora covering Kartali Block is located about 35 km from quarry on Bilaspur-Ambikapur State Highway. The Kartali Block is also approachable from the Korba Coalfield by recently constructed Hardi-Bazar-Pali Road.

1.04 Scope of the study

GSI and CMPDI have carried out detailed geological exploration in the block. In total 59 boreholes have been drilled in 3.85 sq.km of the block with borehole density of 15.32 boreholes / Sq. km.

Baseline environmental data in respect of micro meteorological data, air quality, water quality, soil quality, and noise level data have been generated by M/s Edward Food Research and Analysis Centre (EFRAC), Kolkata. Meteorological and rainfall trends are based upon the data collected from Indira Gandhi Agricultura University(IGAU), Bilaspur. The socio economic data in respect of population statistics, economic profile, work force pattern, civic amenities, land use pattern etc. is based upon data generated by M/s SARDA Consultants, Ramgarh, Ranchi Jharkhand. The Flora and fauna details in core and buffer zone is based upon data generated by M/s/ VRDS Consultants, Chennai. The ground water data have been collected from CGWB, NCC region Raipur.

2.0 PROJECT DESCRIPTION

2.01 Need for the Project

At present coal is the basic primary energy source and to meet the nation's growing energy demand, supplying coal to power sector is very necessary. Hence, the demand projection of coal nationally as well as from CIL/SECL is increasing rapidly and a part of this demand could be met by Ambika OC project.

2.02 Description of Coal Seams

A study of drill hole data of Kartali Block reveals presence of seven coal seams viz. Seam-I, Seam-II, Seam-III, Seam-IV, Seam-V, Seam-VI & Seam-VII. Seam-I is very thin, persistent and unworkable, while Seam-II, III, and IV are planned to extract by Kartali UG mine and Seam-V and Seam-VI (Top and Bottom split) are the main quarriable seams within the present quarry Boundary.

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2.03 Reserve

The total mineable reserves within the quarry have been estimated as **7.60Mt** with a corresponding O.B. volume of **24.02 Mcum**. The sector-wise mineable reserves, volume of OBR and stripping ratio are summarized in Table-1.

Table-1

Coal	Sector-I	Sector-II	TOTAL
Seam VI(T)	0.22	1.82	2.04
Seam VI (B & Comb)	0.34	1.31	1.65
Seam V (T)	0.20	0.30	0.49
Seam V (B & Comb)	1.56	1.86	3.42
Total Coal	2.32	5.28	7.60
OB			
Top OB	6.04	8.97	15.01
Parting VI T & B	0.28	2.39	2.67
Parting VIB & VT	2.08	4.01	6.09
Parting VT & B	0.11	0.14	0.25
Total OB	8.52	15.50	24.02
SR	3.68	2.94	3.17

2.04 Geo-mining characteristics

The geological and mining characteristics of the quarry have been summarized in Table-2.

Table-2

Sl. No.	Particulars	Unit	Value
1	Seam Thickness		
	Seam VI (T)	m	4.13-4.17
	VI (B/Comb)	m	2.30-7.25
	V (T)	m	1.80-2.37
	V (B/Comb)	m	2.79-4.76
2	Quality of Coal	GCV	4725 Kcal/Kg (G-9)
3	Dip	Degree	5 – 8
4	Extraction Category of coal		III
5	Overburden		
	Top Overburden		9.15-30.42
	Parting between VI (T) & VI (B)	m	1.20-14.52
	Parting between VI (B) & V (T)	m	11.97-16.03
	Parting between V (T) & V (B)	m	1.19-1.39
6	Excavation Category		50% Cat.III & 50% Cat.IV
	QUARRY PARAMETERS		
1	Maximum width along strike		
	- at surface	m	2125
	- at floor	m	2065

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

Sl. No.	Particulars	Unit	Value
2	Maximum length along dip		
	- at surface	m	590
	- at floor	m	515
3	Depth of quarry		
	- Minimum	m	18
	- Maximum	m	56
4	Area of excavation		
	- at surface	Ha	87.20
	- at floor	Ha	71.60

2.05 Method of Mining

Both coal production and OB removal have been proposed to be done through outsourcing. However, for coal production deployment of surface miner has been envisaged.

3.0 DESCRIPTION OF THE ENVIRONMENT

3.01 Study Area, Components, Period and Methodology

Study area is considered as the area within 10 km radius from the periphery of the project area and project area as a whole. The environmental baseline data was generated during April to June 2017 within the study area by considering the Environmental components and Methodology as mentioned in Table-3.

Table-3

Sl. No.	Components	Methodology
1.00	Land Environment	
1.01	Land use/ land cover	Topo-sheets, Remote sensing, Google earth and field visits.
1.02	Topography	
1.03	Drainage pattern	
1.04	Geology	Bore log analysis
1.05	Soil quality	As per IS:2720& field visits
2.00	Water Environment	
2.01	Water consumption	IS:1172-1993 and mine specific practices
2.02	Groundwater	As per CGWB guidelines
2.03	Surface water	Guidelines of CPCB and BIS
2.04	Water quality	IS: 3025 (part I) – 198, BIS 3025, AAPHA.
3.00	Air Environment	
3.01	Ambient air quality	IS: 5182 (Part-14): 2000
4.00	Noise Environment	
4.01	Noise level	Protocol for Ambient Level Noise Monitoring, CPCB July 2015

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Sl. No.	Components	Methodology
5.00	Biological Environment	
5.01	Forest	Field visits, data from forest department, query from local residents.
5.02	Flora	
5.03	Fauna	
6.00	Socio-Economic Environment	
6.01	Social Profile	2011 census data collected from Concerned Deptt. Raipur, Field visits, query from local residents.
6.02	Economic Profile	
6.03	Workforce Pattern	
6.04	Basic and Civic Amenities	
7.00	Meteorological trends	
7.01	Temperature trends	Indira Gandhi Agri. University(IGAU), Bilaspur
7.02	Rainfall trends	
8.00	Micro-meteorological trends	
8.01	Wind temperature, speed and direction	Meteorological data collected from installed station and analysis.
8.02	Relative Humidity	
8.03	Cloud Cover	
8.04	Rainfall	

3.02 Establishment of Environmental Baseline

3.02.01 Land Environment

Core Zone Area Land use/ land cover details of the project is as in Table-4.

Table-4

SL. NO.	REQUIREMENT OF LAND	LAND TO BE ACQUIRED (Ha)			
		TENANCY LAND	FOREST LAND	GOVT. LAND	TOTAL
1	Land for Quarry	87.939	0.000	1.261	89.200
2	Safety zone including external dump, Surface industrial building, Colony, R&R site etc.	44.468	0.000	0.524	44.992
	TOTAL LAND TO BE ACQUIRED	132.407	0.000	1.785	134.192

The core zone is largely characterized by a plain country with gently undulating topography. The altitude varies between 312 m and 326 m above MSL. Excepting for the rugged and undulating terrain in the western part, most of the area is covered by soil

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and cultivated land. The main natural drainage is the Ganjar nallah which flow from North East to westward and discharge in the Khurung reservoir. The proposed quarriable property is free from surface features and forest land. The detailed land use map of Study Area is prepared based on topo-sheets and then supplemented by information collected from Forest Department, revenue department and mouza maps of the neighboring villages and the satellite imagery. The area is largely characterized by a plain country with gently undulating topography. The main natural drainage is governed by Sagri Nala, Bagdeva Nala, Gunjan Nala and Ganjar nallah.

Soil quality of the study area is detailed as in Table-5. The soil is suitable for proper growth of vegetation.

Table-5

S. No.	Parameters	Range	Remarks
1	pH, @ 25°C (10% suspension)	6.5-7.3	
2	Cation exchange capacity, meq/100g	21.68-6.3	
3	Electrical conductivity, (µs/cm @ 20°C)	152-96	
4	Nitrogen available, kg/ha	277-28	
5	Phosphorous available, kg/ha	9.1-5.2	
6	Potash available, kg/ha	132.5-31.1	
7	Organic Carbon available (%)	1.4-0.21	

3.02.02 Water Environment

The quality of water samples collected from different locations in and around the project area representing ground and surface water sources is as in Table-6 and Table-7 against the quality standards respectively.

Table-6

Sl. No.	Parameters	Range of Results	IS: 10, 500 - 1991 Norms	
			Desirable	Permissible
1	pH	7.4 – 7.1	6.5 – 8.5	No relaxation
2	Total Dissolved Solids, mg/l	486 – 46	500	2000
3	Chlorides (as Cl), mg/l	52.35 – 6.85	250	1000
4	Fluoride (as F), mg/l	<0.05	1.0	1.5
5	Sulphate (as SO ₄), mg/l	24.78 – 14.65	200	400
6	Total Alkalinity (as CaCO ₃), mg/l	330 – 28	200	600
7	Total Hardness (as CaCO ₃), mg/l	296 – 28	300	600
8	Zinc (as Zn), mg/l	0.033 – 0.013	5	15
9	Iron (as Fe), mg/l	0.024 - <0.001	0.3	1.0
10	Nitrate (as NO ₃), mg/l	16.54 – 10.56	45	100
11	E. Coli, MPN/100ml	Absent	Absent	Absent

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Table-7

Sl.No.	Parameters	Concentration Range & Norms	
		Range of Result	IS: 2296-1982 (Inland Surface Water) Class C
	pH	7.5 – 6.7	6.5 - 8.5
2	Total Dissolved solids, mg/l	560 – 230	1500
3	Dissolved Oxygen, mg/l	6.5 – 6.2	4 (minimum)
4	BOD, 5 Days @ 20°C, mg/l	2.1 – 1.5	3.0
5	Chloride (as Cl), mg/l	48.92 – 41.58	600
6	Fluorides (as F), mg/l	0.27 – 0.24	1.5
7	Sulphate (as SO ₄), mg/l	14.26 – 10.84	400
8	Nitrate (as NO ₃), mg/l	3.68 – 2.32	50
9	Zinc (as Zn), mg/l	0.031 – 0.014	15
10	Iron (as Fe), mg/l	0.016 - <0.001	50

3.02.03 Air Environment

The values of ambient air quality monitored at different locations in and around the project area is mentioned in Table-8. The values observed for SO₂ and NO_x were minor than PM₁₀ and SPM when compared against their respective standard values. All values are well within the standard limits.

Table-8

Name of Sample Location	Concentration of 24 Hrs average						MoEF/CPCB Coal Mines Standards
	Mini.	Max.	98th Percentile	AM	GM	SD	
	PM10 Concentration (µg/m ³)						250
BANKA VILLAGE	44	98	95.8	71.5	69.9	14.9	
DONGANALA VILLAGE	42	98	94.8	69.9	68.3	15	
KARTALI (BHADRAPARA)	43	93	90.4	69	67.3	15.2	
KARTALI SARPANCH HOUSE	43	85	85.4	70.1	69.1	11.4	
RAMTALA VILLAGE	45	94	91.4	71.4	69.9	14.8	
TENDUBHATA VILLAGE	42	93	92.4	72	70.1	16.1	
	SPM Concentration (µg/m ³)						500
BANKA VILLAGE	89	232	230.1	141.9	135.3	46.4	
DONGANALA VILLAGE	79	222	216	135.1	129.6	40.2	
KARTALI (BHADRAPARA)	68	219	216.3	136.3	130.1	42.4	
KARTALI SARPANCH HOUSE	94	206	206.1	138.2	134.2	35.6	
RAMTALA VILLAGE	91	224	221.1	140.4	135.1	41.7	
TENDUBHATA VILLAGE	79	247	232.5	142.9	136.8	44	
	PM2.5 Concentration (µg/m ³)						---
BANKA VILLAGE	13	46	45.4	31.6	30.3	8.8	

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

Name of Sample Location	Concentration of 24 Hrs average						MoEF/CPCB Coal Mines Standards
	Mini.	Max.	98th Percentile	AM	GM	SD	
DONGANALA VILLAGE	14	56	53.1	32.3	30.7	10.1	
KARTALI (BHADRAPARA)	13	52	49.6	32.3	30.8	9.2	
KARTALI SARPANCH HOUSE	11	49	48	31.6	30	9.7	
RAMTALA VILLAGE	10	47	46.1	30.7	28.5	10.8	
TENDUBHATA VILLAGE	10	86	69.3	34.6	32	14.5	
	SO ₂ Concentration (µg/m ³)						120
BANKA VILLAGE	7	22	21	14.4	13.8	3.9	
DONGANALA VILLAGE	6.98	19.4	18.8	13.6	13.1	3.4	
KARTALI (BHADRAPARA)	7.45	19.8	18.8	13.6	13.1	3.5	
KARTALI SARPANCH HOUSE	8.41	22.5	19.8	13.4	13.1	3.1	
RAMTALA VILLAGE	6.87	19.4	19.1	12.4	11.9	3.5	
TENDUBHATA VILLAGE	8.8	18.6	18.5	14.2	13.9	2.9	
	NO _x Concentration (µg/m ³)						120
BANKA VILLAGE	23	37	36	28.1	27.8	4	
DONGANALA VILLAGE	22.68	33.47	33.1	27.1	27	2.9	
KARTALI (BHADRAPARA)	18.4	33.57	33.5	26.3	26	4.1	
KARTALI SARPANCH HOUSE	17.9	35.12	33.9	26.6	26.2	4.5	
RAMTALA VILLAGE	18.9	32.1	31.9	25.1	24.9	3.4	
TENDUBHATA VILLAGE	17.8	37.45	36.2	26.9	26.5	4.8	

3.02.04 Noise Environment

The observed values of Noise Level in and around the project area at specified locations are shown in Table-9. The values observed at different locations are well within the standards limit.

Table-9

Sl. No	Name and Code of sampling location	Average Values of Noise Level (dB(A))		CPCB limits (dB(A))	
		Day Time (06.00 AM to 10.00 PM)	Night Time (10.00 PM - 06.00 AM)	Day Time	Night Time
1	Banka Village (L1)	49.1	40.4	In industrial area	
2	Dongnala Village(L2)	48.9	40.6	75	70
3	Kartali Bhadrapara(L3)	49.2	40.9		
4	Kartali Sarpanch House(L4)	49.1	39.8	In residential area	
5	Ramtala Village(L5)	48.6	40.6	55	45
6	Tendubhata(L6)	48.1	40.2		

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3.02.05 Biological Environment

Simpson's Index was calculated for floral biodiversity within core and buffer zone. The value of this index ranges between 0 and 1, and the greater the value, the greater the sample diversity. Comparison of floral biodiversity between core zone and buffer zone is given in Table-10 and the drawn conclusion is that, biodiversity in core zone ranged between 0.50 - 0.71, which is little bit lower than buffer zone forest 0.45-0.75.

Table-10

Zone	Quadrat Location	Simpson index of biodiversity	% Simpson index of biodiversity
Core zone	Near Karthali village	0.50	50%
	Near nala	0.71	71.07%
Buffer zone	Reserve forest left side of road	0.45	44.89%
	Reserve forest-right side of road	0.75	75%

Among the faunal groups avifauna of terrestrial inhabitants of passerine category birds are conspicuous in grass lands (degraded forest) and forests present within the study area of the project. The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); and Dog (*Canis lupus familiaris*) were found in villages. The aquatic habitats consist of River, Nala, Ponds; Ditches and water logged areas were represented by fin-fish (fishes), shell-fish (mollusk) and prawns (crustaceans) of seasonal varieties.

A list of flora and fauna is mentioned in Annexure-V and Annexure-VI of EIA/EMP document this project.

3.02.06 Social Environment

The study area comprises 62 villages, with a total population of 86499 persons. The details are as in Annexure-VII of EIA/EMP document this project. The summary of literature is as in Table-11 and the summary of worker classification is in Table-12.

Table-11

	LITERATES			ILLITERATES		
	Total	Male	Female	Total	Male	Female
TOT	51755	30635	21120	36803	13827	22976
%		34.59%	23.85%		15.61%	25.94%
Core Zone	1305	768	537	754	246	508
%		37.30%	26.08%		11.95%	24.67%
Buffer Zone	50450	29867	20583	36049	13581	22468
%		34.53%	23.80%		15.70%	25.97%

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

Table-12

Area	WORKERS			NON_WORKERS		
	T	M	F	T	M	F
TOT	45085	24842	20243	43473	19620	23853
%		28.05%	22.86%		22.15%	26.93%
Core Zone	1027	580	447	1032	434	598
%		28.17%	21.71%		21.08%	29.04%
Buffer Zone	44058	24262	19796	42441	19186	23255
%		28.05%	22.89%		22.18%	26.88%
	MAIN WORKERS			MARGINAL WORKERS		
	T	M	F	T	M	F
TOT	30174	19878	10296	14588	4867	9721
%		22.45%	11.63%		5.50%	10.98%
Core Zone	704	483	221	323	97	226
%		23.46%	10.73%		4.71%	10.98%
Buffer Zone	29470	19395	10075	14911	4964	9947
%		22.42%	11.65%		5.74%	11.50%

3.03 Anticipated Environmental Impact and Mitigation Measures

3.03.01 Socio Economic Impact

The different aspects considered for prediction of impact on socio economic conditions around project area are tabulated in **Table-13** and the same are discussed in **Table-14**.

Table-13

1.00	Impact on Socio-economic
1.01	Population Growth & In-migration
1.02	Human Settlement & Resettlement / Rehabilitation
1.03	Transport & Communication
1.04	Income & Employment
1.05	Civic Amenities& Community Development
1.06	Educational facilities & Literacy Drive
1.07	Economic growth
1.08	Growth of Financial Revenues- State & Central
1.09	Social status growth

The above impacts are discussed in Table-14.

Table-14

S. No	Impact on	Impact
1	Population Growth and In-migration	Due to increase in industrial activities, population growth in the project area as well as in the buffer zone could be positively expected due to increased job and income opportunities.
2	Human Settlement,	A problem of new human settlement come into existence, and additional worker colonies start growing in. In view of that the

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	Resettlement / Rehabilitation	existing civic amenities such as water supply, power supply etc. is in improvement with the progress of the project. About 678 Project Affected Persons have been estimated to be affected by acquisition of tenancy land.
3	Transport and Communication	Due to increase in industrial activities and population growth in the area, the existing transport and communication system is being improved with a view to catering for increased traffic volume and frequency.
4	Income and Employment	Coal mining project forms the basic sector of employment. With increase in income opportunities and employment potentialities in this sector as the mining activities increase, the other economic sectors start gaining in momentum. New avenues of employment in the sectors such as construction, service, trade and commerce is also getting on the move.
5	Civic Amenities and Community Development	Due to the infrastructural facilities getting created and the consequent migrations in the project area and nearby, socio-cultural interaction will result amongst population consisting of people from different areas with added educational, medical and communication facilities developed in the areas, the standard of living has improved.
6	Educational facilities and Literacy Drive	A number of educational institutes already exist in the buffer zone. This has attracted nearby villages to avail such facilities which in turn has increased literacy level in the area.
7	Economic growth	The mining activities accelerate economic transformation and urbanization in the region with the creation of new employment opportunities. This will boost the economic growth of the region.
8	Growth of Financial-revenues.	State Government will be benefited through financial revenues in crores of rupees by way of royalty etc. from the direct and indirect operations in the project area. Central exchequer will also get financial revenues by way of Income tax etc.
9	Social status growth	There will be a marked change in social status of the area with opening of the project.

3.03.02 Impact on Land use

The items to be identified for impact assessment are as in **Table-15**.

Table-15

S. No	Within mining area	Outside mining area
1.00	Topography and undulation.	-
2.00	Surface cracks and damage to the vegetation.	-
3.00	Change in Landscape and Land use pattern than pre-mining scenario such as visual impact-loss of aesthetic beauty, ugly scar on land; deforestation-loss of surface soil and vegetation cover.	Landscape and Land use pattern than pre-mining scenario.
4.00	Change in Surface Drainage than pre-mining scenario.	Change in Surface Drainage than pre-mining scenario.

The assessed impacts for change in Land Use are as in **Table-16**.

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

Table-16

S.No	Parameters	Within mining area	Outside mining area
1.0	Topography	In quarry area, dump area and mining equipment area, there will be a marked change in topography.	No appreciable damage is envisaged.
2.0	Change in Landscape and Land use pattern from pre-mining scenario such as visual impact: loss of aesthetic beauty, ugly scar on land. Deforestation: loss of surface soil and vegetation cover	Total scenario of landscape and land use pattern will undergo a stark change.	Landscape and land use pattern will change where erection and development of plants, service /allied services buildings are established.
3.0	Change in Surface Drainage	There will be a stark change in surface drainage; rather a new pattern drainage will be developed.	Surface drainage is likely to change where construction of colony, roads and drains is to be executed.

3.03.03 Impact on Water Environment

Phase-wise items have been identified for water quality impact assessment as in Table-17, and impact assessment done as mentioned in Table-18.

Table-17

Sl. No.	Items to be identified for impact assessment	
1.00	Hydro-geological	Topography and drainage, Changes in aquifer system, lowering of water table and draw down.
2.00	Quality of Water of Ground water and Surface water	Physico-Chemical and Bacteriological such as Turbidity, Colour, Suspended particles, Oil & Grease, BOD, TDS, etc.

Table-18

Sl. No.	Parameters	Impacts Assessment
1.00	Hydro-Geological-Ground water	
1.01	Topography and Drainage	Topography and drainage by developing micro basins
1.02	Aquifer geometry	Changes in aquifer geometry, water level in the vicinity of the mine and disturb ground water flow direction. This can also create secondary fractures and higher permeability zones within the aquifer.
1.03	Water levels	After the mining activity, the aquifer restores its original water level and mined out area acts as a good reservoir. The project is an opencast mine, the impact of mining activity on unconfined aquifer will be to a maximum of 56m.
2.00	Water Quality- Physico-Chemical and Bacteriological ones	
2.01	Ground Water Quality	Leaching of different salts from OB dump and coal stock will contaminate ground water.
2.02	Surface Water Quality	Oil & grease from workshop, TDS, TSS from ETP will degrade surface water quality.

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Summary of EIA/EMP for Ambika OC 1.35 MTPA

3.03.04 Impact on Air Environment

Phase-wise items have been identified for air quality impact assessment, and impact assessment done as mentioned in Table-19.

Table-19

S.No.	Parameters	Type	Impact
1.00	Meteorological condition		Coal dumps are susceptible to fire, and combustion; hence there may be a likely change in ambient temperature, wind speed and direction to some extent.
2.00	Ambient air quality		
2.01		Direct	Minimal increase in dust and noxious emission to the air owing to transport vehicles. Blasting in OB, coal cutting in coal faces and dump handling causes slight increase in the ambient SPM and CO levels.
2.02		Indirect	Surface coal transport, dump handling and Workshop operations will generate indirect impact in the long run.
2.03		Short term	Drilling and Blasting may be attributed to slight increase in the ambient SPM and CO levels.
2.04		Long term	Surface coal transport, dump handling and Workshop will produce long term impact upon the air quality.

3.03.05 Impact on Noise Environment

Phase-wise items have been identified for Noise quality impact assessment, and impact assessment done as mentioned in Table-20.

Table-20

Sl. No.	Parameters	Impacts Assessment
1.00	Increase in Noise Levels at drilling and blasting	May have impact upon the workers and the nearby habitants. The impact of noise more than permissible dosage may cause annoyance and irritation, Mental and Physical fatigue, Interference in normal activities, Health hazards resulting from impaired hearing. In extreme cases, cardio-vascular diseases etc., Task interference, Interference with communication i.e., masking.
2.00	Increase in Noise Levels at Operation of HEMMs like shovel, dumper, dozer, excavator etc.	
3.00	Increase in Noise Levels at Operation of equipment in CHP, workshop etc	
4.00	Increase in Noise Levels due to transport system	

3.03.06 Impact on Soil Environment

Phase-wise items have been identified for Soil quality impact assessment, and impact assessment done as mentioned in Table-21.

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Table-21

Sl. No.	Parameters	Impact Assessment
1.00	pH	Existing pH of the soil level 6.5 to 7.3 is alkaline indicative and the mining activities are mainly opencast, therefore, the likely effect on surface soil quality will be to some extent.
2.00	Electrical conductivity (EC)	Existing EC being 152 to 96 $\mu\text{S}/\text{cm}$ is not going to change appreciably due to mining activities. It will hardly attain harmful germination condition level of EC in this project.
3.00	N, K and P	The mining activities are mainly opencast, therefore, dump leachate may have likely some extent of effect on surface soil quality.
4.00	Soil characteristics, erosion aspects and engineering parameters such as Textural class, Bulk density, Liquid limit, Field capacity, Wilting coefficient and Water storage capacity	The mining activities are mainly opencast, therefore, the likely effect on surface soil quality will be to some extents.

3.03.07 Impact on flora and fauna

Phase-wise items have been identified for flora and fauna quality impact assessment, and impact assessment done as mentioned in Table-22.

Table-22

Sl.No.	Parameters	Impact Assessment
1.00	Negative	
1.01	Vegetation Cover	During survey it is observed that, areas which are important or sensitive for ecological reasons – wetlands, coastal zone, biospheres, mountains are not present within the 10 km buffer zone of the project. Also, areas used by protected, important or sensitive species of flora and fauna for breeding, nesting, foraging, resting, over wintering, migration are not present within the study area. Except the area used for quarry excavation, erection & development of plants, service & allied structures, colony roads, drains, culverts, etc., no other area is going to be affected directly or indirectly by mining activities. Hence, impact on flora and fauna out of core zone will not be of stark appreciable level.
1.02	Forests degradation	i. Mining activities will be carried in 134.192 Ha of land and there is no forest land is going to be affected. ii. The impact on the terrestrial ecosystem due to operation of the proposed mining would mainly occur from deposition of air pollutants. By OB & coal transportation air pollution may affect photosynthesis and transpiration in plants by plugging their leaves' pores. Dust in atmosphere, contributed by mining and associated activities, when deposited on leaves of the plants in the surrounding areas may thus retard their growth. iii. There will be loss of vegetation by excavation and dumping thereby affecting the species for which such vegetation was the host.

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Sl.No.	Parameters	Impact Assessment
		iv. Although, SO ₂ causes Necrosis disease in plants, the effects of air emissions on nearby vegetation and crop lands are not likely to be injurious and noticeable as the pollutants concentrations are expected to be well below the prescribed standards.
1.03	Ecological change	i. As the fauna is closely related to and dependent on the flora, there will be movement of species away from mine core zone with the loss of vegetation and influence of noise, vibrations and lights, etc. ii. Pollution of surrounding water bodies and the Lilagar Nadi flowing adjacent to the core zone, may affect the aquatic bodies to some extent due to leaching from overburden dumps and pollutants from other activities.
1.04	Hydro-geological aspects	Owing to opencast project, water level and draw down are likely to be affected to a nominal value; ground water and surface water on which the flora and fauna of the area directly or indirectly depend upon are not going to be affected to an appreciable and discernible level.
2.00	Positive	
2.01	Plantation work and forest & wild life conservation	(i) Plantation work & conservation in reclaimed areas will develop habitat for flora & fauna (ii) Conservation of forest & wild life in a scientific way by project authorities will take care of flora & fauna to revive in the area.

3.03.08 Impact on Meteorology

Meteorological data with respect to temperature for 1984 to 2014 have been collected from nearest IMD station at Bilaspur. The annual month-wise average rainfall for 1954 to 2014 have been collected from rain gauge station at Katghora. Average rainfall is 1516 mm. Maximum rainfall is received during monsoon months of June to September. During summer season, the temperature rises to a maximum of more than 44.7°C with daily maximum and minimum temperatures averaging about 39°C and 23°C respectively. In winter, daily maximum and minimum temperatures averaging at about 27°C and 5°C respectively.

3.04 Mitigative Measures

3.04.01 Control Measures for Air Pollution

Following air pollution control measures will be practiced within the mining area, at coal handling plants and at railway siding site.

- Water spraying by water Sprinkler will be done regularly on approach roads within the mining area to minimize the dust generation.
- Water sprinkling arrangement will be provided at the transfer points of coal.
- Crusher house of CHP will be provided with dust extraction arrangements.
- Coal transportation to Railway siding will be done in covered trucks.

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- Intensive plantation of adequate width all along the haul road as well as other roads will be raised to minimize transport vehicles generated pollutants.
- Exposed overburden dumps will be covered through an appropriate plantation
- Optimum blast hole geometry will be followed to reduce the dust during blasting.
- Regular monitoring of ambient air quality of project area.

3.04.02 Control Measures for Water Pollution

- The mine discharge will be effectively utilized to meet the mine's domestic, dust suppression and other industrial water needs.
- After the cessation of mining, with copious rainfall and abundant groundwater recharge, the water levels will recoup and attain normalcy. Thus, the impact of mining on groundwater system may be considered as a temporary phenomenon. The abandoned mine workings also behave as water pools and improves the resource availability in the area.
- Utilization of mine water for irrigation use will also enhance the ground water recharge potential through artificial recharge in the area. Thereby, in post-mining condition, the recharge and source potential in core zone will be much higher than the existing. So also, the discharged mine water would be gainfully utilised by the local people for irrigation and domestic use. Thereby the mine water is a resource for many of the local villagers.

3.04.03 Control Measures for Noise Pollution

The present noise levels are below the prescribed limits. If the impulsive noise levels increase due to mining operation, sufficient measures will be adopted to maintain the noise level within permissible limits at working zone. The following measures will be adopted and continued,

1. Every year extensive plantation is being done both on plain and dump area by Chhattisgarh Rajya Van Vikas Nigam (a state government organization).
2. High capacity machines to be deployed in mine. This will ensure reduced number of vehicular trips, thereby reducing noise levels.
3. Reduced quantity of blasting will result in lower noise levels.
4. Lined chutes in Silo to reduce noise.
5. Surface miner deployed to eliminate coal crushing will reduce noise.
6. Provision of ear muffs/ear plugs to workers subjected to noise level above

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recommended limits.

7. Regular monitoring of noise level of project area.
8. Routine maintenance schedules for HEMM and other machineries to eliminate noise as far as possible.

3.04.04 Mine Closure Plan

Although, the mining activities may last for years, but they are liable to leave a long lasting impacts on the landscape, ecology and on local inhabitants. The objective of mine closure plan is aimed at restoration / reclamation of disturbed area, which should be acceptable to local community as well as regulatory authority.

Mine closure is not something that happens at the end of a mine's life, rather mine closure is an ongoing series of activities starting from the planning stage of a mine and ending with a suitably restored site that can be returned to the community. The mine closure is planned in two phases, i.e.,

- a) The first phase/progressive site specific closure plan includes the various activities to be implemented over the life of the mine. The progressive mine closure plan of the project has been approved along with its mining plan.
- b) This plan mentioned and incorporated changes depending upon the actual site condition during implementation, legal & societal requirements in future, availability of additional coal reserves, etc. As such a detailed final closure plan will be prepared five years before the actual/scheduled closure time of the mine.

This plan will be the culmination of the activities given under progressive plan.

Mine closure cost for OC Mine

As per the guidelines of the MoC, the cost of the mine closure is to be computed on the basis of the project area involved in the project. In Ambika OCP total land area involved is **134.192 Ha**. The updated cost of the mine closure as on **July 2017** is estimated to be **Rs. 8.231** lakh per hectare (considering the admissible escalation over Rs. 6.00 lakh per Ha as on August 2009).

Final mine closure cost @ Rs = (WPI of July 2017, 177.7979/WPI of Aug.09, 129.60) x 6 = Rs.8.231 Lakh/Ha. for **134.192 Ha** = **Rs.1104.534 lakhs** (Approx.). The life of the mine is **9 years**. Hence, the management of funds in the Escrow Account would be as in **Table 4.31** and the escalation is as in **Table 4.32**.

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Table-23 Year-wise Fund for Escrow Account

Year	Fund Deposited in Escrow Fund	Fund to be Reimbursed (Maximum)	
1	122.726	Nil	(+) accrued interest as applicable
2	128.862	Nil	
3	135.305	Nil	
4	142.070	Nil	
5	149.174	Nil	
1st phase	678.137	542.510	
6	156.633	Nil	
7	164.465	Nil	
8	172.688	Nil	
9	181.322	Nil	
Final Phase	675.108	810.735	
Total	1353.245	1353.245	

*The interest will be as per the prevailing rates for the period.

Table-24 Total escalation of escrow fund of July'17 from the base year of Aug'09 is given below

Year	Amount (As of August'09)	Escalation	Total amount to be deposited in escrow account (As of July' 17)
1	89.461	33.265	122.726
2	89.461	39.401	128.862
3	89.461	45.844	135.305
4	89.461	52.609	142.070
5	89.461	59.713	149.174
Phase 1	447.305	230.832	678.137
6	89.461	67.172	156.633
7	89.461	75.004	164.465
8	89.461	83.227	172.688
9	89.461	91.861	181.322
Final phase	357.844	317.264	675.108
TOTAL	805.149	548.096	1353.245

Tentative Final Mine Closure Activities and Cost Break-up

The break-up of some major mine closure activities along with their tentative estimation of cost in terms of percentages of the total final mine closure cost has been indicated in **Table 4.33**. The detailed activity schedule for the 'Final Mine Closure Plan' would be prepared at least five years before the intended final closure of the mine along with the detailed mine closure cost break-up.

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Table-25 Tentative Final Mine Closure Activities and Cost Break-up

Sl. No.	Activity	% of Total Mine Closure Cost	Remarks
A	Dismantling of Structures		To be included in final mine closure plan
	Service Buildings	0.20	
	Residential Buildings,	2.67	
	Industrial Structures like CHP, workshop, Field Sub -Station etc.	0.30	
B	Permanent Fencing of mine void and other dangerous area		To be included in final mine closure plan
	Random rubble masonry of height 1.2 m including levelling up in cement concrete 1:6:12 in mud mortar.	1.50	
C	Grading of high wall Slopes		To be included in final mine closure plan.
	Levelling & grading of high wall slopes.	1.77	
D	OB Dump Reclamation		
	Handling/Dozing of external OB dump into mine void.	88.66	71% for progressive & 17.66% for Final mine closure.
	Bio-reclamation including soil spreading, plantation & maintenance.	0.40	Equal Weightage throughout the life of the mine
E	Landscaping		
	Landscaping of the cleared land for improving its esthetic.	0.30	To be included in final mine closure plan.
F	Plantation		
	Plantation over area obtained after dismantling.	0.50	To be included in final mine closure plan.
	Plantation around fencing.	0.20	To be included in progressive mine closure plan.
	Plantation over the cleared off external OB dump	0.00	
G	Monitoring / testing of environmental parameters for three years.		For three years after mine closure.
	- Air quality	0.22	
	- Water quality.	0.20	
H	Entrepreneurship development (vocational and skill development training for sustainable income of affected people).	0.26	Equal Weightage throughout the life of the mine
I	Miscellaneous & other mitigative measures.	2.02	
J	Manpower cost for Supervision	0.80	To be included in final mine closure plan.
	Total	100	

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3.05 Ambient Air Quality Impact Prediction Modeling by FDM, USEPA

AAQ modeling based on FDM, USEPA has been used for assessment of impact on ambient air quality at 6 locations termed as receptors, namely, SA1, SA2, SA3, SA4, SA5 & SA6 (Refer **Plate No. XII** due to coal production of 1.35 MTPA for Ambika OCP. Refer AQIP output data in Section - C of EIA/EMP).

The Emission factors and the incremental values of (PM₁₀) considered in the EIA/EMP for Ambika OC 1.35 MTPA is tabulated in **Table-26**.

Table-26 Emission factors calculated for different activities during mining

TOTAL EMISSION FACTORS FOR AMBIKA OCP			
	E. F without cont.measure	E. F with cont.measure	Unit
EF for Active Mining Pit	1.70E-05	1.51E-05	gm/m ² /s
EF for Active Internal OBD	4.24E-06	3.55E-06	gm/m ² /s
EF for OB-1-L-1 to OB-4-L-5	1.55E-02	7.55E-03	gm/m/s
EF for C-1-L-1 to C-2-L-1	2.72E-03	1.36E-03	gm/m/s
EF for Coal Stockyard	3.10E-04	2.99E-04	gm/m ² /s
EF for Wind erosion of Passive Zone	1.39E-06	6.93E-07	gm/m ² /s

The results of air quality modelling exercise for PM₁₀ have been presented in **Table-27**. The predicted ground level concentration includes the 98 percentile value of the background (existing) concentration of PM₁₀. The modelling exercise reveals the followings,

Table-27 Increase in PM₁₀ levels due to Ambika OC Project coal mining with control and without control condition

Values in (in µg/m³)

S.No.	Receptor Locations code	Receptor Locations name	Baseline PM ₁₀ values (in µg/m ³)- 98 percentile value	Incremental Pollution load due to 1.35 MTPA production (in µg/m ³)		Net pollution load of PM ₁₀ (in µg/m ³)	
				Without control	With Control	Without control	With Control
1.	SA1	Banka Village	95.8	4.225	2.245	100.025	98.045
2.	SA2	Dongnala Village	94.8	1.183	0.638	95.983	95.438
3.	SA3	Kartali Bhadrpara	90.4	23.993	15.273	114.393	105.673
4.	SA4	Kartali Sarpanch House	85.4	530.678	268.129	616.078	353.529
5.	SA5	Ramtala Village	91.4	0.00	0.000	91.4	91.4
6.	SA6	Tendubhata Village	92.4	0.00	0.000	92.4	92.4

The isopleth of the incremental PM₁₀ levels due to 1.35 MTPA coal production from Ambika OC (with control) is shown in **Plate No. XII(A) of EIA/EMP** with mine

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surface features plan and **Plate No. XII(B) of EIA/EMP** Study area. The isopleth of the incremental PM₁₀ levels due to 1.35 MTPA coal production from Ambika OC (without control) is shown in **Plate No. XII(C)** and **Plate No. XII(D) of EIA/EMP**.

In this study the impact of various control measures at source level has only been considered (**Annexure-XIV**). The attenuation of PM₁₀ concentration due to green cover in and around the mine has not been considered. So, the air pollution (PM₁₀) attenuation by green cover will improve the air quality of the mine.

4.00 ANALYSIS OF ALTERNATIVES

4.01 Selection of Technology Alternatives

Method of work to be adopted for any seam depends on many aspects such as depth of occurrence, thickness and gradient of the seam, parting between the seams, structure, gassiness of the seam, geological disturbances etc. In addition, the presence of village, built up area and other surface features play an important role in deciding the method of work.

Underground Mining

Keeping in view the disposition of coal seams in the area, cover over the seams and occurrence of thick seams it does not suit underground mining.

Opencast Mining

Considering geo-mining parameters of the quarry, Surface Miner has been proposed to work for coal winning. Both coal production and OB removal will be done through outsourcing. Keeping in view techno-economic viability and environmental consequences of each system the disposition of coal seam in the area does not suit underground mining techno-economically. Considering cover over the seam and occurrence of thick seams, opencast mining has been proposed.

5.00 ENVIRONMENTAL MONITORING PROGRAM

Monitoring Schedule

A monitoring schedule for Air, Water, and Noise levels will be in operation as per Standards of MOEF vide GSR 742 (E) dated 25.9.2000 & G.S.R-826 (E), dated 16/11/2009.

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Ambient Air: Parameters will be monitored are SPM, PM10, PM2.5, SO₂, and NO_x at the frequency mentioned in GSR 742 (E) dated 25.9.2000 & G.S.R-826 (E), dated 16/11/2009. Monitoring of heavy metal contents such as lead, chromium, arsenic, nickel etc. in ambient air quality is being done half yearly.

Water: For effluent & surface water the parameters will be monitored for pH, Chemical Oxygen Demand, Total Suspended Solid, Oil & Grease at every fortnight and all parameters once in a year.

For drinking water, monitoring will be done as per IS.10500 once in a month.

For Surface Water, Monitoring will be done on monthly basis as per IS: 2296: Part C

Noise: Noise is being monitored during day & night at every fortnight.

Monitoring data thus generated are being submitted to SPCB by end of the following month.

6.00 PROJECT BENEFITS

Secondary Employment opportunities

The mine is located in an industrialized area of district. A no. of mines like Dipka OC, Kusmunda OC, Saraipali OC mines of SECL and also there are Thermal power plants of CSEB within 30 km in the surrounding area. This has led to creation of social infrastructures like schools, hospitals, roads etc., which have helped in the economic development of the region. The commencement of mine will further help in development of region through CSR activities and creation of direct and indirect employment. There will be further improvement of the socio-economic status of the adjoining areas and will help to meet the energy demand of the nation. Project will lead to development of ancillary industries and an overall economic growth of nearby towns to supplement the population of the area. The project is likely to give a boost to the economy of the area and providing primary and secondary

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employment to local people. There will be improvement in infrastructure facilities like drinking water, medical, educational, schools etc. There will be overall gain with respect to improvement in social and economic aspect. This will lead to the overall development of the society.

There will be spontaneous economic stimulus in the area with the expansion of opencast mine. Traders and private enterprises will grow in the area with this economic growth. Besides, the State exchequer will derive financial revenues through levy of royalty, sales tax etc. and Central Government will also be benefited by way of Central Sales Tax, Income Tax, Cess 's etc.

7.00 ENVIRONMENTAL COST BENEFIT ANALYSIS

MOEF while issuing TOR has not specifically indicated for carrying out 'Cost Benefit analysis ', hence the same has not been carried out.

8.00 ENVIRONMENTAL MANAGEMENT PLAN

8.01 Socio Economic Measures

Rehabilitation & Resettlement plan

The following details would be provided in R&R

- Land of villages involved : Kartala
- Number of PAPs : **636**
- PAPs to be offered jobs : **155**
- Rehabilitation package : **Based Upon C.G. State Govt & CIL policy.**
- R&R Colony : Proposed in approved PR

8.02 Land Restoration

Land reclamation of mined out areas is the prime need, which involves not only backfilling of overburden into the excavated voids but also includes operations required to bring the land to some productive use, i.e. agricultural, forestry or recreational purposes. Dump reclamation is continuous process and a major activity of progressive as well as final mine closure plan. (Ref: final stage reclamation plan in **Plate No. IX** of EIA/EMP). Reclamation involves the following processes which include systematic handling, removal, storage, preservation and re-distribution of top soil after completion of technical reclamation. Finally, biological reclamation with proper plantation technique will be carried out.

8.03 Flora and Fauna Conservation Plan

The land requirement of Mine Area (Core Zone) is 89.200Ha and there is no forest land involved in it. In the absence of scientific management in the past, these forests have suffered from heavy felling. Biotic pressure put exerted by human beings and domestic animals of surrounding areas is also tremendous. Dust in atmosphere, contributed by mining and associated activities, when deposited on leaves of the plants in the surrounding areas may thus retard their growth. There will be loss of vegetation by excavation and dumping thereby affecting the species for which such vegetation was the host. Care will be taken to plant native and other suitable species— Salai, Saja, Sisoo, Babool, Kadam etc will be planted. The other fruit bearing trees recommended are Mahuwa, Jamun, Bargad, Pipal, Gular, Aonla, Ber, Imli, Kusum, etc. Grass species will be planted along with the fruit trees on the slopes. On the top surface of the dumps the lower storey will include grasses & fruit trees. The abundance of fruit trees (about 50% of all tree species to be planted) will ensure availability of food to faunal species like sloth bear, & fox. Grass species will support smaller herbivores like Hare. Logs of dead trees will be preserved in the vegetated areas to restore key habitats of the insects of the area. The trees of Ficus species will support python.

Among the faunal groups avifauna of terrestrial inhabitants of passerine category birds are conspicuous in grass lands (degraded forest) and forests present within the study area of the project.

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); and Dog (*Canis lupus familiaris*) were found in villages. The aquatic habitats consist of River, Nalla, Ponds; Ditches and water logged areas were represented by fin-fish (fishes), shell-fish (mollusk) and prawns (crustaceans) of seasonal varieties.

As the fauna is closely related to and dependent on the flora, there will be movement of species away from mine core zone with the loss of vegetation and influence of noise, vibrations and lights, etc.

However, Plantation work & conservation in reclaimed areas will develop habitat for flora & fauna. Conservation of forest & wild life in a scientific way by project

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authorities will take care of flora & fauna to revive in the area. Details of flora & fauna present in study area has been shown in Chapter – III of EIA/EMP, which are all important from conservation point of view. SECL will take the following measures for their protection.

8.03.01 Protection Measures

With the help of the local people and employees watch will be kept on hunting of these animals. Forest and police department will be informed if such incident happens to take action against the offenders. If necessary, help of Forest deptt. will be taken to shift any such stranded animal to a safer place.

Care will be taken to stop undue biotic pressure (both man and its animal) in core and buffer zone. SECL, under the condition stipulated in forest land clearance, provides funds to Forest department for fencing the forest falling out of core zone. The fencing will further strengthen our attempt towards conservation efforts. In addition, while under taking bio-reclamation of over burden dumps care will be taken to plant fruit trees.

8.03.02 Strengthening of water bodies

Through Community development work in villages existing in the area existing water sources particularly the village tanks will be improved to provide drinking water to the local community so that biotic pressure on water resources used by fauna is gradually reduced.

8.03.03 Afforestation

Keeping the geo-climatic conditions of the area in mind the following tree species will be planted in the core zone (Over burden dumps, backfilled areas and vacant land) of the project.

Common Name	Family Name	Botanical Name
Babool	Leguminosae	Acacia nilotica (L.) Willd ex Delile
Maharukh	Simroubaceae	Ailanthus excelsa Roxb.
Australian black wattle	Leguminosae	Acacia auriculiformis A. Cunn ex Benth.
Bitter Albizia	Leguminosae	Albizia amara (Roxb.) B. Boivin
Sirish	Leguminosae	Albizia lebbek (L.) Benth
White sirish	Leguminosae	Albizia procera (Roxb.) Benth.
Saptaparni	Apocynaceae	Alstonia scholaris (L.) R.Br.
Kadam	Rubiaceae	Anthocephalus chinensis (Lamk) A.

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		Rich ex Walp
Jack tree	Moraceae	ArtocarpusheterophyllusLam.
Neem	Meliaceae	Azadirachtaindica (L.) A.Juss.
Bamboo	Bombacaceae	BambusaarundinaceaeL.
Palash	Leguminosae	Buteamonosperma (Lam.) Taub.
Yellow oleander	Apocynaceae	Cascabelathevetia (L.) Lippold
Amaltas	Leguminosae	Cassia fistula L.
Avenue cassia	Leguminosae	Cassia siamiaLamk.
Coconut	Arecaceae	CocosnuciferaL.
Seasam	Leguminosae	DalbergiasissooRoxb. ex DC
Gulmohur	Leguminosae	Delonixregia(Boj. ex Hook) Raffin
Putrajevi	Euphorbiaceae	Drypetusroxburghii (Wall.) Hurus
Silk cotton	Bombacaceae	Ceibapentandra (L.) Gaertn
Coral tree	Leguminosae	ErythrinaindicaLam.
Eucalyptus, blue gum	Myrtaceae	Eucalyptus teriticornisSm.
Udumbara, Fig	Moraceae	FicusracemosaL.
Quick stick	Leguminosae	Gliricidiasepium (Jack.) Kunth ex Walp.
Silver oak	Proteaceae	GrevillearobustaA.Cunn ex R.Br.
Avli, Tapasi	Ulmaceae	Holopteliaintegrifoila (Roxb.) Planch
Bitter orange	Rutaceae	Citrus aurantiumL.
Banaba	Lythraceae	Lagerstroemia speciosa (L.) Pers
Subabul	Leguminosae	Lucinaleucophloea(Lamk) de wit
Mahua	Sapotaceae	MadhucaindicaJ F Gmel
Shajan	Moringaceae	MoringaoleiferaLam.
Copper pod	Leguminosae	Peltophorumpterocarpum(DC) Baker exHeyne
Jungle Jilepe	Leguminosae	PithecellobiumdulceL.
Karanj	Leguminosae	PongamiaglabraVent.
Ashoka	Annonaceae	Polyalthialongifolia (Sonn.)Thw.
Kusum	Sapindaceae	Schleicheraoleosa (Lour.) Oken.
Sal	Dipterocarpaceae	ShorearobustaGaertn f
Java olive tree	Sterculiaceae	SterculiafoetidaL.
Vijaysar	Leguminosae	PterocarpusmarsupiumRoxb.
Teak	Verbenaceae	TectonagrandisL.
Arjun	Combretaceae	Terminaliaarjuna (Roxb. ex DC.) Wight&Arn.
Bastard almond,	Combretaceae	TerminaliacatappaL.
Portia tree	Malvaceae	Thespesiapopulnea(Linn) Soland ex corr

Planting of such fruit and fruit bearing trees will improve the habitat of these animals, and will attract birds, insects etc. also. Planting of trees like Ficus will provide gainful arboreal habitat to Snakes.

8.03.04 Control of forest fire, fire in coal seam and coal stock

Fire can destroy the entire habitats (micro and macro) and its life supporting potential in a forest area. Fire does not spare fauna also. SECL will implement the existing DGMS stipulated fire protection norms on coal seams and coal stock. This will ensure that a congenial atmosphere is created and fire does not affect the fauna and flora as well.

SECL will also encourage its employees and villagers to report forest fires (if any) to Forest/Police department. SECL will also extend its firefighting capabilities whenever needed to forest department for fighting forest fires.

8.03.05 Funds for Conservation efforts

In the EMP funds have been committed under capital & revenue heads for afforestation, reclamation and other miscellaneous expenditure. These funds will be utilized for conservation efforts. However, any additional requirement for conservation plan will be met from the normal revenue expenditure of the opencast project.

9.00 DISCLOSURE OF CONSULTANTS ENGAGED

Central Mine Planning & Design Institute Limited. Briefly, it is generally called as CMPDI. It is an ISO 9001 Company. It is QCI/NABET Accredited Environmental Consultancy organization [vide Minutes of Accreditation Committee Meeting No. 76 for Re-Accreditation held on Jan. 13, 2016.

Its registered corporate office is situated at Gondwana Place, Kanke Road, Ranchi-834 008, a capital city of Jharkhand state. It operates through seven strategically located Regional Institutes over six states territories of India. These Regional Institutes are engaged in exploration, planning & design works of other subsidiary companies of CIL, namely, ECL, BCCL, CCL, MCL, NCL, WCL, SECL and NECL.

(PUBLIC HEARING DOCUMENT)

Summary of EIA/EMP for Ambika OC 1.35 MTPA

The company was formerly known as Coal Mines Authority Limited. And, the Central Mine Planning & Design Institute Limited (herein after called as CMPDI) is a planning & design division of Coal India Limited (hereinafter called as CIL) as per Memorandum of Association of the company. The CIL is a holding company since November 01, 1975, and the CMPDI is one of its subsidiaries since then. It is under Ministry of Coal, Government of India.

The environmental laboratory of CMPDI is recognized by NABL and accredited with ISO-9001 & OHASAS 18001 certification. It undertakes baseline environmental data generation, EIA, EMP and monitoring various factors related environment. It has obtained NABL Accreditation {Certificate No.-T-2968} valid from 24.05.16 to 23.05.18 for the lab located at CMPDI, RI-V, Bilaspur.